



# The influence of budget deficit on the economic growth of Bangladesh

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## Abstract

Bangladesh is consistently facing budget deficit problems since its independence. The paper collects datasets from 1982 to 2020 from the international monetary fund (IMF). This paper searches the influence of fiscal shortage on gross domestic product growth in the economy of Bangladesh. The study applied the vector error correction model (VECM) and found an inverse influence of fiscal shortage on the gross domestic product growth of the economy of Bangladesh. Most of the statistical results were cross-checked with various statistical tool that validates each output. The result supports the Neo-Classical theory of economics. Finally, the study concluded fiscal shortage is not a harbinger for the economy of Bangladesh.

**Keywords:** Budget deficit, Economic growth, VECM, EGR, BDP.

## 1.0 Introduction

The economic reformation of Bangladesh started from a socialist viewpoint after independence. All industries are nationalized for ensuring the best equal opportunities for all people of Bangladesh, especially for basic needs. It was the main spirit of the liberation war. At that time, Bangladesh needs more food (grain/crop) but the traditional

agriculture system did not cope-up with this plan. Cultivation, irrigation system and more productive seed innovation are must for that target. The transport and communication system is the backbone of the economy because goods and capital are moved to this system which creates more utility in the economy. It was a great challenge to convert the population into human capital. After independence Bangladesh was very poor. Her economy mainly depended on imports which creates a deficit in the trade balance. Another problem was unskilled labor, inexperienced entrepreneurs, managers, and production people. Jute was the main economic crop but it was unable to compete with synthetic cloths. The foreign currency reserve was almost zero. Although natural calamity, cyclone plays a devastating role in Bangladesh, around 250,000 people were dead (Zaman et al., 2022). The first month of Bangladesh (December 1971 to January 1972) started with an aid of USD 232 million from India. The inefficiency of the public sector, bureaucracy, and corruption reversed the greater well for all people. As a result nationalization policy turns into privatization. In the late 1980 Bangladesh became more focused on the enhancement of industrial productivity, reform economic structure, fiscal reformation, budget structure, set import targets, trying to attract foreign direct investment, local investment, etc. International Monetary Fund (IMF) advocated the government of Bangladesh to enhance structural capacity in the year of 1991-1993. Since its independence, Bangladesh is suffering a budget deficit, negative trade balance, aid and grant dependency, poor revenue collection, etc. From 1990 foreign aid and grant dependency reduced significantly. From the year 2001 to 2003 Bangladesh took the major initiative to spur the growth of the economy. The international monetary fund (IMF) sanctioned a 490 million USD fund to reduce poverty named the “poverty reduction and growth facility (PRGF)” program. World Bank group sanctioned an interest-free loan of 536 million US dollars to increase economic growth. Consequently Bangladesh achieved 5.8% economic growth. For the first time, it was above 5%. The gross domestic product (GDP) of Bangladesh comprises the agriculture, industry, and service sector. Agriculture sector losses its share continuously averaging 0.05% per year. Now it acquire 13% (Approximate) share. The main sector of agriculture is: “agriculture and forestry, crops and horticulture, animal farming, forest, and related goods and fishing”.

Industrial sectors increased its share in GDP from year to year. Nowadays industry sector achieved a 32% (approximate) share of gross domestic product. The main items of the industry sector are: “mining and quarrying, natural gas and crude petroleum, other mining and coal, manufacturing (large and medium scale, small scale), electricity, gas, water supply, and construction” etc. The most important player in the gross domestic product of Bangladesh is the service sector. This contribution is fluctuating but the approximate share is 55%. The important sectors trade (“wholesale and retail), repair of motor vehicles, motorcycles, personal and household goods, hotels and restaurants, transport (land, water, air, and support), storage, post and telecommunication, financial intermediaries, monetary intermediaries, insurance, other financial auxiliaries, real estate, public administration and defense, education, health and social works, community, social and personal services”. Bangladesh started a new era in 2009. From 2009 to before COVID-19 Bangladesh’s average economic growth is almost 7% per year. The budget deficit of Bangladesh arouse since its birth on an average of 5% of GDP. Bangladesh is an upcoming trade and investment desired country for the world. Infrastructure development and different mega projects bring Bangladesh to a unique height. IMF prepared a report, “world economic output in 2018 depicted, Bangladesh as the 44th largest economy in the world in terms of nominal GDP in 2017 and the 32nd in terms of purchasing power parity”. In the financial year, 2018-2019 GDP of Bangladesh was 302.6 billion US dollars which were 4.2 times that of the financial year 2005-2006. Synchronization of monetary policy with fiscal policy and digitalization of management brought outstanding output. Bangladesh showed the universe how poverty reduction and development achievement are done in a short period. Bangladesh started its journey from a poor to lower-middle-income status in 2015 and desiring to become a developing country in 2026. In the year 1991 poverty rate was 43.5% which was 14.3% in the year 2016. United Kingdom-based magazine Business Insider depicts that “Bangladesh’s economy has been one of the top performers in Asia over the past decade, averaging an annual growth of more than 6%, with most of the growth that the country has achieved coming from the garment sector crowned as New Asian Tiger”. They suggested that for achieving the

expected growth of 8%, Bangladesh must diversify its export items. Goldman Sachs identified Bangladesh as the next 11 rising economies.

