The Impact of Budget Deficit on Economic Growth of Afghanistan

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ABSTRACT

This study investigates the effect of budget deficit on the economic growth of Afghanistan, for this purpose, the quarterly time-series data from the period 2003 to 2017 have been used. To test time-series properties and selection of the model, Hylleberg-Engle-Granger-Yoo (HEGY), and Augmented Dickey-Fuller (ADF) Unit root test has been employed. The long-run relationship between dependent and explanatory variables has been verified by using the Autoregressive Distributed Lag (ARDL) bounds test. Based on the time series data ARDL model has been used. This study found that all variables became stationary at a 5% level of significance at the level and first difference. The empirical findings reveal a positive and significant long-run relationship between the budget deficit and economic growth of Afghanistan, consistent with the Keynesian Hypothesis.

ملخص

تبحث هذه الدراسة في تأثير عجز الميزانية على النمو الاقتصادي لأفغانستان، ولهذا الغرض، تم استخدام بيانات السلاسل الزمنية الفصلية من الفترة الممتدة ما بين 2003 و 2017. ولاختبار خصائص السلسلة الزمنية واختيار النموذج، تم استخدام اختبار Hylleberg-Engle-Granger-Yoo (HEGY) واختبار جذر وحدة (ADF) Augmented Dickey-Fuller. وقد تم التحقق من العلاقة طويلة المدى بين المتغيرات المعتمدة والتفسيرية باستخدام اختبار الانحدار الذاتي للإبطاء الموزع (ARDL). كما تم استخدام نموذج الانحدار الذاتي للإبطاء الموزع استنادا إلى بيانات السلاسل الزمنية. ووجدت هذه الدراسة أن جميع المتغيرات أصبحت ثابتة عند مستوى 5% من الأهمية على المستوى والفرق

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الأول. وتكشف النتائج التجريبية عن وجود علاقة إيجابية وهامة طويلة المدى بين عجز الميزانية والنمو الاقتصادي في أفغانستان، بما يتفق مع الفرضية الكينزية.

ABSTRAITE

Cette étude examine l'effet du déficit budgétaire sur la croissance économique de l'Afghanistan, à cette fin, les données de séries chronologiques trimestrielles de la période 2003 à 2017 ont été utilisées. Pour tester les propriétés des séries temporelles et la sélection du modèle, les tests de racine unitaire de Hylleberg-Engle-Granger-Yoo (HEGY) et le test de racine unitaire augmenté de Dickey-Fuller(ADF) ont été utilisés. La relation à long terme entre les variables dépendantes et explicatives a été vérifiée en utilisant le test des limites du modèle ARDL (Reard autorégressif distribué). Le modèle ARDL a été utilisé sur la base des données de la série chronologique. Cette étude a montré que toutes les variables sont devenues stationnaires à un niveau de signification de 5% au niveau et à la première différence. Les résultats empiriques révèlent une relation positive et significative à long terme entre le déficit budgétaire et la croissance économique de l'Afghanistan, conformément à l'hypothèse keynésienne.

1.   Introduction

A budget deficit refers to a situation in which the amount of government expenditures exceeds its revenue(Fatima, Ahmed, and Rehman 2011). On the other hand, budget deficit or budget surplus is one of the most important macroeconomic factors that impact economic growth (Fischer 1993). Many developing countries think that budget deficits boost economic's prosperity and macroeconomic growth. Therefore, there are three main theories about the relationship between budget deficit and economic growth expressed in three school thoughts of Neoclassical, Keynesian, and Recardian. (Kurantin 2017; Nkrumah, Orkoh, and Owusu 2018). According to the neoclassical approach, the budget deficit will increase current consumption by shifting taxes for future generations, if economic resource are in full employment. An increase in consumption leads to a decrease in savings, and interest rates must to raise to balance the capital market. Rising interest rates reduce private sector investment, known as the "crowding out" effect of the budget deficit, which ultimately

