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The causality relationship between the Budget Deficit and Inflation in Egypt during the period (1991-2021)

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Abstract:

The research aims to test the causality relationship between the budget deficit and inflation in Egypt during the period from 1991 to 2021 using Granger causality test and error correction model.

The results showed a two-way relationship between budget deficit and inflation, the study recommended the need to rationalize spending Government by eliminating corruption associated with it.

Trying to exploit internal and external loans in investment projects instead of using them for consumption with the aim of raising the level of domestic product and national income.

Increasing direct and indirect tax revenues to reduce the budget deficit. Stabilizing the price of the pound in the long term through increasing production capacity, increasing exports. Rationalizing governmental spending by eliminating corruption related to public finance. Raising the efficiency of the tax system in mobilizing financial resources by combating the phenomenon of evasion.

Key words: Budget Deficit – Inflation – Egypt.

1. Introduction:

Egypt suffers from the problem of inflation as well as the budget Deficit. The Egyptian economy has recently witnessed high inflation rates. The fiscal year 2014/2015 witnessed an increase in inflation rates according to the General Consumer Price Index (CPI). In June 2014, the inflation rate continued to rise in June 2016 to reach 14% and then increased by 29.8% during the year 2017/2018 and the total budget deficit amounted to about 11% of the GDP in 2014/2015 and then increased to 12.3% during the year 2015/2016, budget deficit reach to about 7% of the GDP during the year 2019/2020 and Inflation rate reached about 5.6% in same year while in 2020/2021 budget deficit reached to about 5.6% of GDP and inflation rate about 5.04% (Egyptian Central Bank, Annual Reports).

The relationship between budget deficit and inflation rate, has been discussed in economic literature can answer the question: Is the budget deficit inflationary? According to Ricardian equivalence, budget deficit does not have any effect on the equilibrium point of IS-LM curves. So, budget deficit does not influence the equilibrium level of interest rate and other key macroeconomic variables such as consumption, saving, money supply, aggregate demand and hence inflation rate (Barro, 1989).

In the Keynesian motion, budget deficit resulting from an increase in government expenditures, tax cuts, or both will cause a reduction in desired national savings, shifting the IS curve to the right and hence the aggregate demand will increase because of positive effect of budget deficit on money supply resulting in government financing the budget deficit by printing money or selling bonds, this will increase the inflation rate (Vamvoukas and Gargalas,2008)

In the monetarist framework, budget deficit tends to be inflationary through increasing money supply (Habibullah, Cheah and Bahareh, 2011) Monetization of budget deficit by the government to satisfy its inter-temporal budget constraint, so, money supply may be responding endogenously to government budget deficit with inflation being of fiscal-driven monetary phenomenon (Tan, 2006).

According to the monetarist framework, inflation may be associated with budget deficit, if such deficit induces reduction in the government's desired money balances. In this case the effect of budget deficit transferred to inflation in two ways:

- **the effect of changes in interest rate on the public demand for money balances. A higher interest rate reduces the desired money balances, causing an excess money supply, and hence higher inflation.**
- **changing individual's wealth holdings. (Positive relationship between desired money balances and individual's wealth) if the individual's wealth fail over the period the individual's desired money balances will also fail and the higher inflation will occur even though the growth of money stock remains fixed (unchanged).**

This is no longer confined to a particular country or even a group of countries, but is found in most countries of the world, including developed countries, has witnessed the last period, especially after the recent global financial crisis, impeding the economies of many EU countries such as: Greece, Italy, and others, not only that Indeed, But the United States also itself is suffering from inflation in public debt (Hein, 1981). Egypt has also experienced both high budget deficit and high inflation rate. The important and interaction between the budget deficit and the rest of national economy can be observed from the budget deficit definition, especially the components of government expenditures and revenues (Makoshika, 2010). The government expenditure that does not finance through fiscal revenues creates excess total demand in the economy, which results in high inflation rates (Sarfraz and Anwar, 2009).

Budget deficit can be financed by several methods, such as: Increasing taxes, Domestic or /and external finance, foreign exchange reserves, Printing money (Mehdi and Reza, 2011).