Sill (2005) concluded that a budget deficit is termed as a shortfall of revenue from expenditure. Surplus or deficit depends on the forecasting of revenue collection. Oxford dictionary defined "budget deficit as a negative balance of the public budget between the received income and the expenditures made by the end of the budget execution". Budgeting is the fundamental tool to control and execute the ruling party's economical ideology. It is necessary to synchronize between budget and actual expenditure for the expected outcome. The Source of deficit financing is very essential because the different sources of funds impacted the economy differently. A known source of deficit financing is: borrowing from the central bank, commercial bank, issuing bond or savings certificates, and from international sources. Most economists agreed that deficit financed by the central bank causes inflation, the commercial bank reduces private investment, issuance of security increases the cost of fund, and international sources create pressure on reserve. The central bank of Bangladesh control interest rate in two ways- the repo rate and the reverse repo rate. The repurchase rate is used to inflate the amount of money flow and the reverse repurchase rate is used to deflate the amount of money in an economy.

## 2.0 Literature Review

Impacts of budget shortage on the gross domestic product are generalized by "three schools as Neoclassical, Keynesian and Ricardian (Bernheim, 1989)". According to Neoclassical thought, if economic resources are completely engaged then savings will decrease the increase interest rate. Thus continuous shortage (deficit) pooled private capital. As a result economic growth rate decreases. Keynesian thought assumes unemployment increases government expenditure that needs borrowing and would expand output. Ricardian thought assumes budget shortage not impacted gross domestic production. So, the Neo-classical school of thought is the most relevant regarding the relation between budget shortage and gross domestic production. Hirschman, 1969 opined that deficit is the result of imbalance growth that gives more focus on innovation by offering incentives for pushing economic activity and progress. Cebula, 1988

conducted a study and found a strong association ship between shortfall of budget and interest rate which is statistically significant. Budget scarcity is immaterial or neutral in verifying the relation between budget shortage and gross domestic production and does not affect most of the macroeconomic parameters (Barro, 1989). Martin and Fardmanesh (1990) conducted research in exploring the relations among some revenue decision variables on the gross domestic product of seventy-six (76) different countries over the world categorized as developed and developing for the years 1972 to 1981 by sampling cross-sectional data with the specific model. The study concludes that budget shortage inversely affects growth rate. Where government expenditure increases growth and budget deficit increases taxes. They also found that "fiscal policy variables have impacts on economic growth in the case of developing countries, budget deficit negatively impact on the growth rate for low-middle-high income countries". Easterly and Shmidt-Hebbel (1993) did another paper on 10 developing nations and found interesting things that were self-fortifying. They also found interest rate is changed due to budget deficits. Al-khedair (1996) conducted a study and concluded a short-run positive relation between budget shortage and interest rate and no effect in long run. Ghali and Al-Shamsi (1997) completed empirical research by using quarterly data series and concluded that "there is a positive relationship between fiscal policy (investment) and economic growth". Kneller et. Al., (1999) conduct a study to establish a connection between the shortage of budget with the gross domestic product and found a strong connection within them. Prunera (2000) conducted a study to find a connection between fiscal shortage and gross domestic production and concluded that the fiscal shortage influenced gross domestic production in a very weak form and not significant but in the long-run deficit financing in human development, education, infrastructure, etc. is good for the economic health for a nation. This investment by debt financing must be selective by ensuring payback certainty otherwise it may be dangerous or harmful for the economy from the viewpoint of gross domestic production. Many countries of the world cover the budget deficit by increasing taxes and reducing living standards which might be lowering future economic growth and borrowing capacity. He expressed a great question, "does budget deficit influence economic growth".

Gemmel (2001) conducted a study on high, medium, and low-income status countries and found an inverse connection between fiscal shortage and gross domestic production in the above-stated country's status. Brauningner (2002) conducted research that validates the Gemmel study and agreed with Gemmel's finding but he added "if budget deficit ratio exceeds a critical level, then economic growth declines continuously". But he should clarify the critical level by definition with postulates and conditions. Alfredo Schclarek (2004) conducted "a study on developing and industrialized countries to find a relationship between debt financing and economic growth and vindicate an inverse relationship between economic growth and external debt for developing countries but no relation exists between debt and economic growth in industrialized countries". Vuyyuri and Seshaiiah (2004) conducted research in India to explore the influences of some macroeconomic parameters on its total domestic output. They found "there is no relation between budget deficit and economic growth regarding in the context of India, there is no significant relationship among the variables like money supply, consumer price index, currency exchange rate, gross domestic product and economic growth. They also found bi-directional causality between budget deficit and currency exchange rate. They argued budget deficit impacted gross domestic product but the gross domestic product was not impacted by the budget deficit. They used co-integration technique and vector error correction tool for the year of 1970-2002". Perotti (2004) directed research on five countries of "organization of economic co-operation and development to explore a relationship between budget deficit and economic growth and found a weak impact of budget deficit on economic growth". Chowdhury (2004) researched 5 ASEAN countries to explore a connection between fiscal scarcity and gross domestic production by applying a short-term connection identifying technique. The study found no connection between the studied variables. Deficit money should invest in infrastructure development and the public utility sector because it might increase productivity. As a result gross domestic production increases which boost economic growth. If a budget deficit arises crowding out the economy then the results will be opposite to the previous. This study gives an inconclusive result. Chaudary and Shabbir