reduces economic growth (Bernheim 1989). The second view belongs to Keynes. Keynes focuses more on the expansionary of the budget deficit and therefore expresses an antonym argument for the effect of the compensatory effect. According to Keynes, the budget deficit increases domestic production and makes investors more optimistic about the investment process and the amount of investment in the future. He refers to this effect as the "crowding in" effect. Keynes has considered two hypotheses for a better understanding of his points of view: first: not using all resources in full of employment. Second: is the assumption of myopia and lack of full access to liquidity in the condition of unused resources. This approach expects an increase in government spending, whether in the form of investment or consumption, which in turn is financed by government debt, raising economic growth through the multiplier factor. Ultimately, according to Keynes, a budget deficit, despite raising interest rates, may lead to economic growth and prosperity (Bernheim 1989). (SALEH and HARVIE 2005) supported Keynesian's perspective about the relationship between budget deficit and Economic growth; according to their survey of papers about this issue, They found that most of the essay's result reflects the positive and significant impact of budget deficit on economic growth and budget deficit cause induce of domestic absorption. Finally, Ricardo's theory of equality is formed based on the two assumptions of rational expectation that households are futuristic and the assumption of a household's limited horizon that is up to the time of taxation. According to this approach, increasing the budget deficit only delays the payment time that causes the current expenditure to pay with its interest rate in the future. Postponing the tax for the future does not change individual consumption. Ultimately, the effect of the budget deficit on economic growth is neutral (Velnampy 2013).

The need for exploring the relationship between the budget deficit and the economic growth of Afghanistan is justifiable for the following reason: First of all, the result of this research will help the policy maker of Afghanistan to make effective tax policies; and ensure the transparency collection of Afghanistan's government income. Second, this study will recommend to the policy maker to allocate the budget optimally to productive sectors of Afghanistan. Third, this study will be interesting for other researchers as the study considered other influential macroeconomic variables like interest rate, exchange rate, foreign direct investment, and inflation rate. Finally, the authors didn't find any research on the relationship between the budget deficit and the economic growth of

Afghanistan, so this research is necessary for making decisions and research.

2.   Review of Empirical Studies

The study has reviewed important papers that examine the impact of budget deficits on economic growth.

Aslam (2016) investigated the relationship between the budget deficit and economic growth of Sri Lanka for the period 1959 to 2013 and found that the budget deficit and economic growth had preserved a long-run dynamic relationship but no short-run dynamic relationship. He proved that the relationship between budget deficit and economic growth is positive in Sri Lanka. Badaik and Panda (2018) studied the impact of fiscal deficit on macroeconomic variables like; GDP growth, inflation, and private capital formation for the period 1970 to 2018 in India. Their findings from the research imply that there is a long-run equilibrium relationship between FD, inflation, and Growth of GDP, while FD is not statistically significant in the long run; however, in the short-run, FD has a positive effect on the inflation rate and a negative on GDP growth. According to this study, FD didn't influence private capital significantly in the short run. They suggested reducing the fiscal deficit. In a study conducted by Fatima et al. (2012), with the help of the Ordinary Least Squares (OLS) method, explored the association between the budget deficit and economic growth of Pakistan while using annual data from 1978 to 2009. They found a negative impact of budget deficit on the economic growth of Pakistan, so they suggested preventing a certain level of the budget deficit for having the desired growth rate. Dritsakis and Stamatiou (2016), in cross-sectional research, investigated the impact of Budget deficit and foreign direct investment on the economic growth of Baltic countries, considering the data for the period of 1995 to 2012. The result shows a positive relationship between foreign direct investment and economic growth and negative relation between budget deficit and economic growth in the long run. Also, the causal relationship shows a unidirectional relationship from foreign direct investment to economic growth and budget deficit to economic growth in both the short and long run. Van and Sudhipongpracha (2015) studied the impact of the budget deficit on the economic growth of Vietnam for the period 1989 to 2011 and used Fixed Effect Model. The article demonstrated that government deficit has no direct effect on economic productivity, while foreign direct investment

