

## **Role of Value Added Tax (VAT) on the Economic Growth of Bangladesh**

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### **Abstract**

#### *Purpose*

*This paper discusses and empirically analysed the role of VAT on the Economic Growth of Bangladesh.*

#### *Methodology*

*The Ordinary Least Square regression techniques are applied to estimate three models using annual quantitative time series secondary data, both descriptive and inferential statistics used to analyse it.*

#### *Findings*

*The results of the models revealed a significant positive impact of VAT on economic growth as measured by gross domestic product (GDP) in Bangladesh. There is a perfect positive relationship between VAT and total tax revenue (TTR), and VAT and total revenue (TR) during the study period. The study also reveals that VAT boosts the general economic growth of Bangladesh compared to sales tax.*

#### *Research Limitations*

*The study mainly based on secondary sources of data, no opinion was taken from the concerned authorities regarding the contribution of VAT on economic growth.*

#### *Research Implications*

*It expected that the study would add value to the existing stock of knowledge in the tax literature, especially in VAT. The policymakers may get the message to take suitable policy measures to boost tax revenue vis-à-vis economic growth.*

#### *Originality/value*

*The study is one of the initial studies examined the role of VAT on the economic growth of Bangladesh as well as showed the comparative scenario of the contribution of sales tax and VAT on economic growth, considered as an evolving economy.*

**Keywords:** Value Added Tax; Economic growth in terms of GDP; Total Tax Revenue; Total Revenue; Sales Tax.

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Date of Submission: 13-02-2021

Date of Acceptance: 27-02-2021

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### **I. Introduction**

Economic development means the increase of the national income or total amount of the output of goods and services of any country. The increase of national income is the result of the increase in per capita income of a country. In Bangladesh, various plans and programs are implemented by the government for the economic development of the country. The central part of the required money for implementing those plans and program comes from public revenue. Tax is the leading source of public revenue because almost 85 per cent of revenue comes from tax (Shil, Masud, & Alam, 2019). In Bangladesh, almost 75 per cent to 80 per cent of public revenue comes from tax, and the remaining 20 per cent to 25 per cent comes from non-tax revenue (Ullah, 2017). However, according to the Bangladesh economic review, (2019), more than 90 per cent of public revenue comes from tax, and the remaining part comes from non-tax revenue (GOB, 2019). As a developing country, the indirect tax system of Bangladesh plays a vital role in the economic development of the country. The collection of indirect taxes is an almost perfect positive correlation with GDP and a statistically significant effect on the GDP of Bangladesh (Islam, 2016). VAT is an indirect tax obligatory on the added value of goods and services at each stage of production and distribution of the products and services. It is a multi-point tax system without the effect of double taxation. VAT is one of the primary sources and fruitful instruments of public revenue in the resource mobilisation of Bangladesh (Shil et al., 2019). In recent years, revenue collection from VAT is the highest position, and income tax is the second-highest position of public revenue earners which is an indispensable contribution to revenue mobilisation in Bangladesh (GOB, 2019). It is a consumption tax imposed on added value to all stages of production and sale (Parvez, 2012). It is indirect taxation which widely

accepted across the world. It has been put into operation in more than 150 countries by 2012 (Brown & Gale, 2012) which increased to 166 countries by 2016 including all members of Organization for Economic Co-operation and Development (OECD) except the United States uses a sales tax system (OECD, 2016). As a fiscal policy instrument, VAT might have a central role in economic growth (Simionescu & Albu, 2016). VAT is an excellent way to raise resources and modernise the overall tax system for the remarkable adoption and rise of VAT worldwide (Ebrill, Keen, Bodin, & Summers, 2001). It established that VAT is a 'money machine' for the countries that introduced VAT than other countries (Keen Lockwood, 2010, cited in Alavuotunki, Haapanen, & Pirttila, 2019). In the 33 OECD countries, VAT is the third important source of tax revenue for the governments after the position of social security contributions (27 per cent) and personal income taxes (25 per cent) whereas 27 out of 33 OECD countries more than 15 per cent comes from VAT (Charlet & Buydens, 2012). An increase in tax revenue, including VAT signifies that more revenue is available for economic growth.

Furthermore, revenue generated from VAT helps various sectors of the economy to function very well, thereby enhancing the growth and development of the country (Inimino, Otubu, & Akpan, 2018). The government strengthened by the increase of the C-efficiency ratio, which ultimately affects the GDP of Nepal (Acharya, 2016). The objective of introducing VAT was to increase the revenue base of the government as well as make funds available for developmental purposes for accelerating economic growth. From the inception of VAT, it is playing a positive role in the economic development of the country. This study is an attempt to investigate whether VAT has made any significant contribution to the economic development of the country so that the Government could balance its budget.

## **II. Statement of the problem**

As a consumption tax, VAT charged at each phase of the consumption series and ultimately borne by the final customer of the product or service (Onwuchekwa & Aruwa, 2014). VAT introduced by the Government of the People's Republic of Bangladesh in 1991 to replace sales tax to increase the revenue base of the government and make funds available for developmental purposes that will accelerate economic growth (Lalarukh & Chowdhury, 2013). The Government of Kosovo took on some steps to increase tax, especially VAT to balancing the budget revenues and expenditures according to the recommendation of the International Monetary Fund (Shala, 2017). The enhancement of the VAT-club membership in the developing countries of the world was noticeably speedy in the 1990s (Alavuotunki et al., 2019). The benefits of the VAT can be numerous which are cascading effects of indirect taxes, it is perhaps difficult to evade than other forms of taxation, and it can easily be made reasonable with international trade (Alavuotunki et al., 2019). Tax-GDP ratio is one of the professed standards for pronouncing the level of development of a country (GOB, 2019). The average rate of tax to GDP ratio of South Asian countries is 11 per cent, the developing countries more than 15 per cent, the high-income countries are 24 per cent, and the industrialised countries are 30 per cent.

In contrast, such a ratio is too small (9 per cent) in Bangladesh (Ali, 2018). Taxes are the sources of the maximum share of revenue in the state budget of any country, and it should be 50 to 80 per cent (Mankiw, Weinzierl, & Yagan, 2009). Maximum share of revenues affords in the national budget from indirect taxes, mostly from VAT since its commencement in Bangladesh (GOB, 2019).

## **III. Literature Review**

The related and relevant available literature on the internet at home and abroad reviewed to find out the research gap, formulating research questions, and limit the scope of the present research. The outcome of the review of the literature summarised below keeping an eye on the needs.

Adegbie, Olajumoke, and Danjuma (2016) showed that VAT has a significant effect on the economic growth measured by GDP. They also found a positive relationship of VAT with GDP using Ex-post-factor, descriptive and analytical research (Simple linear regression) approach from 1994 to 2015.

Anojan (2015) identified a significant relationship between VAT and GDP and between VAT and the budget deficit of Sri Lanka applying regression and correlation analysis based on the secondary data from 2004 to 2013.

Ayoub and Mukherjee (2019) found a positive relationship between the GDP and VAT both in the long and short-run in China using the ARDL model based on the time series secondary macro data during 1986 to 2016.

Degbie, Olajumoke, and Danjuma (2016) observed that VAT has a positive relationship with GDP in Nigeria using a simple linear regression where 1 per cent increase in VAT will lead to a 0.88 per cent increase in GDP.

Emmanuel (2013) demonstrates that VAT has a significant effect on the economic growth measured by GDP and also on TTR using the simple linear regression method based on the time-series data during the period 1994 to 2010.