Because the Egyptian governments faced many difficulties in increasing taxes and printing money, they always used one or more substitutes: hence the money supply will increase and affect positively total demand which leads to high inflation rate. Finally, we can say that there are two-ways relationships between budget deficit and inflation.

2. Research problem:

The research problem is handled in this research that Egypt suffers from both higher inflation rate and budget deficit. As cash budget deficit reach to about LE 93.4 billion in 2010 and Inflation rate reached about 18 % in 2008 and continue to increase reached in 2016 to 14% and then increased by 29.8% during the year 2016/2017 and the total budget deficit amounted to about 11% of the GDP in 2014/2015 and then

increased to 12.3% during the year 2015/2016. budget deficit reach to about 7% of the GDP during the year 2019/2020 and Inflation rate reached about 5.6% in same year while in 2020/2021 budget deficit reached to about 5.6% of GDP and inflation rate about 5.04%, in 2021/2022 budget deficit reached about 4.6% and inflation rate was about 5.2% during the same year (IMF Databases).

3. The hypothesis of the research:

There are three hypotheses:

1- **There is two ways relationship between budget deficit and inflation.**
2- **There is a negatively impact of inflation on budget deficit.**
3- **There is a negatively impact of budget deficit on inflation.**

4. The objective:

The aim of the research is to clarify the relationship between the budget deficit and inflation in Egypt during the period 1991 to 2021, and to test the last three hypotheses of study, to verify the validity of error of those hypotheses and know the direction of the relationship between the two variables and the quality of the relationship between them is negative or positive.

5. The methodology:

The research will use the Deduction approach which concerned with deducting conclusions from premises or propositions, starting from a general case to specific one. as we will discuss the literature review of the relationship between budget deficit and inflation, we also will discuss the last studies results and will apply that in the Egyptian economy through the period (1991-2021).

This research is organized as follows: section 1: introduction, section 2: the research problem, section 3: research hypothesis, section 4: research objective, section 5: methodology of research, section 6: discusses theoretical framework and literature review, section 7: the previous studies, section 8: the model, econometrics technique and data sources, section 9: empirical results, section 10: presents conclusion and policy implication, section 11: presents the references.

6. Theoretical framework and literature review:

The economic schools were divided between supporters and opponents of the case of deficit, according to the interpretation of each direction and according to the standards of economic evaluation, and below we will present the most important theories that dealt with the issue of the budget deficit from its point of view: in the classical theory, Among the basic pillars on which the classic thought is based is the principle of balancing the state's public budget and avoiding creating deficits in the state's public budget because of its great importance in the national economy. The theory of balance of the state's public budget according to the classic is based on the equalization of total revenues with total public expenditures, so the principle of balance of the budget in light of this doctrine is a major goal that must be achieved in all circumstances (Lwanga and Mawajje, 2014) the role that the state plays in classical thought, represented by the guardian state, from their point of view, its role is limited to ensuring that public utilities operate within the narrowest limits without interfering with economic and social life. (Bernheim, 1989 and Seater, 1993). The classics rely on many arguments in which they defend the principle of the balance of the budget and the non-occurrence of the public budget deficit, most notably the following (Bernheim, 1989)

- **In the long run, public loans lead to an increase in public spending an increase exacerbates the deficit, and thus the state finds itself forced to borrow.**
- **The deficit of the public budget leads to printing money, that is, what is known as the new monetary issuance, which leads to an increase in the supply of money in circulation, and consequently the means of payment increase in a way that exceeds the volume of supplied goods and from it the state falls into inflation and the negative economic effects that result from it.**

Accordingly, to achieve balance in the general budget and not to fall into deficit, the classic relied on covering public expenditures on taxes in a large way. As for loans, they do not use them except in exceptional cases, such as crises and wars, and they prefer short-run loans (Abidemi and Maliq, 2010).

Keynesian theory With the Great Depression (1929-1932), which showed the inability of supply to create an equivalent demand, the classical theory could not explain it, which led to a major collapse in economic conditions.