has a positive effect; meanwhile, interest rate showed a negative impact on the economic growth of Vietnam. This article suggested that instead of expanding the Government deficit, Vietnam requires doing administrative and regulatory reforms to warrant an efficient use of government resources. Nkrumah, Owusu, and Orkoh (2016) investigated the relationship between budget deficits and the economic growth of Ghana by using quarterly time-series data from 2000 to 2015 and the ARDL approach. The Article's result expressed the negative impact of budget deficit on economic growth. They recommended that government must allocate the budget spending to sectors that lead the economy to a high-growth rate without compromising the welfare of the citizenry. Rana and Wahid (2016) studied the effect of budget deficits on the economic growth of Bangladesh from 1981 to 2011. The study found a negative and significant relationship between the budget deficit and Bangladesh's economic growth. The study recommended reestablishing the rule of law, political stability of the country, renovation of tax structure, closing tax loopholes, and synchronizing fiscal policy with monetary policy to absorb additional domestic and foreign investment. Edame and Okoi (2015) explored the effect of fiscal deficit on Nigeria's economic growth in both regimes (Military and democratic) from 1986 to 2013. The article's result revealed that FSD had a significant impact on economic growth during the Military period, while it has not significantly affected a democratic regime. On the other hand, the study's outcome indicates a significant effect of gross fixed capital formation on economic growth in both regimes; however, the interest rate didn't significantly impact economic growth in both regimes. They suggested decreasing of lending rate to support investors. Finally, they asked to prevent the politicization of the budgetary process. Eminer (2015) studied the causal relationship between budget deficit and economic growth of NORTH CYPRUS. He applied ARDL to estimate the relation between all the variables in the period1983 to 2010. The ARDL bound test result shows that all variables are co-integrated. Finally, the result revealed an insignificant bivariate causal relationship between economic growth and the budget deficit. Gyasi (2020) found that budget deficits have a long-run and short-run effect on the economic growth of Morocco. This study conducted the relation of Macroeconomic variables from 1990 to 2017 using the ARDL model. Rahman (2012) investigated the impact of Malaysia's budget deficit on economic growth using the ARDL bound test and quarterly time series data from 2000 to 2012.This research showed that budget deficit has no impact on economic growth and follows the Ricardian perspective;

meanwhile, the relationship between productive expenditure and economic growth is positive and long-run. Hussain and Haque (2017) studied the relationship between Bangladesh's economic growth and fiscal deficit. They collected data from two different sources (Local and International) for the period of 1993-2016. Their result showed positive effect of BD on Economic growth based on Local data set and supported the Keynesian perspective, while the second model of them based on World Bank data indicated negative effect of BD on economic growth.

Mohanty (2019) analyzed the relationship between fiscal deficit and economic growth of India in both short-run and long-run, during the periods 1970–2012. He found a negative and significant relationship between fiscal deficits and economic growth in the long run while discards the short-run relationship between them. According to this research, the negative impact of fiscal deficit on economic growth increased in the post reform of fiscal deficit than its pre-reform. He recommended that India's government decreases subsidies and uses this money to invest in the most infrastructures, education, health, and other Sectors that cause higher economic growth. Ahmad (2013) examined the impact of the Budget deficit on the economic growth of Pakistan from the period 1971 to 2007. He found bi-directional causality running from Budget deficit to GDP and vice versa. Ojong et al. (2013) investigated the impact of fiscal deficit financing on the development of Nigeria's economy from 1980 to 2018 and applied the OLS regression technique to estimate the equation. They prepared six hypotheses for their research to analyze the relationship between the dependent variable (GDP) and independent variables (government budget deficit financing, unemployment, inflation, BOP, government financing, and government revenue). Their finding indicates a significant relationship between budget deficit financing and economic growth, an inverse relationship between unemployment and economic growth, a direct relationship between inflation and GDP, a significant relationship between GDP and government expenditure, and an inverse relationship between GDP and government revenue in Nigeria. They recommended budget transparency in the budget process. Kurantin (2017) studied the quantitative impact of continued fiscal deficit on the rate of economic growth, governance, and development of Ghana. He used the Ordinary Least Squares model to estimate the effects of variables on the economic growth rate from 1994 to 2014. The article's result indicates the adverse impact of the continued budget deficit on economic growth and development. He recommended

policies that could lead unsustained situations to a sustainable condition even if employing this policy causes a crowding-out effect. Biplob (2019) applied an Auto regressive distributed Lag (ARDL) Model to check the elasticity of explanatory variables and used the Vector Error Correction Model (VECM) to indicate directional causalities of the variables. His findings indicate a significant and positive long-run and short-run relationship between the budget deficit and economic growth of Bangladesh, while the government expenditure increases GDP only in the long run. This result supports the "crowding in" effect of the budget deficit in support of the Keynesian proposition. Furthermore, directional causalities result shows a unidirectional causality from budget deficit to economic growth. Nayab (2015) studied the relationship between budget deficit and Pakistan's economic growth from 1967 to 2007. Her finding supports the Keynesian perspective and indicates a positive impact of budget deficit on economic growth.