Gatawa, Aliero, and Aishatu (2016) found a significant positive impact of VAT on economic growth in Nigeria using secondary data applying Johansen (1988) co-integration test. They recommended that VAT should continue; hence, all identified administrative escapes should be shielded for VAT revenue to endure to contribute more significantly to the economic growth.

Hassan (2015) showed the strong and positive impact of VAT revenue on the economic growth (GDP) of Pakistan using the OLS regression technique based on data from 1991-92 to 2011-12.

Jalata (2014) demonstrate that VAT, TTR, non-tax revenue, and foreign revenue positively contributed to the economic growth measured by GDP in Ethiopia applying descriptive statistics and multiple regressions based on the secondary macroeconomic time-series data from 2003 to 2012.

Jones, Nwawuru, and Nmesirionye (2018) state that VAT has a significant negative relationship with the GDP in Nigeria using the Engle-Granger General Error Correction Model (ECM) technique based on data from 1994 to 2012.

Kalas and Milenkovic (2017) demonstrate that VAT has no significant impact on GDP using descriptive statistics and simple linear regression analysis. Tax revenue and total revenue has strong positive correlated to the GDP.

Lalarukh and Chowdhury (2013) revealed that the VAT has a positive impact on GDP and contributes to the economic growth of Bangladesh applying the Johansen co-integration technique based on the data from 1991/92 to 2011/2012.

Ofishe (2015) found a strong significant positive relationship of VAT on economic growth-measured by GDP and TTR using OLS regression during the study period from 1994 to 2012.

Okoye and Gbegi (2013) observed that VAT has not only a significant impact on wealth creation and significant outcome on TTR in Nigeria but also a strong significant positive relationship among VAT, TTR and GDP using Product Moment Correlation Coefficient and Student T-test.

Onwuchekwa and Aruwa (2014) illustrate that VAT has a significant positive relationship to the TTR applying the OLS technique, which ultimately affected the economic growth measured by GDP.

Shala (2017) confirmed that VAT has a significant impact on economic growth measured by GDP and a strong positive relationship between VAT and GDP in Kosovo using descriptive analysis and econometric (simple regression) technique based on the data from 2005 to 2015.

Simionescu and Albu (2016) mentioned a positive influence of the VAT rate on the economic growth in Bulgaria, Czech Republic, Hungary, Poland, and Romania. They applied the random-effect model, dynamic panel, and panel vector-auto regression to show the effects of 1995–2015.

Thus it is evident from the review of available literature that many research works have done on the contribution of VAT in the economic development of different countries. There is some literature in the context of Bangladesh. However, there is hardly any literature on the role of VAT in the economic growth in Bangladesh. Here is a research gap, and that is why the present study is an attempt to fill in this gap.

#### **IV. Research Questions**

The following research questions developed to find out the answer to the research problem in a methodological way.

1. How do VAT revenue effects on the economic development of Bangladesh?
2. What is the effect of VAT revenue on the overall tax revenue in Bangladesh?
3. How much share of VAT in the total revenue in Bangladesh?

#### **V. Objective of the Study**

The study aimed to evaluate the role of VAT on the economic growth of Bangladesh. The following objectives considered as sub-objectives.

- i. To examine the effects of VAT revenue on the economic growth in Bangladesh measured by GDP during the study period.
- ii. To examine the effect of VAT revenue on the overall tax revenue of Bangladesh during the study period.
- iii. To find out the share of VAT in the total revenue of the government during the study period.

#### **VI. Research Methodology**

This study is empirical research applying descriptive and inferential statistics based on secondary sources of data. Okoye and Gbegi (2013); Gatawa et al. (2016) used descriptive and inferential statistics to accomplish the influence of VAT revenue on wealth creation and economic growth in Nigeria. Jalata (2014) used descriptive statistics and multiple regression to analyse the time series macro-economic data to achieve whether VAT boosts the economic growth of Ethiopia. Both SPSS version 22.0 and Eviews (SV) 11.0 is employed for analysing the data of this study.

### **6.1. Sources and Collection of Data**

Necessary macro-economic data for the study obtained from the publications of the ministry of finance, Bangladesh Bank, Bangladesh Bureau of Statistics (BBS), books, journals, periodicals relating to VAT from 1991/92 to 2018/2019 to show the relationship of VAT to GDP. The data presented in Appendix Table-1 and Appendix Table-2. However, the data of total government revenue (TGR) taken to describe the ratio of VAT to the respective TGR, TTR, and GDP. Data on GDP and sales tax (ST) from 1972-1973 to 1990-1991 collected to compare the growth rate of GDP before and after introducing VAT in Bangladesh.

The population consist of the record of the TTR, TR, VAT revenue, GDP and also ST revenue for 47 years. The whole period of 47 years' data collected for the study.

### **6.2. Variables of the Research**

GDP, TTR, and TR considered as dependent variables, and VAT considered as an independent variable. The variables of the study have similarities with different earlier researches (Adereti, Sanni, and Adesina, 2011; Jalata, 2014; Ofishe, 2015). TR is the summation of TTR and non-tax revenue. OLS technique used to identify the relationship between VAT and GDP, VAT and TTR, and VAT and TR.

### **6.3. Hypothesis of the study**

The related and relevant available online literature at home and abroad reviewed to develop the hypotheses. Following three hypotheses developed through the review of related literature to test the relationship between VAT and GDP, between VAT and TTR, and between VAT and TR.

#### **6.3.1. VAT and GDP**

Several studies have investigated the relationship between VAT and GDP. With a few exceptions, most of these studies have found a positive relationship between VAT and GDP (Gatawa et al., 2016; Shala, 2017; Lalarukh and Chowdhury, 2013; Okoye and Gbegi, 2013; Ofishe, 2015; Hassan, 2015; Kalas and Milenkovic, 2017; Jalata, 2014; Ayoub and Mukherjee, 2019; Adegbe, Olajumoke, and Danjuma, 2016; Inyama and Ubesie, 2016; Kolahi and Noor, 2016; Inimino et al., 2018; Hassan, 2015; Anojan, 2015). On the other hand, Emmanuel (2013); Onwuchekwa and Aruwa (2014); Anojan (2015) showed that VAT has a significant effect on GDP. Akhor and Ekundayo (2016); Madugba and Joseph (2016); Jones et al. (2018) identified that VAT had a negative but significant impact on real GDP/GDP.

The empirical result demonstrates a contradictory conclusion, a significant positive or significant negative or a significant relationship between VAT and GDP. It should mention here that the maximum number of studies showed a positive relationship between the variables. Therefore, the study expects a positive relationship and the first hypothesis has developed regarding the VAT and GDP.

**H<sub>1</sub>:** VAT has made a significant impact on economic growth proxy by GDP in Bangladesh.

#### **6.3.2. VAT and TTR**

TTR has considered a significant government revenue that can influence the GDP of the country. Many studies have found a positive impact of TTR on the various countries' GDP (Egbunike, Emudainohwo, and Gunardi, 2018; Islam, 2019; Babatunde, Ibukun, and Oyeyemi, 2017; Jalata, 2014). Moreover, VAT has a significant effect on TTR (Emmanuel, 2013; Onwuchekwa and Aruwa, 2014; Ofishe, 2015; Okoye and Gbegi, 2013). There is a positive relationship between VAT and TTR (Ofishe, 2015). As stated by Okoye and Gbegi (2013), a significant influence on the wealth creation in Nigeria through revenue collected from VAT.