(2005) conducted a study on Pakistan and opined that economic stability depends on both monetary and fiscal policy variables. They explored the relation by applying basic general regression assumptions and opined fiscal policy and monetary policy variables influenced budget deficit. Huynh (2007) directed research on Vietnam, a developing country on the Asian continent. He uses the time series panel data of around twenty years to find a relationship between fiscal shortage and gross domestic production. The study found an inverse connection between fiscal shortage and gross domestic production in the case of Vietnam. Bose et, al. (2007) directed research to explore a relationship between fiscal scarcity and gross domestic production. They concluded a positive relationship between fiscal scarcity and gross domestic production. They used a dataset for the long period from 1970-1990. However, few researchers had seen an inverse relationship between fiscal shortage and gross domestic production for some developing countries of the universe. They suggested that deficit finance must be invested in the productive sector like human development, capital development, education, health, infrastructure development, etc. As a result, growth will be increased. International Monetary Fund (IMF) directed a research paper on developing countries to examine the influence of fiscal scarcity on gross domestic output. The study concluded an inverse connection between fiscal scarcity and gross domestic output. Majumder (2007) examined a study on Bangladesh to establish a connection between budget shortage and gross domestic production. This study used rank matrix, VAR, or VECM technique with Granger causality to find a relationship with its nature or trends of causality. He concluded an effective direct connection between budget shortage and gross domestic production. The study concluded, in the case of Bangladesh budget shortage crowding in out private investment means private investment is not increasing. Alfonso and Turin (2008) conducted a study on European Union countries to find an association with government expenditures to gross domestic product. Brender (2008) conducted a study on "developed and developing countries to explore a relationship between budget deficit and economic growth". He found various results for developing and developed countries by analyzing the cross-sectional analysis technique. Fiscal shortage boosts the gross

domestic product of developing countries because they spend money for productive purposes. On the other hand, developed countries found opposite results to developing countries' results because they spend money for non-productive (kind) purposes. Adak (2010) examined research on Turkey to assess the connection between budget shortfall to gross domestic output to find a reverse connection between budget shortfall to gross domestic output. He also opined "there is no retrospective effect of fiscal deficit on economic growth and no long-term relationship". Rehman et, al. (2011) conducted research on the dataset of Pakistan for defining the connection between fiscal shortage to gross domestic product. They concluded an inverse connection exists between the studied variables. They gave more attention, to why fiscal shortage arises. They found that the underlying cause for fiscal deficits is confined tax slab, illogical tax structure, clumsy tax rule/law/decreed in income tax ordinance, excessive defense expense, huge interest on borrowings, instability of price, and one of the most important cause is political unrest. Fatima et al (2011) directed research on Pakistan for a time frame of 1980 to 2009 with the help of statistical application software. They concluded that the budget deficit impacted economic growth and current account balance. Taylor et, al. (2012) explored the influence of fiscal shortage on GDP growth and interest rate for a half-century (1961 to 2011). The study uses a multi-phase VAR model with IRF and other statistical and econometrical tools. They found an effective positive connection between fiscal shortage and gross domestic production. They also concluded higher expenditure with lower tax rate boost gross domestic product. Mohanty (2012) directed further study on fiscal scarcity and gross domestic output of the Indian economy in the period 1970-2012. He found two reciprocal conclusions which are opposite to each other "there is an inverse relationship between budget deficit and economic growth in the long-run, but in the short-run, he found a positive relationship". The reason behind this reverse result is financial system reformation, he said. The study categorized its post and pre-reform budget deficit. Goher et al (2012) concluded fiscal deficit influenced GDP growth negatively. They directed a study on the economy of Pakistan for the time of 1978-2009. The study uses the ordinary least square

principle. They also concluded that due to the budget deficit, Pakistan is unable to spend more money on productive purposes, this lack of revenue did not boost economic growth. Ezeabasili et al (2012) analyzed a relation "between budget deficit and economic growth and found that fiscal deficit affects economic growth negatively (a 1% increase in fiscal deficit can cause a decrease in economic growth by 0.023%) using a dataset throughout 1970 to 2006 by applying co-integration and structural analysis method". Biza et al (2013) directed research on the emerging tiger of Africa named South Africa and found "that there is a negative relation between budget deficit and economic growth" because it crowding out private sector investment. Risti et al (2013) examined a study and found that "the budget deficit has an impact on all the macroeconomic variables and at the same time macroeconomic indicators affect budget deficit or budget balance". Cinar et al (2014) directed a study on Eurozone ten economies and found a direct connection between fiscal scarcity to GDP growth. The research selects five top and five lowest economy status countries for research of quarter data of recession period. Hasan et, al. (2014) directed research on the United States of America in fiscal deficit and gross domestic product growth. The study also explores the causality among budget deficit, unemployment, inflation, and interest by using a statistical analysis system. They found budget deficit and unemployment had an inverse impact on economic growth. They also found an interrelation between inflation, unemployment, economic growth, and interest rate. Nayab (2015) analyzed the influence of budget shortage on GDP growth in the Pakistani economy over a long time from 1976 to 2007. The study found a certain relation between fiscal scarcity to gross domestic production by applying co-integration and the VECM technique of SAS software. Haider et al (2016) guided a study on the economy of Bangladesh under the time frame of 2000 to 2012. The study uses "stationary test, Vector Auto-Regression (VAR), Vector error correction (VEC) and causality test to explore the relationship between budget deficit and economic growth of Bangladesh, found an inverse relationship between fiscal deficit and economic growth of Bangladesh and also found interrelationship among fiscal deficit, inflation, and real currency exchange rate". Rana, Wahid et, al. (2016)