3.   Data and Methodology

A.   Data Description and Sources

This study has estimated based on quarterly time series data covering time period from 2003:1 to 2017:4. We collected annual data of variables from various sources, namely World Bank, International Monetary Fund and Afghanistan's finance ministry, based on National Budget Decree documents from different years. We converted the annual data of variables to quarterly through Eviews11. This research tried to investigate the relationship between budget deficit and economic growth of Afghanistan, So economic growth has introduced as dependent variable, namely GDPG. Independent variables considered are Budget deficit, Foreign Direct Investment, Real Interest rate, Inflation rate, and Real Exchange Rate. For analysis and applying the empirical model, in this research, we have used both logarithmic variables and non-logarithm variables, which has selected based on different tests. For estimation and Diagnostic tests of this research, we have used analysis package Eviews11. Table 1 displays the summary of the Article's variables, their sources, units, scale, and expected mark of them based on individual coefficient.

Table 1: Summary of Variable's sources, Units and Expected mark

Variables	Labeled	Unit	Scale	Expected mark	Source
Economic growth rate	GDPG	% change Per year	-	Positive	World Bank[4]
Log Budget Deficit	LBD	Local Currency(AFG)	Million	Positive/Negative	Ministry Finance of Afghanistan[5]
Log Real Exchange rate	LRER	Index (LCU Per US$, period average)	-	Positive/Negative	International Monetary Fund[6]
Real Interest Rate	RIR	% Change Per Year	-	Negative	World Bank[7]
Log Foreign direct investment	LFDI	Local Currency(AFG)	Million	Positive	World Bank[8]
Log of Inflation Rate	LINF	% Change Per Year	-	Negative	World Bank[9]

Sources: Author's collected data from Different site and Documents.

B.   Methodology

In analyzing the impact of government budget deficit on economic growth, most researchers used precise econometric processes and methods, such as the Vector Error Correction Model (VECM), Johansen co-integration test, Granger causality test, Ordinary Least square, and Autoregressive Distributed Lag Model (ARDL).

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[4]. Data are available at:
https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=AF.
[5]. Data are available at: https://www.budgetmof.gov.af/index.php/en/2012-12-06-22-51-13/national-budget.
[6]. Data are available at: https://data.imf.org/regular.aspx?key=61545854.
[7]. Data are available at:
https://data.worldbank.org/indicator/FR.INR.RINR?locations=AF.
[8]. Data are available at:
https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=AF.
[9]. Data are available at:
https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=AF.

In this study, we applied Autoregressive Distributed Lag Model (ARDL) to understand the impact of the budget deficit and some other variable on the economic growth Of Afghanistan. Pesaran, Shin, and Smith (2001) introduced the ARDL approach for testing the long-run and short-run relationship between dependent variables with explanatory variables. This approach enables us to estimate the models that their variables integrated I (0), I (1), or I (0), and I (1) together. The most important reason for using the ARDL model for estimating the effect of budget deficit on economic growth is that, this approach checks the relation of the Dependent variable with its lag as an explanatory variable, and lags of explanatory variables. In this paper, we follow the model introduced by Shojai (1999) and applied by Fatima et al. (2012) research with few changes to its variables. We used economic growth instead of the gross domestic product and foreign direct investment instead of gross investment. The mathematical model applied to assess the relationship between budget deficits with economic growth determined as;

$$GDPG = F\ (BD,\ RER,\ RIR,\ FDI,\ INF) \tag{1}$$

Where GDP is the gross domestic product growth rate, BD is the budget deficit, RER is the Real Exchange rate, RIR is the Real interest rate, FDI is the foreign direct investment and INF is the Inflation rate.

$$GDP = \beta_1 + \beta_2 BD_t + \beta_3 RER_t + \beta_4 RIR_t + \beta_5 FDI_t + \beta_6 INF_t + u_t \tag{2}$$

For the linearity of some variables, we took natural Logs from equation (2), so equation (3) shows the result.

$$GDP = \beta_1 + \beta_2 lnBD_t + \beta_3 lnRER_t + \beta_4 RIR_t + \beta_5 lnFDI_t + \beta_6 lnINF_t + u_t \tag{3}$$

Finally, the growth equation is given in the below equation:

$$\Delta GDP = \beta_1 + \beta_2 \Delta lnBD_t + \beta_3 \Delta lnRER_t + \beta_4 \Delta RIR_t + \beta_5 \Delta lnFDI_t + \beta_6 \Delta lnINF_t + u_t \tag{4}$$