Because of these reasons, a positive relationship between VAT and TTR can be expected, which will be ultimately affected the GDP of the country. Therefore, the second hypothesis formulated as follows:

**H<sub>2</sub>:** VAT had made a significant effect on TTR in Bangladesh.

#### **6.3.3. VAT and TR**

TR considered as another important characteristic that can influence the GDP of the country. Several theoretical and empirical research has investigated the relationship between TR and GDP. Some studies found a positive relationship, and other studies found a negative relationship between TR and GDP of the country. It is possible to say that the results of the previous empirical studies concerning the relationship between TR and the GDP usually indicate that a significant positive relationship between GDP and total consolidated revenue (Ofishe, 2015; Madugba and Joseph, 2016; Onaolapo, Aworemi, and Ajala, 2013). Similarly, Onaolapo, Aworemi, and Ajala (2013); Onwuchekwa and Aruwa (2014) observed that VAT has a statistically significant TR generation effect. On the other hand, VAT does not significantly impact on GDP, TR, and TTR (Kalas & Milenkovic, 2017). Haruna, Kumshe, Magaji, and Bani (2015) revealed that an increase in total actual revenue and VAT raised the economic growth of Adamawa state. In this sense, a positive relationship between VAT

and TR can be expected, which will be ultimately affected the GDP of the country. Therefore the third hypothesis formulated as follows:

**H<sub>3</sub>:** There is a significant influence of VAT revenue in the TR in Bangladesh.

#### **6.4. Model Specification**

Ofishe (2015) adopted three models to show the relationship between (1) economic growth measured by GDP as the dependent variable and VAT as an independent variable (2) GDP as dependent variable and TR as an independent variable and finally (3) TR is the dependent variable and VAT is the independent variable, so that proved the possible impact of VAT revenue on economic growth proxy by GDP. On the other hand, Kalas and Milenkovic (2017) applied three models were they considered (1) GDP as dependent variable and VAT as an independent variable, (2) TTR as dependent variable and VAT as an independent variable and (3) TR as dependent variables and VAT as an independent variable. The same model also used by Onwuchekwa and Aruwa (2014), Adegbe et al. (2016). In this study, three significant models developed to measure the possible impact of VAT on economic growth measured by GDP.

Therefore, the models for this study is as follows:

##### **Model 1**

A link comprised of the two variables to realise the working relationship between VAT and GDP, the following OLS regression method specified:

$$GDP = F(VAT) \dots\dots\dots(1)$$

From the above working relationships, it found a linear or stochastic model as:

$$GDP = \alpha_0 + \beta_0 VAT + \epsilon_t \dots\dots\dots (2)$$

Usually, the execution model can be restated in the natural logarithm as follows:

$$\ln GDP = \alpha_0 + \beta_0 \ln VAT + \epsilon_t \dots\dots\dots (3)$$

##### **Model 2**

To initiate the working relationship between VAT and TTR, the OLS regression model specified below:

$$TTR = F(VAT) \dots\dots\dots(1)$$

From the above working relationships, it found a linear or stochastic model as:

$$TTR = \alpha_0 + \beta_0 VAT + \epsilon_t \dots\dots\dots (2)$$

Usually, the execution model can be restated in the natural logarithm as:

$$\ln TTR = \alpha_0 + \beta_0 \ln VAT + \epsilon_t \dots\dots\dots (3)$$

##### **Model 3**

The working relationship between VAT and TR showed in the OLS regression method as:

$$TR = F(VAT) \dots\dots\dots(1)$$

The above working relationships showed in a linear or stochastic model as:

$$TR = \alpha_0 + \beta_0 VAT + \epsilon_t \dots\dots\dots(2)$$

Usually, the execution model can be restated in the natural logarithm as:

$$\ln TR = \alpha_0 + \beta_0 \ln VAT + \epsilon_t \dots\dots\dots (3)$$

Where

GDP = Gross Domestic Product

VAT=Value Added Tax

TTR =Total Tax Revenue which is a summation of both direct and indirect tax

TR = Total Revenue which is the summation of TTR and nontax revenue, and

$\alpha_0$  = the constant parameter (intercept)

$\beta_0$  = regression coefficient of VAT

ln = natural log

$\epsilon_t$  = Error term or stochastic term

A prior expectation:  $\beta_0 > 0$  in the above Model 1, Model 2 and Model 3.

In this study, the original data are linear but not normally distributed, a logarithm used to make the data normal and linear.

## **VII. Data Analysis and Interpretation**

Data analysis and interpretation presented here dividing into four parts. Descriptive statistics presented in the table and give a brief description in the first part. In the second part, the normality tested of the data series. In the third part, different tests applied to verify the data to fit the model. In the last part, three OLS regression model developed to test the relationship between VAT and GDP, between VAT and TTR, and between VAT and TR.

## **7.1. Results of Descriptive Analysis**

Descriptive analysis such as the contribution of VAT on economic development, a comparative scenario of the contribution of sales tax and VAT to GDP, and trend and growth rate of GDP, VAT, TTR and TR presented in this section.

### **7.1.1. Contributions of VAT to the Economic Growth of the Country**

When a country grows wealthy, the government typically raises immense tax revenue, which becomes an enormous contribution to any country's GDP. Appendix Table-1 and figure-1 show that the matter is consistent in Bangladesh because, after VAT adoptions, the growth rate of GDP was radically increased and reached about 15.20 per cent on an average during the fiscal year 1991/92 to 2018/19. The minimum rate was 4.88 per cent in 1992/93, and the maximum was 30.11 per cent in 2005/06. The VAT revenue to GDP ratio was only 1.45 per cent at the beginning of the adoptions of VAT, but such ratio reached its highest points of 3.43 per cent in 2012/13. The average VAT revenue to GDP ratio was 2.71 per cent, but there were fluctuations of VAT to GDP ratio during the review. The growth rate of VAT was 18.82 per cent on an average from 1991/92 to 2018/19, while the maximum growth rate was 47.74 per cent in 1992/93 and minimum rate was 5.75 per cent in 1997/1998.

Appendix Table-1 also shows that the VAT- TTR ratio was 21.96 per cent, and VAT- TR ratio was 17.68 per cent at the inception year of VAT in Bangladesh. The ratio is an increasing trend and reached 36.87 per cent, and 32.92 per cent in 2018/2019. The average of such ratios were 33.29 per cent and 27.73 per cent, respectively, during the study period. Therefore, VAT is contributing to the economic growth of Bangladesh from its adoptions.

### **7.1.2. Comparative Scenario of the Impact of Sales Tax and Value Added Tax on GDP**

Since the independence of Bangladesh, ST introduced as a consumption tax, and it functioned up to the fiscal year 1990/1991. From the fiscal year, 1991/1992 VAT executed instead of ST, and now it is operating in the country. Appendix Table-1 and 2 shows that both the ST- GDP ratio and VAT-GDP ratio were fluctuating during the periods. VAT-GDP ratio significantly increasing after the introduction of VAT, and such ratio is more stable than the ST-GDP ratio. The average ST-GDP ratio was 0.82 per cent, where the minimum ratio was 0.42 per cent in the F/Y 1972/1973, and the maximum ratio was 1.40 per cent in the F/Y 1978/1979.