And here, Keynes came to demonstrate the beginning of a new phase in which the state would be an effective element in economic activity, and Keynes said that it is not necessary to respect the principle of annual balance of the public budget, but what is important is the balance of the budget throughout the entire economic cycle and the budget deficit becomes necessary as long as it is related to increasing production and employment, (Arora and Dua, 1993). In the case of inflation, the budget surplus leads to achieving the level of aggregate demand to reach the level commensurate with the aggregate supply, and from which stability will be achieved in the national economy (Chaudhary and Shabbir, 2005).

Neoclassical theory after the collapse of the international monetary system and the abandonment of the United States of America from converting dollars into gold in 1971 The stagflation crisis arose, for which Keynesian thought could not find a solution, Neoclassical thought came to provide solutions to what was afflicting the global economy at that time. This theory is based on the ideas of the classical theory with its strong belief in the principle of the invisible hand of Adam Smith and John Bates Say's law. (Dalyop, 2010).

This theory is based on curtailing the role of the state in economic activity, as it sees that the main reason for the public budget deficit is the state's interference in the economy, neo-classicalism is based on the ideas of the monetary school, which sees that the main objective of economic policy is the need to confront inflation, not achieving economic stability or achieving full employment (Dang, 2016).

According to the monetarist framework, Inflation may be associated with budget deficit, if such deficit induces reduction in the government's desired money balances. In this case the effect of budget deficit transferred to inflation in two ways Firstly, through the effect of changes in interest rate on the public demand for money balances. A higher interest rate reduces the desired money balances, causing an excess money supply, and hence higher inflation (Huynh, 2010).

According to Farajova, (2011) and Pekarski, (2011), inflation may affect budget deficit through many channels, such as:

a) **Real tax revenues: As inflation reduce the real tax revenues, the budget deficit will increase, the most often cited channel is the Olivera-Tanzi effect that deteriorates real budget revenues through lags in tax collection. This effect destabilizes public finance. It should thus strengthen the incentives to stabilize high inflation.**
b) **Nominal interest rates: As inflation may increase the nominal interest rates, and hence increasing the debt servicing payments, the**

budget deficit will increase. According to those two channels, inflation has negative effects on budget deficit.
Finally, we can say that there are two-ways relationships between budget deficit and inflation.

7. previous studies:

There are a various studies examined the relationship between budget deficit and inflation, some of them concerned on the impact of budget deficit on inflation, such as:

- **Helmy (2010), and El-Sakka, and Ghali (2005) tried to study the relationship between budget deficit and inflation For Egyptian economy. The result showed that in 0Egypt they concerned with the inflation determinants, but budget deficit was not of them.**
- **Tiwari, and pandey, (2012) aims to examine the direction of causality among fiscal deficit, government expenditure money supply and inflation, by using the standard of granger, to examine the direction of causality among test variables. the results showed that there is a conflict with the results for India. Causality analysis based on DL approach suggests that both government expenditure and money supply Granger-cause fiscal deficit while standard Granger-causality test indicates that only government expenditure Granger-cause fiscal deficit. And money supply Granger-cause government expenditure and fiscal deficit Granger-cause money supply.**
- **Kalim, and Hassan (2013) investigate most factors affecting fiscal deficit in Pakistan for the period of 1976 to 2010. International trade, economic growth, total debt servicing and broad money supply. the empirical results showed that the economic growth only that has an insignificant impact on fiscal deficit in the long run but has significant impact in the short run. Whereas all other factors affect fiscal deficit significantly in both short run as well as in the long run.**
- **Pandey (2012) test the direction of causality through government expenditure, inflation, money supply and fiscal deficit. He suggests that both government expenditure and money supply cause fiscal deficit while standard causality test indicates that only government expenditure cause fiscal deficit, and money supply cause government expenditure and fiscal deficit cause money supply. He found that inflation doesn`t cause any of the test**

variable included in the model and no variable included in the model cause fiscal deficit.