We showed Natural logarithmic with ln operator and difference operator with Δ sign in the model. Where the elasticity of variables have introduced with coefficient, β_2, β_3, β_4, β_5, and β_6. β_1 is the drift components, t defines

time and u is the error term. Based on the analysis, equation 3 can be introduced in ARDL representation as:

$$\Delta GDP_t = \gamma_0 + \gamma_1 GDP_{t-1} + \gamma_2 \ln BD_{t-1} + \gamma_3 \ln RER_{t-1} + \gamma_4 RIR_{t-1} + \gamma_5 \ln FDI + \gamma_6 \ln INF + \sum_{i=0}^{m} \delta_{1i} \Delta GDP_{t-i}$$

$$+ \sum_{i=0}^{m} \delta_{2i} \Delta \ln BD_{t-i} + \sum_{i=0}^{m} \delta_{3i} \Delta \ln RER_{t-i} + \sum_{i=0}^{m} \delta_{4i} \Delta RIR_{t-i} + \sum_{i=0}^{m} \delta_{5i} \Delta \ln FDI_{t-i} + \sum_{i=0}^{m} \delta_{6i} \Delta \ln INF + \varepsilon_t \quad (5)$$

Based on equation (5) Δ is the first difference operator, m shows the lag order selected by the Schwarz Bayesian Criterion (SBC), γ_0 is the constant parameter, and ε_t, is the error term which has a mean zero and constant variance. The γ_1 to γ_6 parameters represent the long-run parameters, meanwhile, the δ_1 to δ_6 parameters act as representatives of the short-run parameters. Pesaran et al. (2001) suggested the ARDL bound test, for testing the existence long-run relationship between parameters. Based on this test the F-statistics is computed then will compare with upper bound test, if the F-statistics value is greater than the upper critical value, then Reject H_0 and accept the being long-run relationship between parameters. In this case the H_0 Hypothesis express no long-run relationship between parameters and H_1 indicates long-run relationship between parameters. So the null hypothesis is specified as:

H0 = γ0= γ1= γ2= γ3= γ4= γ5= γ6

H1 = γ0≠γ1≠ γ2≠ γ3≠ γ4≠ γ5≠ γ6

If long-run relationship between variables specified, then the following procedure would help to estimate the coefficient of long-run and short-run. The ARDL model specified for the long-run relationships of variables as:

$$GDP_t = \omega_0 + \sum_{i=0}^{m} \theta_{1i} GDP_{t-i} + \sum_{i=0}^{m} \theta_{2i} \ln BD_{t-i} + \sum_{i=0}^{m} \theta_{3i} \ln RER_{t-i} + \sum_{i=0}^{m} \theta_{4i} RIR_{t-i} + \sum_{i=0}^{m} \theta_{5i} \ln FDI_{t-i} + \sum_{i=0}^{m} \theta_{6i} \ln INF + \varepsilon_t \quad (6)$$

The short-run representation of the ARDL model is formulated as:

$$\Delta GDP_t = \omega_0 + \sum_{i=0}^{m} \lambda_{1i} \Delta GDP_{t-i} + \sum_{i=0}^{m} \lambda_{2i} \Delta \ln BD_{t-i} + \sum_{i=0}^{m} \lambda_{3i} \Delta \ln RER_{t-i} + \sum_{i=0}^{m} \lambda_{4i} \Delta RIR_{t-i} + \sum_{i=0}^{m} \lambda_{5i} \Delta \ln FDI_{t-i}$$

$$+ \sum_{i=0}^{m} \lambda_{6i} \Delta \ln INF + \psi ECT_{t-1} + \varepsilon_t \quad (7)$$

Where ψ represent the speed of disequilibrium adjustment between dependent and independent variables that is reformed in the short-run so as to convert to an equilibrium in long-run pathway. ECT (-1) indicates

the first lag of error correction term, and ɛt represent the error term that is called white noise.

4.   Results and Discussion

Descriptive statistics of variables applied in this Article are presented in Table-2. It reflects that most of the variables have changed considerably over the period of time [see Table 2]. For example, Economic growth rate (Gross Domestic Product growth rate in %) ranges from a minimum growth rate of 0.42% up to. 21.3%. Similarly, budget deficit (BD) of Afghanistan ranges from 62.1 Million AFG to 75234 Million AFG. Meanwhile, the findings of the research have rejected a moderate level of variability within the variables because the standard deviation shows high distance between data.

Table2: Descriptive statistics based on Annual data for the period (2003-2017)

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
GDP (Annual growth rate %)	7.21	5.35	21.3	0.42	6.21
BD in Million Afghanis	17256	323	75234.5	62.1	28428
RER (LCU per US $)	53.3	50.25	68.03	46.45	7.12
RIR (%)	9.35	10.70	17.54	-3.58	6.11
FDI in Million Afghanis	6076	3505	13413	2313	3990
INF (consumer price index %)	6.84	6.44	26.4	-6.8	7.77

GDP= Gross Domestic product growth rate, BD= Budget Deficit Million (AFG), RER= Real Exchange rate, RIR= Real Interest Rate (%). FDI= Foreign Direct Investment (Million AFG), INF= Inflation rate (%).
Source: Author's calculation based on Annual data of variables.