examined research on Bangladesh's economy using multiple econometric tools and techniques to establish a relationship. The study found fiscal deficit impacted the gross domestic product of Bangladesh negatively. They suggested that efficient and effective tax reformation, synchronizing fiscal policy with monetary policy, good governance, and political durability will increase investment. As a result gross domestic product will increase. Hussain and Haque (2016) conducted a study to find association "among foreign direct investment, export, and growth for the economy of Bangladesh". Using the VECM technique this study concluded that economic growth is positively impacted by foreign direct investment and export. This also reduces capital flight from Bangladesh. Hussain and Haque (2017) also conducted a further study on Bangladesh. "This study explores a relationship between monetary policy and economic growth". They selected money supply as a monetary policy variable and gross domestic product growth for economic growth. ECM and causality techniques and found a positive relationship between them. The study advised us monetary policy should be introduced by adjusting "interest rate and inflation to cool the economy that will continue the growth of the economy". After considering the concurrent literature, a great question arise, does the budget deficit truly influence gross domestic product of a country? This is a controversial issue that has been seriously discussed among eminent economists, researchers, and students of economics. But the interesting thing is that the output is inconclusive. The budget deficit is cited as the most important macroeconomic parameter influencing economic growth. "To find a relation between budget deficit and economic growth" induce many different school of thoughts. Among them, there are five famous theories: 1) Classical theory of economics 2) Keynesian school of thought 3) Ricardian Equivalence theory 4) Hirschman's disequilibrium theory and 5) Rostow's growth stage model. The classical theory of economics believes that government spending increases aggregate demand known as the "crowding in" effect stimulates the economy and economic growth. The Keynesian school of thought believes that it is the opposite of classical theory. Whenever aggregate demand is low, rising government spending augments the economy. In the last world fallback period of 2007 to 2009 most of country of

the world found good output by following this policy. Ricardian Equivalence Hypothesis assumes that "fiscal deficits cannot stimulate the economy; an increased deficit implies a future tax whose present value is equal to the value of the deficit". In the twentieth-century prominent economist, Rostow introduce an economic model on the growth stage which became the most famous and effective model for development economics. He found that "five stages of development have been labeled that every country must pass through as they develop from the initial stage (traditional society) to an advanced stage (the age of high mass consumption) where government investment is necessary to develop the infrastructure and social capital that will open up the way for the private sector to come forward to invest and develop by conducted a study on the United States of America and Western Europe". Hirschman introduce a theory titled Disequilibrium growth model and cited that "development is a chain of disequilibrium that is a symptom of gains and losses in a competitive economy that must be sustained rather than eliminated; if the government invest in key sectors of the economy and builds the necessary infrastructure, the private sector will step in and invest in other sectors that become profitable after the initial government investment. Developing countries often have lower savings and investment than developed countries; thus limited investment in key sectors is a very attractive strategy to break the vicious circle of poverty".

### 3.0 Research Questions and Hypothesis

The primary objective of this study is to investigate whether and how to budget deficit influences economic growth. More specific research questions are as follows:

- a. Whether, how, and to what extent does the budget deficit impact on the economic growth of Bangladesh?
- b. Is there is a relation between budget deficit and economic growth?

This research uses the following alternative hypothesis:

- a. There is no relation between budget deficit and economic growth.

## 4.0 Methodology

This research collected a secondary dataset over a long time from a prominent and reliable source named IMF. Data of (the GDP) growth rate is termed as the economic growth rate (EGR), Government revenue (GR), and government expenditure (GE) consequences budget deficit (BD) then calculate fiscal shortage ratio in respect to the gross domestic product (GDP) is prepared for a time from 1982-2020. At first, the study observed the trends of the studied variables. Also observed are the trends of economic growth and fiscal shortage ratio to gross domestic product for Bangladesh. The study checked the dataset's summary statistics and correlation matrix for time series datasets. Test of the stationary tendency of a time series dataset before exploring further relation between them is mandatory. Generally, most of the studies use a unit root test of data series is stationary or not. This paper explores the lag order by doing lag order selection criteria, after that, the study did a rank test before conducting a vector error correction model with causality assuming the following model:-