- **Dwyer (1982) explained that there is a direct relationship between government deficit and inflation is that by increasing the real value of outstanding bonds and perceived net wealth, the researcher found that deficit can raise total spending and the price level because the economy is operating at full employment.**
- **Mehdi, and Reza (2011) study in the Iran's economy (1975-2006), Studied the relationship between fiscal deficits and inflation, the findings showed that budget deficit (represented by both domestic and external finance) had a significance effect on inflation. So, the study concluded that methods of financing fiscal deficits create inflation in Iran.**
- **Serfraz, and Anwar (2009) examine the relationship between inflation and fiscal deficits in Pakistan by GDP deflator, through estimating the inflation equation in the period (1976-2007). Inflation is a function of money supply, internal and external borrowing. the results showed that budget deficit had a significance effect on inflation.**
- **Makochekanwa, (2010) used Johnsen (1991, 1995), and cointegration approach over the period (1980-2005). The results showed that there is a weakly positive significant effect of budget deficit on inflation in Zimbabwean economy.**
- **Sahan, and Bektasoglu (2010), measure the impact of budget deficit on inflation in Turkey (1990-2008), the findings were there were an inflationary effect on budget deficit in turkey.**
- **Tan, (2006) measure the impact of budget deficit on both inflation and money supply (price level) in Malaysia in the period (1966-2003). The results showed that the budget deficit had an inflationary impact on the Malaysian economy, while the impact on the long run was absent.**
- **Chudhary, and Ahmed (1995) concerned with the impact of budget deficit on money supply (indirect effect of budget deficit on inflation). The findings showed that financing budget deficit among domestic borrowing specially from banking system was inflationary in the long run.**
- **Catao, and Terrones (2003) study the relationship between budget deficit and inflation during the period (1960-2001) for 107 countries. The findings showed there were a strong positive relationship between among the variables in high-inflation and developing countries, but there is no in low-inflation advanced.**

Analyzing previous studies and identifying the research gap:

Through what has been reviewed in previous studies, the researcher can analyze and conclude that, the relationship between budget deficit and inflation differs, depending on the differences in time series periods, sources of financing budget deficit and country's conditions, and this which the paper aims to test.

8. The model, econometric technique, and Data Sources:

8-1 The model and econometric technique

The hypothesis will be tested by relying on a econometric model as follows: (Chimobi and Igwe, 2010 p.54)

(INF) = f (BD, MS) (1)

The function can also represent in form, thus:

(BD) = F (BDt-1, INF) (2)

Where:

INF: Represent the Inflation rate.

BD: Represent the budget deficit to the real gross domestic product (GDP).

MS: Represent the money supply which used in the model to test the indirect effect of budget deficit on inflation.

BD_{t-1}: Represent the budget deficit for the previous year.

8.2 The unit root test

The unit root test is an important and fundamental test of time series data, that is time series data must pass this test before estimating the required model. Therefore, the variables used in the model to be estimated must be stationary, and if they are not, the data must be transformed to be stationary either by using new variables or by taking the first difference of the original variable data or other data transformation methods.

8.3 Granger Causality Test

Granger Causality Test includes the statistical detection of the direction of the causal relationship between the explanatory variable and the dependent variable, and the null and alternative hypothesis can be formulated as follows:

Null Hypothesis H0: X does not cause Granger Cause Y

Alternative Hypothesis H1: X does cause Granger Cause Y

The rule of decision is based on the level of significant. If the level of significant is greater than or equal to 0.05, we cannot reject the null hypothesis, but if it is less than 0.05, we can reject the null hypothesis and accept the alternative hypothesis.

8.4 The data sources:

We depended on the time series data of the World Bank for Consumer Price Index (CPI) and money supply (MS), and the annual reports of the official website of the Ministry of Finance for the budget deficit.