A.   Unit Root and the Co-integration Tests

For Estimating the ARDL Model first we need to check the stationarity of variables, to know the suitable order of integration in each variable. Thus, this research studied the order of integration by using, Hylleberg-Engle-Granger-Yoo (HEGY) and Augmented Dickey-Fuller (ADF) Unit

root tests. The HEGY test is used to test null hypothesis of unit roots at different frequencies (test statistic for each of the 0, harmonic pairs, and π frequencies, in addition to the joint test for all seasonal frequencies, a joint test for all frequencies other than 0, and a joint test for all frequencies including the frequency 0), that all of them are introduced as t (0), F (π), F ($\frac{\pi}{2}, \frac{\pi}{3}$), F (All season) and F (all). So, if the variables didn't become stationary at 0 frequency, we would apply ADF test to check their stationarity at level and first difference. The result of HEGY test indicates that variables are stationary in all frequencies except to 0 frequency See Table (3). Just RIR (Real interest rate) is stationary at all frequencies. Thus, for checking the non-seasonal stationarity of other variables, we applied ADF test. The ADF test result revealed that GDP, LnBD, and RIR are integrated at level or I(0), Meanwhile, LnRER, LnFDI and LnINF are integrated of I(1) See Table (4).

Table 3: HEGY test for checking stationary of variables

Variables	lags	t(0)	F($\frac{\pi}{2}, \frac{\pi}{3}$)	F(π)	F(all seas)	F(all)
GDP%	6	-1.9	40.3**	-6.3**	37.4**	31.3**
LnBD (Million AFG)	2	-2.3	38.5**	-3.6**	26.2**	24.1**
LnRER (index)	0	-2.1	31.5**	-4.1**	351**	264**
RIR (%)	5	-3.4**	10.2**	-3.0**	10.8**	17.8**
LnFDI (Million AFG)	2	-2.3	32.0**	-5.4**	30.2**	32.9**
LnINF (%)	1	-2.6	19.8**	-4.2**	24.8**	23.1**

GDP= Gross Domestic product growth rate, BD= Budget Deficit Million (AFG), RER= Real Exchange rate, RIR= Real Interest Rate (%). FDI= Foreign Direct Investment (Million AFG), INF= Inflation rate (%). ** represent significant of variables.
Source: Author's calculation Using Eviews11.

Table 4: ADF test for order of integration at level and first difference

Variables	Level			First Differences			Remark
	lags	ADF-statistics	P-value	Lags	ADF-statistics	P-value	I(d)
GDP%	2	-4.43	0.004***	-------	--------	--------	I(0)
LnBD (Million AFG)	0	-8.22	0.000***	-------	-------	-------	I(0)
LnRER (index)	1	-2.02	0.57	0	-2.60	0.01***	I(1)
RIR (%)	2	-4.25	0.000***	-------	-------	-------	I(0)
LnFDI (Million AFG)	4	-3.37	0.065*	3	-3.90	0.00***	I(1)
LnINF (%)	4	-2.68	0.25	8	-14.4	0.00***	I(1)

ADF=Augmented Dickey Fuller, GDP= Gross Domestic product growth rate, BD= Budget Deficit Million (AFG), RER= Real Exchange rate, RIR= Real Interest Rate (%). FDI= Foreign Direct Investment (Million AFG), INF= Inflation rate (%). Null hypothesis: there is no unit root. *** represent significant level at 1%, ** indicate significant level at 5% and * represent significant level at 10%.
Source: Author's calculation using Eviews11.

The stationary tests result revealed that all variables are integrated at level and first difference. So, for checking their long-run relationship, we applied ARDL Bound co-integration test. The F-statistics of ARDL bound compared with Upper bound and Lower critical values. Based on the ARDL bound test F-Statistics is greater than the upper critical value at 1% significance level. Therefore, the result reported in Table 5 shows the long-run relationship between variables.