$$y_t = \alpha + \beta_{y(t-1)} + \gamma x_t + \varepsilon_t$$

Here, represents dependent variable = EGR<sub>t</sub> and represents independent variable = BDP<sub>t</sub>. ADF test concludes with the stationary of the data series but we need non-stationary data, which is done by differencing. Secondly finding a co-integration rank is very essential. Johansen and Juselius's technique is more appropriate for having directional causality. The study found co-integration and then run VECM model for estimating the associations by considering the following equations:-

$$\Delta EGR_t = \alpha_{1t} + \beta_{1t} \sum_{i=1}^{n-1} EGR_{t-i} + \gamma_{1t} \sum_{i=1}^{n-1} BDP_t - \theta_{1t} ECM_{t-1} + \varepsilon_{1t} \dots \dots \dots i$$

$$\Delta BDP_t = \alpha_{2t} + \beta_{2t} \sum_{i=1}^{n-1} BDP_{t-i} + \gamma_{2t} \sum_{i=1}^{n-1} EGR_t - \theta_{2t} ECM_{t-1} + \varepsilon_{2t} \dots \dots \dots ii$$

Denotes first order differentiation symbol, and are the coefficients of error correction terms and and represents random terms of errors.

Many previous researchers conducted studies on the almost same topic but methodology, selection of variables, time frame, etc. are different. This study is unique in selecting variables that cover a large time and compare with another country and also applies twice most of the tests for more surety.

## 5.0 Empirical Results Analysis

Trend Analysis: Gross domestic product (GDP) of Bangladesh is consistently rising over the period. The GDP of Bangladesh in 2020 was BDT 11477.97 billion which was BDT 1602.09 billion in 1982 that means increased more than seven times. Government revenue (GR) in 2020 was BDT 2651.8 billion that was BDT 24.4 billion in 1982 which increased more than 109 times. Government expenditure (GE) in 2020 was BDT 4170.36 billion that was BDT 52.35 billion in 1982 which increased more than 80 times. The budget deficit (BD) in 2020 was BDT -1518.6 billion that was BDT -27.95 billion in 1982 which increased more than 54 times. Bangladesh experiences a surplus budget for the first time from 1991 to 1994. After that, it was always a deficit but from 2018 it reached double digits in percentage. In 2018 it was 10.21%, in 2019 it was 12.49% and in 2020 it was 13.23%. The following table summarizes that.

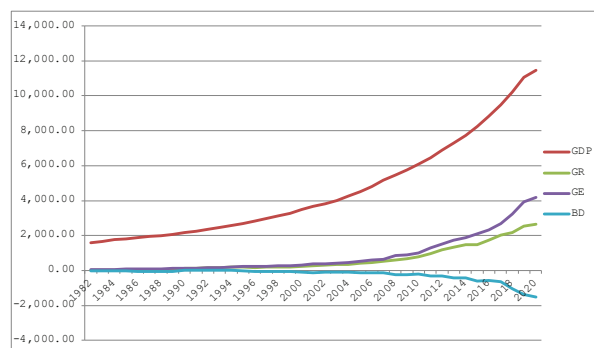
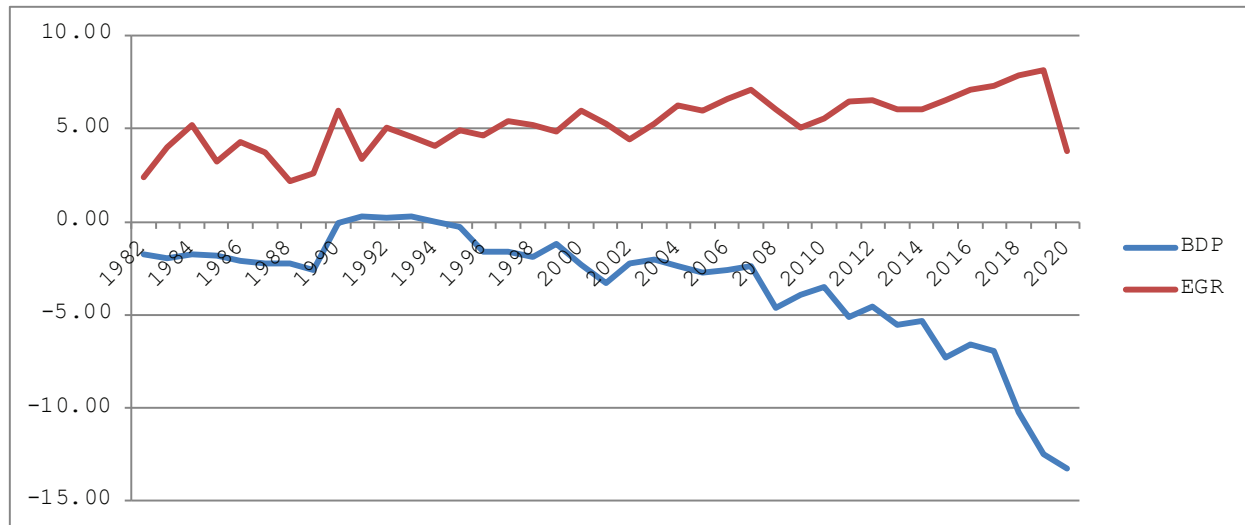


Fig-1: Trends of BDP of Bangladesh.