On the other hand, VAT- GDP ratio almost continuously increased and reached 2.71 per cent on an average where the minimum VAT-GDP ratio was 1.45 per cent, in the beginning, F/Y 1991/1992, and the maximum ratio was 3.43 per cent in the F/Y 2012/2013. There were negative growth rates of sales tax in three fiscal years: -7.59 per cent in 1981/1982, -8.40 per cent in 1982/1983 and -7.24 per cent in 1988/1989 whereas the highest rate was 103.86 per cent in F/Y 1973/1974. The mean growth rate of ST was 29.52 per cent with a standard deviation of 34.97, whereas the mean growth rate of VAT was 18.82 per cent with a standard deviation of 18.15. There were no negative growth rates of VAT since its inception in Bangladesh. Finally, during the VAT period average VAT is 6818 per cent more collected than the average ST during the sales tax period.

Many variables influence to measure the GDP in any country other than the ST or VAT. From the above analysis, it indicates that the GDP of Bangladesh significantly more increased during the VAT period than the ST period. Therefore, the contribution of VAT to the economic growth of the country is still extensive compared to ST.

### **7.1.3. Trends of GDP, VAT, TTR, and TR**

The figure-4 demonstrates that GDP, VAT revenue, TTR and TR have an upward trend during the study period and such trends were more accelerated after the F/Y 2006-2007 compared to from the inception of VAT to the F/Y 2005-2006. With the passes of time, the growth trends are accelerating.

## **7.2. Result of Normality Test of the Data Set**

There are some necessary assumptions and statistical test for data normality. Figure-6, Table-1 and table-2 show that the data set of all variables are only linear but not normally distributed because prerequisite data of normality of all variables not accomplished. When these data set are transformed to natural log, then the data of natural log variables are normally distributed. There is no outlier in the ln data series. Descriptive statistics (in table-3) shows that the skewness and kurtosis values of all log variables are near to zero. Their z values between +1.96 to -1.96 testimony that the log form data of all series normally distributed. On the other hand, Table-4 shows that p-value of each log variable of Kolmogorov-Smirnov and Shapiro-Wilk test is greater than 0.05, which indicates that the log data normally distributed and Figure-7 also shows that the data of Invariables are linear.

## **7.3. Analysis of Empirical Results**

The section provides the empirical result of the inferential statistics to investigate the relationships among VAT, GDP, TTR, and TR of Bangladesh from F/Y 1991/92 to 2018/19. Before investigating the result,

various tests required to establish whether the linear regression model is fit or not. Durbin-Watson statistics check the autocorrelation. The Johansen cointegration test used to prove the long-run association between or among the data series. Breusch-Pagan-Godfrey test is applied to know the heteroskedasticity in the data set. From the above results of pre assumption tests, the simple linear regression model is fit, and it is possible to do the regressions analysis by OLS method.

### **7.3.1. Test of long-run relationship**

At level or transformed data of all variables are time series data. There is a necessity to identify whether the long-run relationship between or among the variables exists or not. For this, the Johansen cointegration test used for examining such relationships between or among the variables.

H<sub>0</sub>: There is no cointegration equation or no long-run association among the variables.

H<sub>1</sub>: There is a cointegration equation or long-run association among the variables.

Decision criteria: If the trace statistic is greater than 5 per cent critical value, then the null hypothesis is rejected otherwise accepted.

The results of the Johansen cointegration test in table-5 (when lag 1) observed that the trace statistic of none order and at most 1 order is greater than 5 per cent critical value and the P-value is less than 5 per cent level of significance. So, the null hypothesis rejected, and the alternative hypothesis is accepted. So it can conclude that all variables displayed long-run association.

Table-6 also demonstrates that (when lag 2) the trace statistic of none and at most 1 is greater than 5 per cent critical values, and respective P-value is smaller than 5 per cent level of significance. So the null hypothesis rejected, and the alternative hypothesis accepted. So it can conclude that there is a long-run relationship among the variables.

### **7.3.2. Testing Heteroskedasticity**

H<sub>0</sub>: There is no heteroskedasticity in the series.

H<sub>1</sub>: There is heteroskedasticity in the series.

From the table-7 (at original or level data) observed that the Obs\*R-squared value is 8.293056 and Probability Chi-Square value is 0.0403, which is less than the 0.05. So, the null hypothesis rejected and concluded that there is heteroskedasticity in the series. After converting the data to ln data, it observed that the Obs\*R-squared value is 6.540492, and Probability Chi-Square value is 0.0881, which is greater than 0.05. The results testimony that the null hypothesis can be accepted and it can conclude that there is no heteroskedasticity in the model.

## **7.4. Regression Analysis:**

This section establishes the effects of VAT on GDP and TTR applying lnVAT, lnGDP and lnTTR. Again, the share of VAT on the TR of the government applying lnVAT and lnTR. When estimating the study, then an autocorrelation problem is found in the series. For this, it follows the Dynamic Regression Model to remove the autocorrelation problem. By Dynamic Regression Model, it applied the first lag and removed the autocorrelation of the respective series. On the other hand, since the data of this study is time-series data, so it is considered the time trend during the regression analysis to avoid the spurious result.

### **7.4.1. GDP and VAT**

H<sub>0</sub>: The regression model can not predict the lnGDP by lnVAT

H<sub>1</sub>: The regression model can predict the lnGDP by lnVAT

Table-8 showed that F-statistic is 8486.501 and p-value of F-statistic < 0.05, which indicates that the null hypothesis rejected and the regression model is statistically significant. The coefficient of determination (r<sup>2</sup>) is 0.999, which implies that over 99 per cent of the variation in economic growth measured by lnGDP is explained by lnVAT during the study period. So it can be concluded that the statistically model is very significant and a robust model. The Durbin-Watson statistic is 1.549, which implies that there is no autocorrelation problem in the series.

The estimated model is-

$$\ln\text{GDP} = 2.054 + 0.216\ln\text{VAT} + \epsilon$$

The regression results of the study showed the intercept or autonomous value is 2.054, the coefficient of lnVAT is 0.216, and its p-value is 0.038, which is less than 0.05 level of significance. So, the null hypothesis rejected, and it can conclude that VAT revenue makes a statistically significant positive influence on the economic growth of the country during the study period. The estimated model indicates a 1 per cent increase in lnVAT will lead to a 0.22 per cent increase in lnGDP. These findings aligned with the results of Lalarukh and Chowdhury (2013); Shala (2017); Emmanuel (2013); Hasan (2015) that VAT has a significant positive effect on the Economic Growth of the countries.

### 7.4.2. TTR and VAT

**H<sub>0</sub>:** The regression model can not predict the lnTTR by lnVAT.

**H<sub>1</sub>:** The regression model can predict the lnTTR by lnVAT

The estimated model is-

$$\ln TTR = 0.366 + 0.646 \ln VAT + \epsilon$$

Table-9 illustrates that F-statistic is 11487.848 and p-value of F-statistic < 0.05 indicates that the null hypothesis rejected, and concluded that the regression model is statistically significant. The r<sup>2</sup> value is 0.999, which indicates that above 99 per cent of the systematic variations in the dependent variable lnTTR has explained by the explanatory variable lnVAT. The model is a statistically very significant and robust model. It also shows that the Durbin-Watson statistic is 1.731, which implies no autocorrelation problem in the series.