Table 5: Autoregressive Distributed Lag Model Bound test for being co-integration

Critical value bound	F-statistics	90% Level		95% Level		99% Level	
Intercept with trend	24.27	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K=5		3.08	4.27	3.67	5.00	5.09	6.77

Dependent Variables

F(GDP)=F(GDP| LnBD, LnRER, RIR, LnFDI, LnINF)

GDP= Gross Domestic product growth rate, BD= Budget Deficit Million (AFG), RER= Real Exchange rate, RIR= Real Interest Rate (%). FDI= Foreign Direct Investment (Million AFG), INF= Inflation rate (%). K= indicates the number of explanatory variables.
Source: Author's calculation using Eviews11.

B.   Long run and Short run Analysis

This study used ARDL bound testing approaches to investigate the long-run coefficient of the budget deficit on Economic growth (GDP) where the GDP acts as the dependent variable. The long-run outcome of the ARDL bound test is reported in Table 6. The result of the Table 6 revealed that the coefficients of Budget deficit (lnBD) and Foreign Direct Investment are positive and statistically significant at the level of 1% while the remaining coefficients of variables are negative. Among the remaining variables that resulted the negative impact on economic growth, the Real Exchange rate (lnRER) is statistically significant while the Inflation rate (LnINF) and Real interest rate (RIR) are not statistically significant. The result shows a 1% increase in the Budget deficit and foreign direct investment respectively increases the economic growth by 1.44% and 6.37% in the long run. Meanwhile, a 1% increase in the real exchange rate (LnRER), Real interest rate (RIR), and Inflation rate (LnINF) respectively decrease the economic growth by 21.2%, 0.01%, and 0.83% in the long run. According to the table's result, it can be concluded that the impact of a budget deficit in Afghanistan supports the Keynesian theory and the result of this study confirmed the prior researches outcome (Aslam 2016; Gyasi 2020; Hussain and Haque 2017) that have reflected the positive effect of budget deficit on economic growth.

Table 6: Long-run coefficient Representation for ARDL Model (3, 0, 1, 1, 0, 0)

Variables	Coefficient	Standard Error	T-Statistic	Probability
LnBD	1.4428	0.5074	2.8431	[0.0104]***
LnRER	-21.208	8.996	-2.3573	[0.0293]**
RIR	-0.0188	0.1396	-0.1346	[0.8943]
LnFDI	6.3795	1.5740	4.0529	[0.0007]***
LnINF	-0.8368	1.4306	-0.5849	[0.5655]
Diagnostic tests		**Null Hypothesis**		**Probability**
Serial Correlation		No serial correlation at up 2 lags		0.6701
Heteroskedasticity		Homoskedasticity		0.6508
Normality		Normality of Error correction term		0.9410
Function Form		Model specification is correct		0.8901

GDP= Gross Domestic product growth rate, BD= Budget Deficit Million (AFG), RER= Real Exchange rate, RIR= Real Interest Rate (%). FDI= Foreign Direct Investment (Million AFG), INF= Inflation rate (%).
Source: Author's calculation using Eviews11.

The Diagnostic test outcomes reported in Table 6, indicate that all the tests confirmed the robustness of the Model. For instance, the serial correlation and heteroscedasticity hypothesizes are rejected and it reveals that the model is respectively free of serial correlation, while it is homoscedastic. The error term is normally distributed and The Ramsey RESET test accepted the well-specified model.

Table 7 reported the short-run outcome of the growth model. The result indicates the highly significant and negative coefficient of the error correction term (ECT) at a 1% level. Based on the result Error correction term (ECT) coefficient is 44, which means that the short-run disequilibrium would adjust to equilibrium with 44% speed in the long run. Also, we can say that it took time approximately 2.27 period to adjust from short-run disequilibrium to long-run equilibrium.

Table7: Error Correction Representation for ARDL Model (3, 0, 1, 1, 0, 0)

Variables	Coefficient	Standard Error	T-Statistic	Probability
DGDP(-1)	0.14	0.048	2.90	[0.0091]***
DGDP(-2)	0.24	0.055	4.47	[0.0003]***
DLnRER	6.14	11.03	0.55	[0.5843]
DRIR	1.02	0.063	16.00	[0.0000]***
C	-33.67	2.76	-12.19	[0.0000]***
Trend	-0.013	0.013	-0.98	[0.3373]
ECM(-1)	-0.44	0.032	-13.56	[0.0000]***
R-squared	0.93	Prob(f-stat)	0.0000***
Adjusted R-square	0.92	Mean dependent var	-0.39
S.E. or regression	0.81	S.D. dependent var	2.88
Sum Squared residual	15.92	Akaike info criterion	2.62
Log Likelihood	-33.66	Schwarz criterion	2.94
F-Statistics	58.89	Durbin-watson stat	1.80