Table-1: EGR and BDP of Bangladesh.

Period	EGR	BDP
1982-1990	3.72	-1.84
1991-2000	4.80	-0.81
2001-2010	5.75	-2.97
2011-2020	6.58	-7.73

The fiscal shortage as a percentage of GDP (BDP) of Bangladesh was consistently declined over the decades. From 1982 to 1990 it was an average of 1.84% that improved in 90 decades was 0.81%, in 2001-2010 was 2.97% and last ten years it jumped to 7.73% at an average.



**Figure-2: EGR and BDP of Bangladesh.**

The economic growth rate of Bangladesh was continuously improved over the decades. From 1982-1990 it was 3.72% that reached 4.8% in 1991-2000, 5.75% in 2001-2010 and 6.58% in 2011-2020.

**Table-2: summary statistics of variables.**

	<b>EGR-BDG</b>	<b>BDP-BDG</b>
Mean	5.25	-3.38
Median	5.26	-2.31
Standard Deviation	1.45	3.19
Kurtosis	-0.29	2.70
Skewness	-0.22	-1.62
Minimum	2.16	-13.23
Maximum	8.15	0.30
Obs	39	39

Summary statistics show that the economic growth rate (EGR) of Bangladesh is an average of 5.25% and platy kurtic with left tailed while it is 5.16 and platy kurtic. The budget deficit percentage (BDP) mean of Bangladesh was 3.38%. Bangladeshi BDP was also left-tailed but platy kurtic having a value of 2.7 that is almost meso kurtic.

**Table-3: Correlation Matrix**

	<b>BDP</b>	<b>EGR</b>
BDP	1	
EGR	-0.46	1

The above table concludes a moderate inverse correlation between fiscal shortage and the gross domestic product of Bangladesh.

**Table-4: Stationary Test**

	<b>TS</b>	<b>1% CV</b>	<b>5% CV</b>	<b>10% CV</b>
BDP				
Z(t)	1.950	-3.668	-2.966	-2.616
DBDP				
Z(t)	-3.971	-3.675	-2.969	-2.617



EGR				
Z(t)	-2.417	-3.668	-2.966	-2.616
DEGR				
Z(t)	-6.703	-3.675	-2.969	-2.617

Table 5 exhibits the Augmented Dickey-Fuller test results for all variables from Bangladesh's perspective. ADF tests assumed the Null Hypothesis stationary. The above table depicts that the value of test statistics for BDP was 1.950 which is less than the critical values of 3.668, 2.966, and 2.616 are significant levels. So we cannot reject null hypotheses, series have a unit root or are not stationary. The first difference value of test statistics for DBDP was 3.971 which is greater than that of the critical values of 3.675, 2.969, and 2.617 are significant at the maximum level. So all datasets are stationary. The value of the t statistic for EGR was 2.417 which are less than the critical values of 3.668, 2.966, and 2.616 are significant at all level. So the series has a unit root or is not stationary. The first difference value of test statistics for DEGR was 6.703 which is greater than that of the critical values of 3.675, 2.969, and 2.617 are significant at all level. So the series has not unit-root or stationary.

**Table-5: Lag test**

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-147.249				17.3362	8.52852	8.6174	
1	-100.653	93.191	4	0.000	1.52131	6.09448	6.18652*	6.36111*
2	-99.0874	3.132	4	0.536	1.75374	6.23357	6.38697	6.67795
3	-90.8135	16.548*	4	0.002	1.38337*	5.98934*	6.20411	6.61148
4	-90.6761	0.27478	4	0.991	1.74704	6.21006	6.48619	7.00996

The above table exhibits the result of lag selection criteria using various methods of criteria like FPE, AIC, HQIC, and SBIC. Several criteria indicate different lag orders. Few methods suggested lag number 1 and some suggested lag number 3. In this case, econometricians concluded to select the minimum lag number for searching further relationships is best. That is why the study considers the lag number should 1.

**Table-6: Rank test**

Max rank	Parms	LL	EV	TS	5% CV	1% CV
0	2	-117.6129	.	18.2663	15.41	20.04
1	5	-108.50832	0.38071	0.0572*_	3.76	6.65
2	6	-108.47973	0.00150			

Max rank	Parms	LL	EV	MS	5% CV	1% CV
0	2	-117.6129	.	18.2092	14.07	18.63
1	5	-108.50832	0.38071	0.0572	3.76	6.65
2	6	-108.47973	0.00150			

The study observed the value of both statistics at a maximum significance level. Since  $0.0572 < 3.76$  and  $6.65$ , then verify a co-integrating relation. Both results conclude that there is one co-integrating equation. So the study should run VECM for estimating the expected relation to Bangladesh.