From the above-estimated model, the intercept value is 0.366, the coefficient of lnVAT is 0.646, and its p-value is 0.000, which is less than 5 per cent level of significance. Therefore, the null hypothesis is rejected and accept the alternative hypothesis assuming that VAT revenue has a statistically significant positive impact on TTR in Bangladesh. The estimated regression model indicates that a 1 per cent increase in lnVAT will lead to a 0.646 per cent increase in lnTTR. These findings are similar to the results of Okoye and Gbegi (2013) and Emmanuel, (2013).

### 7.4.3. TR and VAT

**H<sub>0</sub>:** The regression model cannot predict the lnTR by lnVAT

**H<sub>1</sub>:** The regression model can predict the lnTR by lnVAT

The estimated model is-

$$\ln TR = 1.275 + 0.597 \ln VAT + \epsilon$$

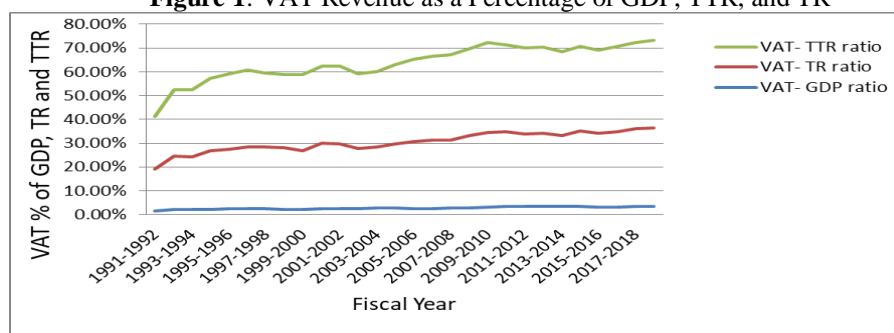
Table-10 showed that F-statistic is 8347.589 and p-value of F-statistic < 0.05, which implies that the null hypothesis rejected and the regression model is statistically significant. It also shows that the coefficient of determination (r<sup>2</sup>) is 0.999 which represent a very high level of reliability of the model and the Durbin-Watson statistic is 1.786, which implies that no autocorrelation problem exists in the series.

From the above-estimated model, the intercept value is 1.275, the coefficient of lnVAT is 0.597, and its p-value is 0.000, which is less than 5 per cent level of significance. Therefore, it can conclude that VAT revenue has a statistically significant positive impact on TR in Bangladesh. It also indicates that a 1 per cent increase in lnVAT lead to a 0.60 per cent increase. The statistical result implies that VAT has a statistically significant positive impact on the TR of the country.

## VIII. Conclusion

The Government of the People's Republic of Bangladesh introduced VAT to replace the outdated general ST in the F/Y of 1991/1992 to increase the government's revenue and make funds available for the developmental purposes that will accelerate economic growth. The work attempts to empirically analyse and investigate the impact of VAT on economic growth in Bangladesh. Both descriptive and inferential statistics applied using the annual quantitative time series secondary data. The study investigates the relationship of four economic variables- GDP, VAT, TTR, and TR applying the OLS regression method. The empirical result shows that VAT has a statistically significant positive impact on economic growth measured by GDP in Bangladesh. VAT also has a statistically positive significant impact on TTR and TR, which are also impacting on economic growth measured by GDP in Bangladesh. The findings of the study reveal that VAT enhances the economic growth measured by GDP of the country during the periods under review. The study agrees with the earlier studies by Adegbe et al. (2016); Jalata (2014); Hasan (2015); Ofishe (2015); Onwuchekwa and Aruwa (2014); Ayoub and Mukherjee (2019) that VAT has a significant positive effect on Economic Growth of various countries.

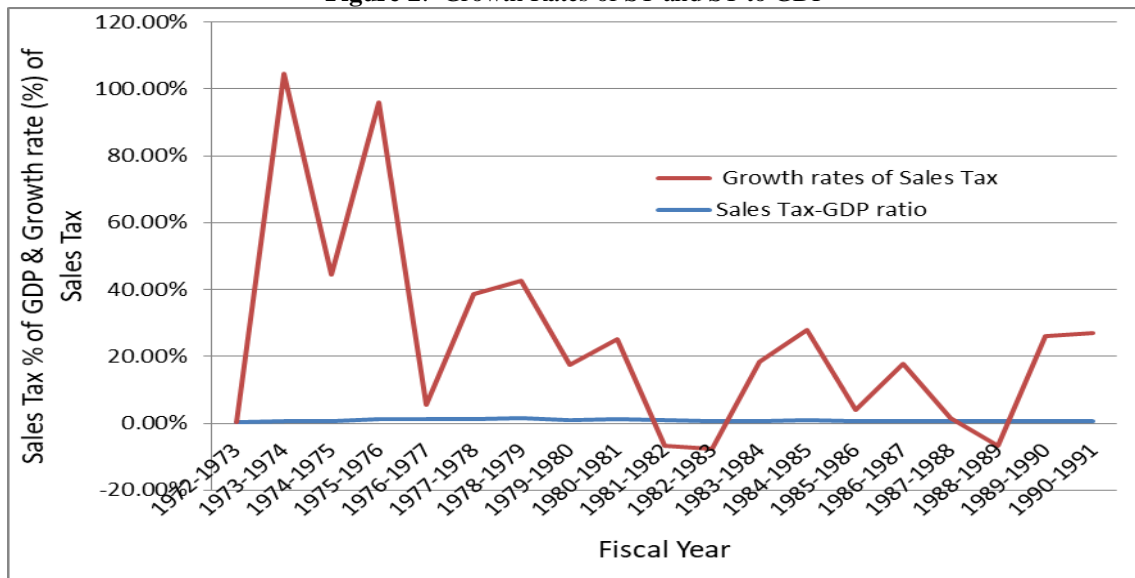
**Figure 1: VAT Revenue as a Percentage of GDP, TTR, and TR**