GDP= Gross domestic products, RER=Reals exchange rate, RIR= Real Interest rate, ECM=Error Correction term.
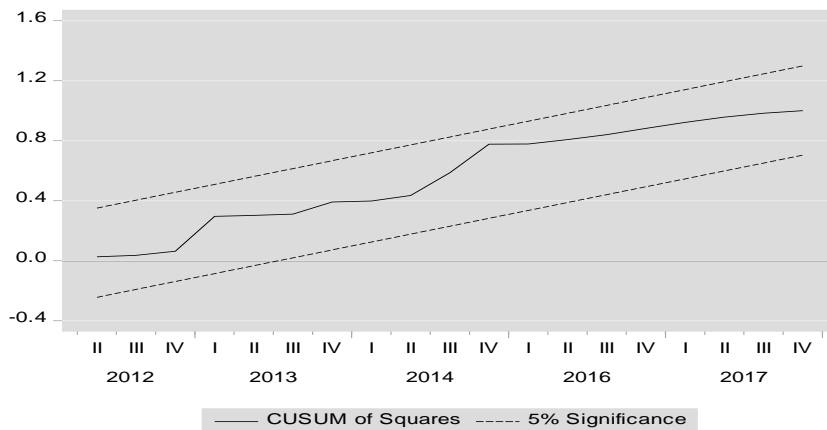Source: Author's calculation using Eviews11.

The stability of long-run and short-run is examined by using cumulative sum (CUSUM) and cumulative sum of squares. The test lines in Figure 1-1 of CUSUM and 1-2 CUSUMsq lie within the 5% critical bounds that confirm the robustness of the model along with stable long-run and short-run parameters.

Figure 1. The plot of cumulative sum of recursive residuals Budget Deficit model.
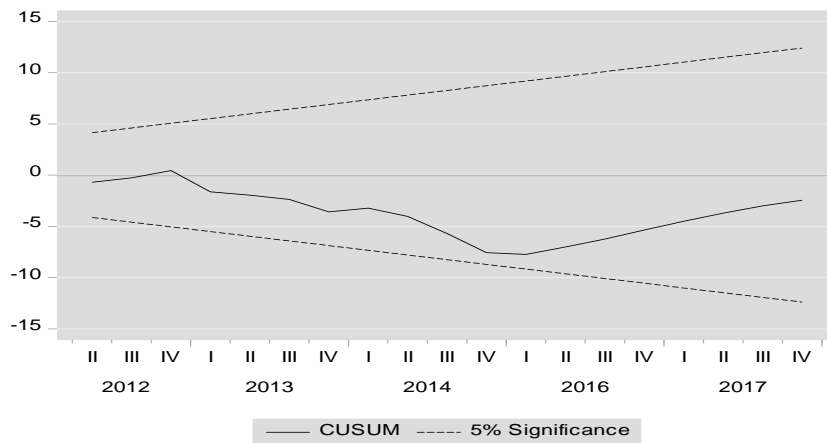
Source: Author's calculation using Eview11.

Figure 2. The plot of cumulative sum of squares of recursive residuals Budget deficit Model.

Source: Author's calculation using Eview11.

5.   Conclusion and Recommendations

The primary purpose of this research is to investigate the impact of the budget deficit on the economic growth of Afghanistan. To find out the result, an application of the unit root test and ARDL model was applied using quarterly data sets from different sources for the period 2003-2017. Afghanistan is a developing country and the economic sectors of this country are faced with lots of problems, the most minor financial changes in the productive sectors would immediately increase the economic growth, so the budget deficit has a positive impact. Afghanistan needs lots of changes in all sectors, meanwhile, the government couldn't support its expenses through its revenue and they don't have enough savings to allocate for the development of Afghanistan's economy. So it's a golden chance for them to receive a loan from the World Bank, IMF, and other organization that gives loan with a low-interest rate and invests them in productive sectors. The other variables in the model also affect economic growth, for instance, foreign direct investment has a positive effect, and the Real exchange rate has a significant and negative effect, while Real Interest rate and Inflation rate have an insignificant and negative impact on the long run. The model's result expressed the positive impact of budget deficit on economic growth, it doesn't recommend that the government increases the deficit. In contrast, they must prevent corruption and collect all the revenues transparently from borders and everywhere government has revenue, to overcome the problem of the budget deficit and fund its budget without the financial support of another countries.

At all we recommend transparency in the budget spending process, investment in productive sectors, preventing DE politicization of the budget process, and paving the ground for investors to invest in Afghanistan.

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