9. Empirical Results:

9.1 Descriptive Statistics

We apply descriptive statistics to describe the variables in terms to central tendency and dispersion. The following table declares the results of descriptive statistics for the variables:

Table (1) Results of Descriptive Statistics and correlation analysis

	BD	INF	M2
Mean	**7.045161**	**9.645645**	**1201.616**
Median	**6.900000**	**9.319000**	**560.3000**
Maximum	**13.70000**	**29.50200**	**5650.000**
Minimum	**0.900000**	**2.270000**	**98.40000**
Std. Dev.	**3.688165**	**5.895434**	**1487.573**
Skewness	**-0.060964**	**1.301850**	**1.721086**
Kurtosis	**2.120779**	**5.343147**	**4.947442**

Source: Results of statistical analysis using EVIEWS10.

From the table we conclude that:

The budget deficit to the real gross domestic product (GDP)

The budget deficit to the real gross domestic product through the period of study from 1991 to 2021 fluctuates between high and low, and reaches its minimum values in the years 1996, 1997, 1994, 1995 since it reaches 0.9%, 1.0%, 1.2%, 1.3% respectively while it reaches to its maximum values in the years 2015, 2013, 2012 since it reaches 12.3%, 12.8%, 13.7% respectively, but it has declining during the last years 2017, 2018, 2019, 2020, 2021 reaching 9.8%, 8.2%, 7%, 5.6%, 4.6% respectively because of the economic reform policies. The mean value is 7.05% with standard deviation 3.69%.

The following figure shows the evolution of the time series of the budget deficit to the real gross domestic product during the study period:

Figure (1) the evolution of the time series of the budget deficit to the real gross domestic product

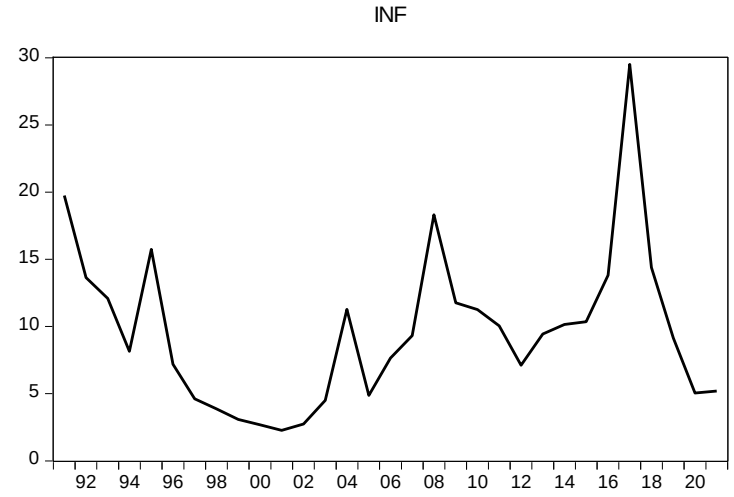
Source: Prepared by the researcher using EVIEWS10 based on the study data

Consumer Price Index "CPI" as Inflation (INF):

The consumer price index through the period of study from 1991 to 2021 fluctuates between high and low, and reaches its minimum values in the years 2001, 2000, 2002 since it reaches 2.27%, 2.68%, 2.74% respectively while it reaches to its maximum values in the years 2008, 1991, 2017 since it reaches 18.32%, 19.75%, 29.5% respectively, but it has declining during the last years 2019, 2020, 2021 reaching 9.15%, 5.04%, 5.2 respectively because of the economic reform policies the mean value is 9.65% with standard deviation 5.9%.

The following figure shows the evolution of the time series of the consumer price index during the study period.

Figure (2) the evolution of the time series of the consumer price index during the study period



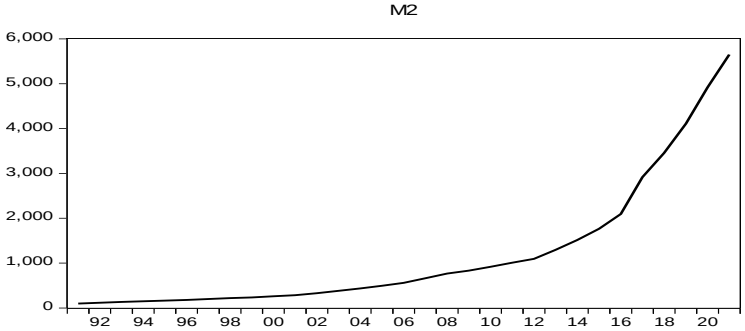
Source: Prepared by the researcher using EVIEWS10 based on the study data