Source: Analysis of data from F/Y 1991/1992 to 2018/2019 in Appendix Table-1

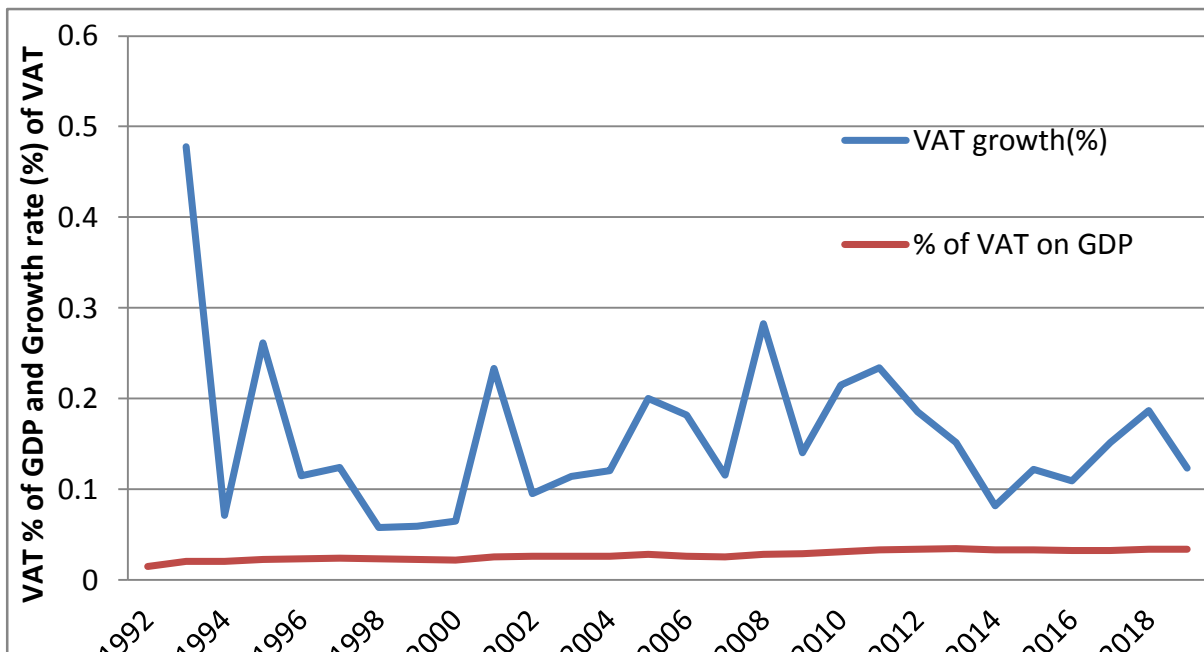


**Figure 2: Growth Rates of ST and ST to GDP**



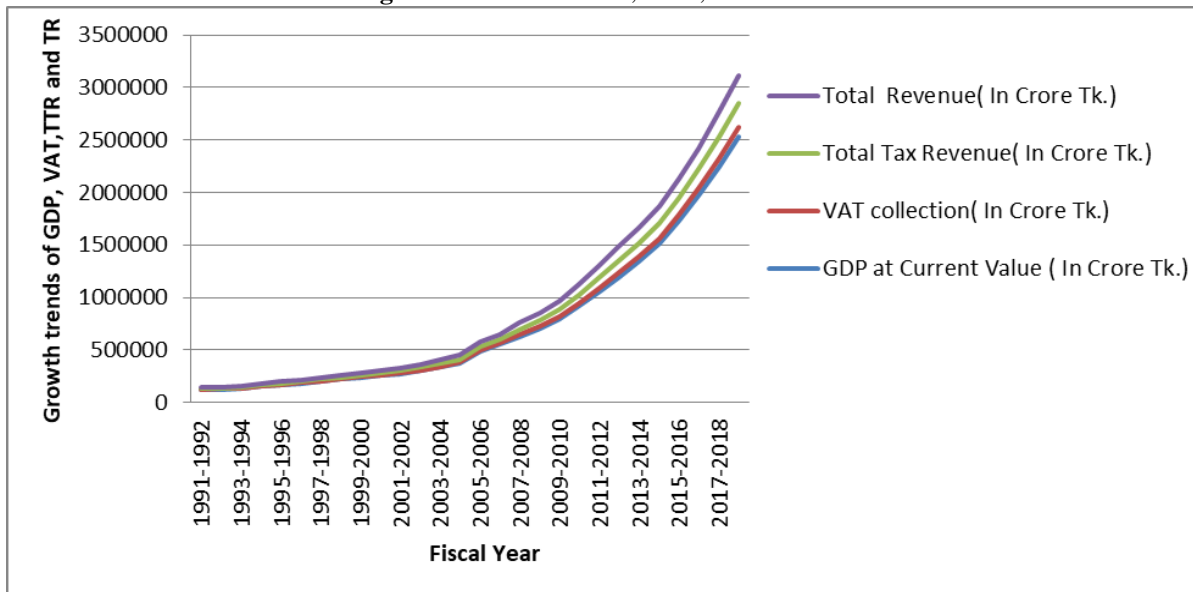
Source: Analysis of data from F/Y 1972/1973 to 1990/1991 in Appendix Table-2

**Figure 3: Growth Rates of VAT and VAT to GDP**



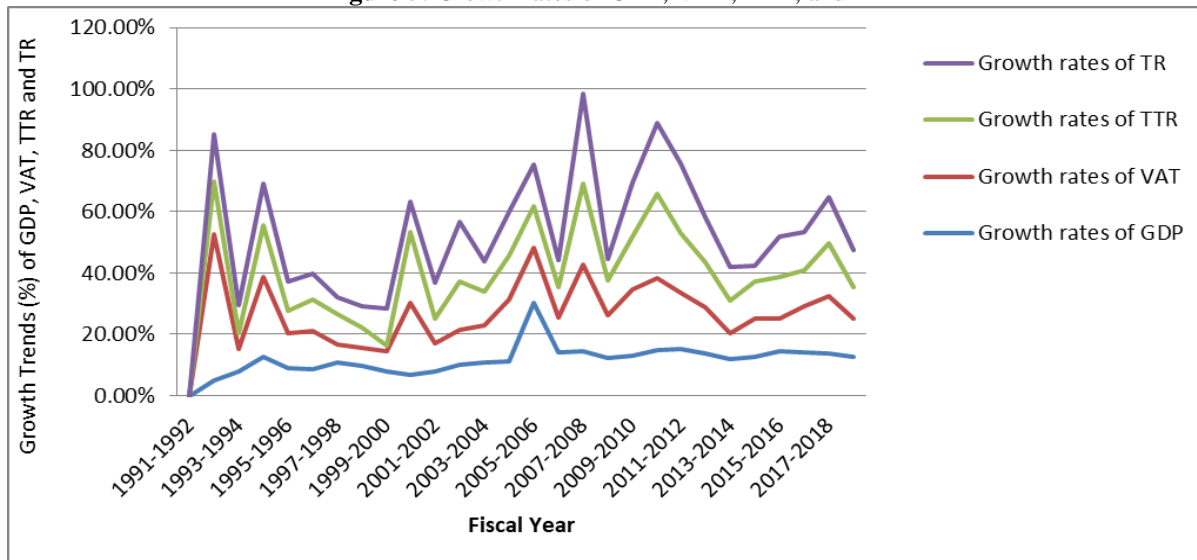
Source: Analysis of data from F/Y 1991/1992 to 2018/2019 in Appendix Table-1

Figure-4: Trends of GDP, VAT, TTR and TR



Source: Analysis of data from F/Y 1991/1992 to 2018/2019 in Appendix Table-1

Figure 5: Growth rates of GDP, VAT, TTR, and TR



Source: Analysis of data from the F/Y of 1991/1992 to 2018/2019 in Appendix Table-1

Table 1: Descriptive Statistics of Original Data

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
GDP ( In Crore Tk.)	28	119542.00	2536180	741287	702574	1.236	.441	.543	.858
VAT ( In Crore Tk.)	28	1735.27	85125	22997	24211	1.244	.441	.538	.858
TTR ( In Crore Tk.)	28	7900.72	230863	64885	66142	1.236	.441	.433	.858
TR ( In Crore Tk.)	28	9816.72	258566	75476	73847	1.163	.441	.232	.858
Valid N (listwise)	28								

Source: Analysis of Data.

Table-2: Tests of Normality of Original Data

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
GDP ( In Crore Tk.)	.201	28	.005	.823	28	.000
VAT ( In Crore Tk.)	.220	28	.001	.813	28	.000

TTR ( In Crore Tk.)	.223	28	.001	.808	28	.000
TR ( In Crore Tk.)	.217	28	.002	.821	28	.000

a. Lilliefors Significance Correction

Source: Analysis of Data.