**Table-7: Short and Long-term Relation Test**

D_egr	<b>equation</b>	<b>Coef.</b>	<b>Std.Err.</b>	<b>z</b>	<b>p&gt;z</b>
	_cel LI.	-2.073661	.2485881	-8.34	0.000
	degr LD.	.4872165	.1536585	3.17	0.002
	dbdp LD.	-.6502108	.1282893	-5.07	0.000
	_cons	-.0106068	.1643017	-0.06	0.949
D_bdp	_cel LI.	.2833395	.3380624	0.84	0.402
	degr LD.	-.1384081	.2089648	-0.66	0.508
	dbdp LD.	-.4359897	.1744644	-2.50	0.012
	_cons	-.0776271	.2234388	-0.35	0.728

**Validating the short term**

Equ	Parms	$\chi^2$	P> $\chi^2$
_cel	1	17.34947	0.0000

**Validating Long term**

-cel	beta	Coef.	Std. Err.	z	P>z
	degr	1.000	.	.	.
	dbdp	-.4390146	.1053989	-4.17	0.000
	_cons	-.1654126	.	.	.

From the above test output, the error correction term (-2.073661) and coefficient of EGR (0.4872165), and BDP (-.6502108) all are significant at the maximum level. The model confirms a short-run relation within the studied variables of Bangladesh. The value of \_cel of the co-integrating equation was verified at the maximum level. Johansen normalized restriction imposed model depicts an inverse influence of fiscal shortage on the gross domestic product of Bangladesh for both terms.

**Table-8: Autocorrelation test**

lag	$\chi^2$	df	P> $\chi^2$
1	14.5486	4	0.005574
2	9.9843	4	0.04069

The study exhibits the results of the autocorrelation test that concludes no autocorrelation that was properly specified.

**Table-9: Normality of errors test**

J-B

Equation	$\chi^2$	df	p > $\chi^2$
D_egr	5.202	2	0.07418
D_bdp	1.298	2	0.52245
ALL	6.501	4	0.16473

Skew

Equation	Skewness	$\chi^2$	df	p > $\chi^2$
D_egr	-.7929	3.877	1	0.04895
D_bdp	-.23839	0.350	1	0.55385
ALL		4.227	2	0.12079

Kurto

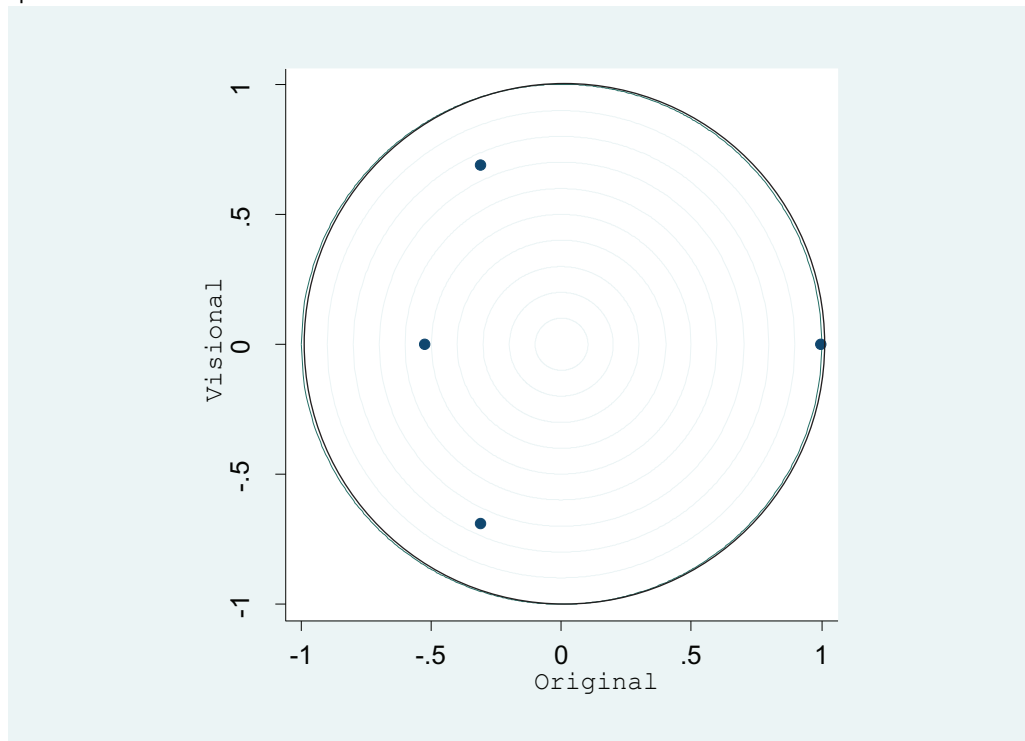
Equation	Kurtosis	$\chi^2$	df	p > $\chi^2$
D_egr	3.9273	1.326	1	0.24960
D_bdp	2.2158	0.948	1	0.33023
ALL		2.274	2	0.32086

In the above table (table-9) the study conducted the normality tests of the residuals and finds that are normally distributed. Jarque and Bera's output accept the alternative hypothesis, in Skewness and kurtosis, we cannot reject null hypotheses. Overall the study cannot reject the null.