Money Supply (M2)

The money supply is increasing through the period of study from 1991 to 2021 since reaches its minimum values in the 1st three years 1991, 1992, 1993 since it reaches 98.4, 117.6, 133.1 billion pounds respectively while it reaches to its maximum values in last three years the years 2019, 2020, 2021 since it reaches 4110, 4920, 5650 billion pounds respectively. The mean value is 1201.62 billion pounds with standard deviation 1487.57 billion pounds.

The following figure shows the evolution of the time series of the money supply during the study period:

Figure (3) the evolution of the time series of the Money Supply during the study period



Source: Prepared by the researcher using EVIEWS10 based on the study data

9.2 The Unit root test

It is important to ensure the data stationary or non-stationary, through applying unit roots test, which contains both Augmented Dickey fuller (ADF) and Phillips–Peron (PP) tests.

Augmented Dicky fuller (ADF) test

The following table declares the results of unit root test "Augmented Dicky fuller (ADF)" test:

Table (2) Results of the unit root test Augmented Dickey fuller (ADF)

	Var.	None		Intercept		Trend & Intercept	
		t-statistic	Prop	t-statistic	Prop	t-statistic	Prop
Level	INF	-1.961919	0.0490	-3.282104	0.0249	-3.400303	0.0703
	BD	-1.398547	0.1473	-1.612122	0.4642	-2.480867	0.3344
	M2	4.545541	1.0000	3.990170	1.0000	6.843835	1.0000
1st diff	INF	-6.825009	0.0000	-6.728664	0.0000	-6.598070	0.0000
	BD	-4.329735	0.0001	-4.211325	0.0027	-4.211325	0.0027
	M2	2.533938	0.9961	1.710608	0.9994	-2.997258	0.1525
2nd diff	INF	-4.270064	0.0002	-4.094007	0.0051	-4.567333	0.0082
	BD	-7.531068	0.0000	-7.447620	0.0000	-7.812436	0.0000
	M2	-2.852249	0.0066	-3.632446	0.0140	-5.157923	0.0025

Source: Results of statistical analysis using EVIEWS10.

Concerning variables (BD, M2), t-statistic not significant at the variables level (the variables without any differences), this indicates that the variables are not stationary since the prob. > 0.05 at all cases (none, intercept, trend intercept).

Concerning variable INF, the variable is not stationary at level at the case (trend & intercept).

After we apply the test at the 1st difference the variables BD, INF indicate that we can reject the null hypothesis that the unit root exists. So, we can conclude the BD, INF are not stationary at level, but they are stationary at the 1st difference, but the variable M2 is not stationary at level or at the 1st difference.

After we apply the test at the 2nd difference the variables INF, BD, M2 indicate that we can reject the null hypothesis that the unit root exists. So, we can conclude the INF, BD, M2 are stationary at the 2nd difference. i.e., they are integrated in order two. I.e., I (2).

Phillips–Perron (PP) test

The following table declares the results of unit root test "Phillips–Perron (PP)" test:

Table (3) Results of the unit root test Phillips–Perron (PP)

	Var.	None		Intercept		Trend & Intercept	
		t-statistic	Prop	t-statistic	Prop	t-statistic	Prop
Level	INF	-1.899847	0.0559	-3.283986	0.0248	-3.283986	0.0248
	BD	-1.409056	0.1446	-2.069491	0.2576	-2.996774	0.1496
	M2	16.30268	1.0000	12.97193	1.0000	6.512674	1.0000
1st diff	INF	-7.869181	0.0000	-7.685578	0.0000	-7.525924	0.0000
	BD	-4.424889	0.0001	-4.287635	0.0022	-4.074238	0.0171
	M2	1.131193	0.9292	0.218701	0.9691	-1.847158	0.6554
2nd diff	INF	-4.270064	0.0002	-4.094007	0.0051	-4.567333	0.0082
	BD	7.531068	0.0000	-7.447620	0.0000	-7.812436	0.0000
	M2	-6.974380	0.0000	-7.447620	0.0000	-9.488009	0.0000

Source: Results of statistical analysis using EVIEWS10.