Figure-6: Linearity Trends of GDP, VAT, TTR, and TR

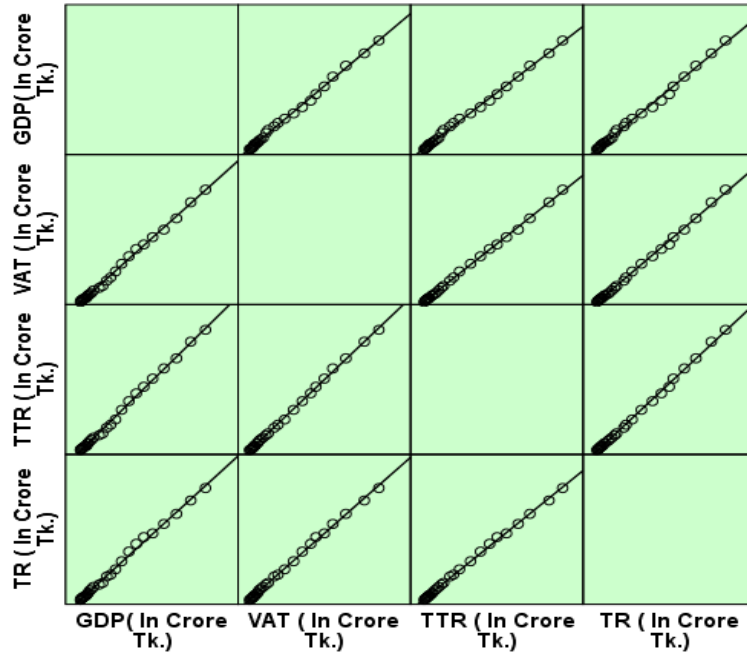


Table-3: Descriptive Statistics of Invariables

Name of Variables	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
lnGDP	28	11.6914	14.7462	13.078067	.1829683	.9681773	.219	.441	-1.291	.858
lnVAT	28	7.4589	11.3519	9.451962	.2186731	1.1571095	.103	.441	-1.259	.858
lnTTR	28	8.9747	12.3496	10.557767	.2011362	1.0643128	.224	.441	-1.308	.858
lnTR	28	9.1918	12.4629	10.743643	.1948714	1.0311625	.191	.441	-1.335	.858
Valid N (listwise)	28									

Source: Analysis of Data.

Table-4: Tests of Normality of Invariables

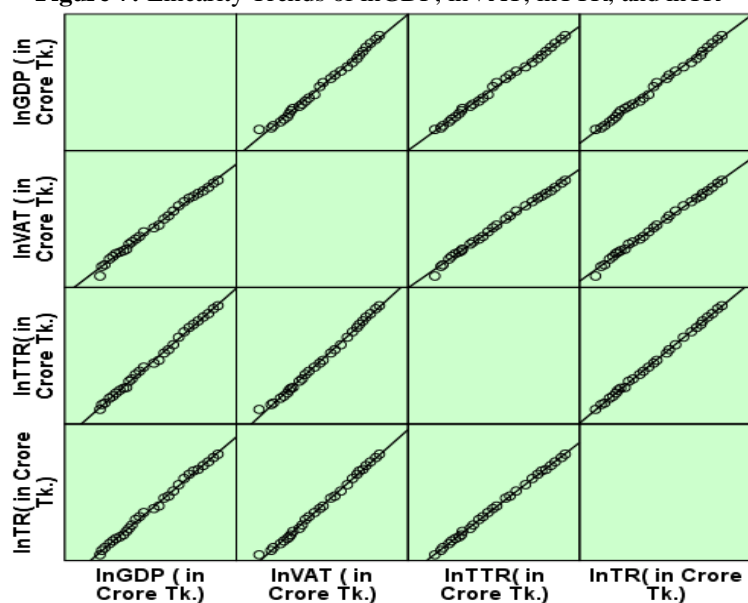
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
lnGDP ( in Crore Tk.)	.113	28	.200*	.939	28	.102
lnVAT ( in Crore Tk.)	.103	28	.200*	.950	28	.203
lnTTR ( in Crore Tk.)	.115	28	.200*	.937	28	.092
lnTR ( in Crore Tk.)	.107	28	.200*	.937	28	.093

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Analysis of Data.

**Figure 7: Linearity Trends of lnGDP, lnVAT, lnTTR, and lnTR**



**Table 5: Result of Johansen cointegration test ( When lag 1)**

Date: 10/29/20 Time: 19:28  
 Sample (adjusted): 3 28  
 Included observations: 26 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: LnGDP, LnVAT, LnTTR, LnTR  
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.610362	55.79844	47.85613	0.0075
At most 1 *	0.555106	31.29250	29.79707	0.0334
At most 2	0.315871	10.23459	15.49471	0.2631
At most 3	0.013931	0.364753	3.841465	0.5459

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Computed with Eviews 11 (SV)

**Table 6: Result of Johansen cointegration test (When lag 2)**

Date: 10/29/20 Time: 19:30  
 Sample (adjusted): 4 28  
 Included observations: 25 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: LnGDP, LnVAT, LnTTR, LnTR  
 Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.799150	74.30228	47.85613	0.0000
At most 1 *	0.568786	34.17232	29.79707	0.0147
At most 2	0.406959	13.14353	15.49471	0.1096
At most 3	0.003245	0.081258	3.841465	0.7756

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Computed with Eviews 11 (SV)

**Table-7:** Result of Heteroskedasticity Test (Breusch-Pagan-Godfrey Test)

	At original or level data)	At transformed or Indata		At original or level data)	At transformed or Indata
F-statistic	3.366552	2.438264	Prob. F(3,24)	0.0352	0.0892
Obs*R-squared	8.293056	6.540492	Prob. Chi-Square(3)	0.0403	0.0881
Scaled explained SS	5.924847	3.176113	Prob. Chi-Square(3)	0.1153	0.3653

Computed with Eviews 11 (SV)

**Table-8:** Results of OLS Regression Testing the Relationship between lnGDP and lnVAT

Variable	Coefficient	Std. Error	t-Stat.	p-value
Intercept	2.054	.727	2.825	.010
LaglnGDP	0.682	.103	6.614	.000
lnVAT ( in Crore Tk.)	0.216	.098	2.197	.038
Fiscal Year	0.009	.008	1.123	.273
R-Squared	0.999			
Adjusted R-Squared	0.999			
F-statistic	8486.501			
p-value of F-Statistic	0.000			
Durbin-Watson stat.	1.549			

a. Dependent Variable: lnGDP (in Crore Tk.)

b. Predictors: (Constant), Fiscal Year, LaglnGDP, lnVAT (in Crore Tk.)

Source: Analysis of Data

**Table 9:** Results of OLS regression analysis testing the relationship between lnTTR and lnVAT

Variable	Coefficient	Std. Error	t-Stat.	p-value
Intercept	.366	.444	.823	.419
LaglnTTR	.408	.081	5.065	.000
lnVAT ( in Crore Tk.)	.646	.090	7.154	.000
Fiscal Year	-.012	.008	-1.577	.129
R-Squared	0.999			
Adjusted R-Squared	0.999			
F-statistic	11487.848			
p-value of F-Statistic	0.000			
Durbin-Watson stat.	1.731			

a. Dependent Variable: lnTTR ( in Crore Tk.)

b. Predictors: (Constant), LaglnTTR, Fiscal Year, lnVAT ( in Crore Tk.)