**Table-10: Stability condition Test**

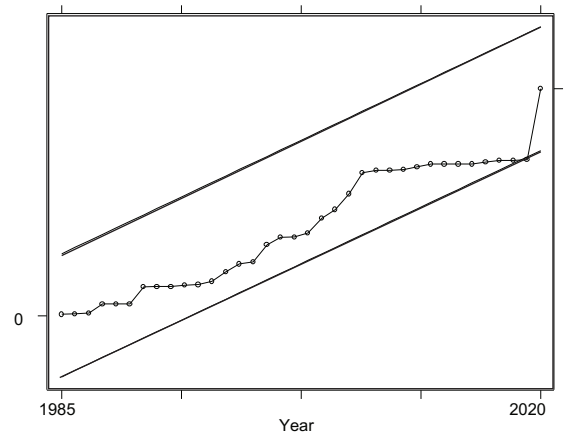
Eigenvalue		Modulus
-.3109352	+ .6923868i	.758999
-.3109352	- .6923868i	.758999
-.5249545		.524954

Table 12 shows the output of the stability test of the eigenvalues. It concluded that the studied model was specific.



**Fig-3: unit-root circle graph**

The study conducted companion matrix validates a co-integrating equation. We sketch eigenvalues to visualize a graph. We found that no one eigenvalue is close near to the unit circle which confirms that the model is specified accurately.



**Fig-4: Cusum sq graph**

The above figure identified that the upper and lower bounds of recursive residual values over the whole period (year to year) are plotted. All values are within the boundaries at a 5% significance value which means that the model was stable.

**Table-I I: Heteroskedasticity test**

$$\text{chi2}(2) = 7.69$$

$$\text{Prob} > \text{chi2} = 0.0214$$

Source	Chi2	Df	P
Hetero	7.69	2	0.0214
Skew	16.69	1	0.0000
Kurto	1.24	1	0.2661
Tot	25.62	4	0.0000

The study observed the p-value of table-I I  $0.0514 > 0.05$  which means the study finds the significance of the heteroskedasticity problem. Robust the error to solve those problems.

## 6.0 Conclusion

I discussed the influence of the shortfall of budget ratio concerning the gross domestic product of Bangladesh over a long period from 1982-2020 in a dataset collected from the international monetary fund (IMF). The study found a reverse connection between budget shortfall to gross domestic product growth after analyzing the vector error correction model. These “findings support the neo-classical theory of economics which is opposite to Keynesian theory of economics”. According to the outcome of the study, Bangladesh should give more focus on government spending because planning and quality of spending are very important for sustained economic growth. It is very crucial because the spending purpose determines the output level. If Bangladesh spends more money on an unproductive sector like revenue expenditure, defense expenses rather than productive sectors like tourism, agro- processing, electronics goods & parts production, human development, infrastructure development, land-water-rail transport system development that will create crowding out effect in the economy. That is why private sectors will suffer a capital crisis. The investment in the private sector might be reduced and production or contribution of the private sector will also decrease. As a consequence of that gross domestic production may hamper and also decrease gross domestic product growth. The quality of spending means the way or procedure of spending. The government money spending authority should give more attention to the cost-benefit analysis scenario for the expenditure of a single taka. They may update or develop a standard operating procedure to spend money and do budget variance analysis. Other factors are corruption, bureaucratic complexity, lack of transparency, lack of proper accounting, lack of good governance, and incompetency is the

barrier to public money spending utilities. Spending in useful and productive sector of every currency will boost the economic growth. Bangladesh government may train their employees, and the private sector to improve in choosing where and how the money should be spent. Project implementation capacity and procedure of development work hamper economic growth because the development projects execution is delayed and quality is below the desired level. It increases the monetary and social cost and also downgrades the cost-benefit ratio in monetary and financial aspects. The study observes that the budget deficit percentage of gross domestic product is increasing day by day as well as over the studied period. It creates extra pressure on the economy of Bangladesh. Since the studied result showed the reverse influence of budget shortage on gross domestic production then Bangladesh should give more focus on reducing the budget deficit. The source of deficit financing and the way of reducing the budget deficit are the two dimensions of the budget deficit. Loan from domestic and from abroad are the sources of fiscal deficit financing for a country. The loan from the local commercial bank, issuing the bond, and government security certificates are well-known sources of fiscal deficit financing. This creates interest pressure and reduces private investment. International sources of finance are a loan from other countries and world development partners and development agencies. Most of the cases they impose stringent conditions. It also reduces foreign currency reserve, increases trade imbalance, and might increase inflation, real exchange rate, cost of production and decrease purchasing power. Results are varied from case to case. The budget deficit percentage of gross domestic product is the main player in reducing the gross domestic product growth in the case of Bangladesh. It is directly related to government fiscal policy decisions that are interdependent on monetary policy decisions. The first government of Bangladesh should harmonize fiscal policy with monetary policy. Collecting more revenue or reducing expenditure are the way to reduce the budget deficit. Collection of revenue increases by expanding tax net, increasing tax rate, and tax base, imposing more duty, levy on new items, or increasing rate. Value-added tax switching with the hope of collecting more revenue for Bangladesh. VAT collection is increasing year to year. The government of Bangladesh should restructure

the direct and indirect tax system of Bangladesh by concealing the loopholes of tax evasion from the viewpoint of a practical, reliable, effective and efficient manner. Government must reduce expenditure on non-productive and luxury items. The study suggests that the Bangladesh government should take necessary policy actions to formulate a surplus budget.

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