Concerning variables (BD, M2), t-statistic not significant at the variables level (the variables without any differences), this indicates that the variables are not stationary since the prob. > 0.05 at all cases (none, intercept, trend intercept).

Concerning variable INF, the variable is not stationary at level at the case (None).

After we apply the test at the 1st difference the variables BD, INF indicate that we can reject the null hypothesis that the unit root exists. So, we can conclude the BD, INF are not stationary at level, but they are stationary at the 1st difference. But the variable M2 is not stationary at level or at the 1st difference.

After we apply the test at the 2nd difference the variables INF, BD, M2 indicate that we can reject the null hypothesis that the unit root exists. So, we can conclude the INF, BD, M2 are stationary at the 2nd difference. i.e., they are integrated in order two. i.e., I (2).

9.3 Granger Causality test

By conducting Granger Causality test we obtained these results:

Table (4) the results of Granger Causality test

Null Hypothesis:	No of lags	Obs	F-Statistic	Prob.
BD does not Granger Cause INF	4	27	4.37408	0.0121
INF does not Granger Cause BD	1	30	4.71259	0.0389

Source: Results of statistical analysis using EVIEWS10.

From the table we can reject the 1st null hypothesis (BD does not Granger Cause INF) and accept the alternative hypothesis (P-value = 0.0121 < 0.05) at four lags, and we can reject the 2nd null hypothesis (INF does not Granger Cause INF) and accept the alternative hypothesis (P-value = 0.0389 < 0.05) at one lag.

So, we accept the 1st research hypothesis "There is two ways relationship between budget deficit and inflation.

This result is consistent with the study of Tiwari, and pandey, (2012).

9.4 Co-integration test

To examine the presence or non-presence of co integration among the variables by using the cointegration test, introduced by Johansen. As, in the presence of co-integration among budget deficit, inflation, and money supply and means that there is a long –run equilibrium as suggested theoretically.

While, in absence of co-integration among the variables the VAR model in the first difference will be used (Chimobi, O. P. and O. L. Igwe, p.56) While, if, co-integration test (both Trace Statistic and Maximum Eigenvalue) suggested that there was co-integration (long-run) relationship among the variables, so the Error Correction Model will be used to test the short-run and long – run relationship among the variables. (Chimobi, O. P. and O. L. Igwe, p.56).

Unrestricted Co-Integration Rank Test (Trace)

The following table declares the results of Unrestricted Co-Integration Rank Test (Trace)

Table (4) Results of Unrestricted Co-Integration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.543976	37.55280	29.79707	0.0053
At most 1	0.326874	14.78169	15.49471	0.0638
At most 2	0.107644	3.302829	3.841466	0.0692
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* Denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Results of statistical analysis using EVIEWS10

The Trace test indicates that there is one co-integration relationship between the variables at the level of significance 0.05, where at "At most 1" the trace value was smaller than the critical value at the 0.05 level of significance, where the Trace value = 14.78169 while the critical value was 15.49471 at the 0.05 level, and the calculated level of significance was 0.0638, which is greater than 0.05, which confirms the existence of one equilibrium relationships between the variables in the long term. And that the regression relationship between the dependent variable and the independent variables is not a spurious regression.

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

The following table declares the results of Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Table (5) Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		**Max-Eigen**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	**0.543976**	**22.77111**	**21.13162**	**0.0291**
At most 1	**0.326874**	**11.47886**	**14.26460**	**0.1318**
At most 2	**0.107644**	**3.302829**	**3.841466**	**0.0692**
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
*** Denotes rejection of the hypothesis at the 0.05 level**				
****MacKinnon-Haug-Michelis (1999) p-values**				

Source: Results of statistical analysis using EVIEWS10

Also maximum eigenvalue test indicates that there is one co-integration relationship between the variables at the level of significance 0.05, where at "At most 1" the Max Eigen Statistic was smaller than the critical value at the 0.05 level of significance, where the Max-Eigen value = 11.47886 while the critical value was 14.26460 at the 0.05 level, and the calculated level of significance was 0.1318, which is greater than 0.05, which confirms the existence of one equilibrium relationships between the variables in the long term. And that the regression relationship between the dependent variable and the independent variables is not a spurious regression.