Source: Analysis of Data

**Table 10:** Results of OLS Regression Testing the Relationship between lnTR and lnVAT

Variable	Coefficient	Std. Error	t-Stat.	p-value
Intercept	1.275	.551	2.314	.030
LaglnTR	.363	.114	3.179	.004
lnVAT ( in Crore Tk.)	.597	.115	5.174	.000
Fiscal Year	-.002	.009	-.271	.789
R-Squared	0.999			
Adjusted R-Squared	0.999			
F-statistic	8347.589			
p-value of F-Statistic	0.000			
Durbin-Watson stat.	1.786			

a. Dependent Variable: lnTR ( in Crore Tk.)

b. Predictors: (Constant), LaglnTR, Fiscal Year, lnVAT (in Crore Tk.)

Source: Analysis of Data

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**APPENDICES:**

**Appendix Table- 1 : Comparison data Analysis among GDP, VAT, TTR & TR**

Year	GDP at Current Value (In Crore Tk.)	VAT collection (In Crore Tk.)	VAT-GDP ratio	Growth rates of VAT	Total Tax Revenue (In Crore Tk.)	VAT-TTR ratio	Total Revenue (In Crore Tk.)	VAT-TR ratio	Growth rates of GDP
1991-1992	119542	1735.27	1.45%	100%	7900.72	21.96%	9816.72	17.68%	100.00%
1992-1993	125370	2563.73	2.04%	47.74%	9254.98	27.70%	11321.98	22.64%	4.88%
1993-1994	135412	2746.24	2.03%	7.12%	9724.74	28.24%	12388.53	22.17%	8.01%
1994-1995	152517	3463.57	2.27%	26.12%	11356.03	30.50%	14089.53	24.58%	12.63%
1995-1996	166324	3860.7	2.32%	11.47%	12174.1	31.71%	15408.04	25.06%	9.05%
1996-1997	180701	4338.86	2.40%	12.39%	13452.92	32.25%	16663.9	26.04%	8.64%
1997-1998	200177	4588.26	2.29%	5.75%	14792.83	31.02%	17589.75	26.08%	10.78%
1998-1999	219697	4860.07	2.21%	5.92%	15750.21	30.86%	18805.36	25.84%	9.75%
1999-2000	237086	5174.87	2.18%	6.48%	16081.36	32.18%	21029.41	24.61%	7.91%
2000-2001	253546	6379.8	2.52%	23.28%	19777.44	32.26%	23180.44	27.52%	6.94%
2001-2002	273201	6985.41	2.56%	9.49%	21315.21	32.77%	25900.21	26.97%	7.75%
2002-2003	300580	7780.62	2.59%	11.38%	24717.42	31.48%	30874.92	25.20%	10.02%
2003-2004	332973	8714.61	2.62%	12.00%	27430.77	31.77%	33943.77	25.67%	10.78%
2004-2005	370707	10458.47	2.82%	20.01%	31325.46	33.39%	38868.46	26.91%	11.33%
2005-2006	482340	12358.17	2.56%	18.16%	35528.43	34.78%	44131.43	28.00%	30.11%
2006-2007	549800	13782.3	2.51%	11.52%	39075.32	35.27%	47912.32	28.77%	13.99%
2007-2008	628682	17671.36	2.81%	28.22%	49477.66	35.72%	62004.66	28.50%	14.35%
2008-2009	705073	20146.85	2.86%	14.01%	55180.25	36.51%	66302.25	30.39%	12.15%
2009-2010	797539	24468.05	3.07%	21.45%	64785.16	37.77%	77954.16	31.39%	13.11%
2010-2011	915829	30190.68	3.30%	23.39%	82632.11	36.54%	95874.11	31.49%	14.83%
2011-2012	1055204	35777.43	3.39%	18.50%	98692.99	36.25%	117337.99	30.49%	15.22%
2012-2013	1198923	41182.42	3.43%	15.11%	113272.7	36.36%	134635.73	30.59%	13.62%
2013-2014	1343674	44543.41	3.32%	8.16%	125430.9	35.51%	149730.85	29.75%	12.07%
2014-2015	1515802	49980.6	3.30%	12.21%	140520.7	35.57%	157697.7	31.69%	12.81%
2015-2016	1732860	55449.96	3.20%	10.94%	159271	34.81%	178918.96	30.99%	14.32%
2016-2017	1975820	63848.85	3.23%	15.15%	178094.4	35.85%	201230.44	31.73%	14.02%
2017-2018	2250480	75766.23	3.37%	18.66%	208923.9	36.26%	231152.94	32.78%	13.90%
2018-2019	2536180	85125	3.36%	12.35%	230863	36.87%	258566	32.92%	12.70%
Mean	741287.1	22997.92	2.71%	18.82%	64885.12	33.29%	75476.09	27.73%	15.20%

## Role of Value Added Tax (VAT) on the Economic Growth of Bangladesh

Standard deviation	702574.37	24211.80	0.52%	18.15%	66142.60	3.48%	73847.79	3.63%	17.20%
Maximum	2536180	85125	3.43%	47.74%	230863	37.77%	258566	32.92%	30.11%
Minimum	119542	1735.27	1.45%	5.75%	7900.72	21.96%	9816.72	17.68%	4.88%
Range	2416638	83389.73	1.98%	41.99%	222962.28	15.81%	248749.28	15.24%	25.23%

**Source:** Author's computations based on the data from NBR, BBS & IBAS++, Ministry of Finance

**Appendix Table- 2: Sales Tax Revenue and GDP**

Year	GDP at Current Value ( In Crore Tk.)	Sales tax collection (in Crore Tk.)	Sales Tax-GDP ratio	Growth rates of GDP	Growth rates of Sales Tax
1972-1973	4985	20.99	0.42%	100%	100%
1973-1974	7575	42.79	0.56%	51.96%	103.86%
1974-1975	12437	61.57	0.50%	64.18%	43.89%
1975-1976	11032	119.98	1.09%	11.30%	94.87%
1976-1977	11600	125.27	1.08%	5.15%	4.41%
1977-1978	14519	172.33	1.19%	25.16%	37.57%
1978-1979	17405	243.31	1.40%	19.88%	41.19%
1979-1980	28078	283.7	1.01%	61.32%	16.60%
1980-1981	32214	351.72	1.09%	14.73%	23.98%
1981-1982	36174	325.02	0.90%	12.29%	-7.59%
1982-1983	40831	297.71	0.73%	12.87%	-8.40%
1983-1984	48979	350.36	0.72%	19.96%	17.68%
1984-1985	56194	445.61	0.79%	14.73%	27.19%
1985-1986	63269	460.49	0.73%	12.59%	3.34%
1986-1987	72771	538.52	0.74%	15.02%	16.94%
1987-1988	79993	542.82	0.68%	9.92%	0.80%
1988-1989	89060	503.54	0.57%	11.33%	-7.24%
1989-1990	100329	632.11	0.63%	12.65%	25.53%
1990-1991	110518	798.39	0.72%	10.16%	26.31%
Mean	44103.32	332.43	0.82%	24.35%	29.52%
Standard deviation	33597.12	215.04	0.26%	25.16%	34.97%
Maximum	110518	798.39	1.40%	64.18%	103.86%
Minimum	4985	20.99	0.42%	5.15%	-8.40%
Range	105533	777.4	0.98%	59.03%	112.26%

**Source:** Author's computations based on the data from NBR, BBS & IBAS++, Ministry of Finance

Zia Ur Rahman. "Role of Value Added Tax (VAT) on the Economic Growth of Bangladesh." *IOSR Journal of Business and Management (IOSR-JBM)*, 23(02), 2021, pp. 12-27.