Lag Structure Criteria

To determine the optimum length of lag we choose the length that minimize LogL, LR, FRE, AIC, SC, HQ criteria, the following table declare the optimum length criteria:

Table (6) The optimum length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-205.4586	NA	351.7453	14.37646	14.51790	14.42076
1	-74.36847	226.018*	0.077935*	5.95645*	6.522224*	6.13364*
2	-66.08158	12.57321	0.083839	6.005626	6.995737	6.315717

*** Indicates lag order selected by the criterion**

LR: Sequential Modified LR Test Statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: Hannan-Quinn Information Criterion

Source: Results of statistical analysis using EVIEWS10

The table shows that the optimal length criteria is one according to criteria of LR, FPE, AIC, SC, HQ.

9.5 Estimating Vector Error Correction Model VECM:

Model 1 (INF) = f (BD, MS) (1)

After confirming the existence of a long-term co-integration relationship, the best model for estimating this long-term equilibrium relationship is the error correction model. The results of estimating the model are as follows:

Table (7) Results of Vector Error correction VECM Model 1

Standard errors in () & t-statistics in []			
Cointegrating Eq:	CointEq1		
D (INF (-1),2)	1.000000		
D (BD (-1),2)	-0.621352		
	(0.84781)		
	[-0.73289]		
D(M2(-1),2)	0.037234		
	(0.01409)		
	[2.64179]		
C	-0.934065		
Error Correction:	D(INF,3)	D(BD,3)	D(M2,3)
CointEq1	-1.560168	0.058186	-16.03175
	(0.26571)	(0.08700)	(4.48734)
	[-5.87162]	[0.66880]	[-3.57267]
D (INF (-1),3)	0.018651	-0.016511	10.09215
	(0.14813)	(0.04850)	(2.50156)
	[0.12591]	[-0.34043]	[4.03435]
D (BD (-1),3)	-0.843232	-0.663622	-15.45252

	(0.49734)	(0.16284)	(8.39895)
	[-1.69550]	[-4.07536]	[-1.83982]
D(M2(-1),3)	0.029773	-0.002700	-0.346793
	(0.01367)	(0.00448)	(0.23093)
	[2.17733]	[-0.60312]	[-1.50174]
C	0.030781	-0.131812	-0.437034
	(1.40579)	(0.46028)	(23.7408)
	[0.02190]	[-0.28637]	[-0.01841]
R-squared	0.839913	0.457251	0.679987
Adj. R-squared	0.810807	0.358569	0.621803
Sum sq. resids	1169.943	125.4221	333668.5
S.E. equation	7.292410	2.387678	123.1534
F-statistic	28.85641	4.633595	11.68680
Log likelihood	-89.19114	-59.04529	-165.5092
Akaike AIC	6.977121	4.744095	12.63031
Schwarz SC	7.217091	4.984065	12.87028
Mean dependent	0.246368	-0.111111	-2.944444
S.D. dependent	16.76557	2.981266	200.2567
Determinant resid covariance (dof adj.)		2829548.	
Determinant resid covariance		1530713.	
Log likelihood		-307.1908	
Akaike information criterion		24.08821	
Schwarz criterion		24.95210	

Number of coefficients		**18**	

Source: Results of statistical analysis using EVIEWS10.

From the table we conclude that long time equilibrium relation can be formulated as follow:

$$\Delta(INF_{t-1},2) = 0.934065 + 0.621352^{*}\ \Delta(BD_{t-1},2) - 0.037234^{*}\ \Delta(M2)_{t-1},2)$$

The variation from equilibrium can be corrected in the short run term as follow:

Δ(INF,3) = - 1.56*(Δ (INF (-1),2) - 0.621*Δ(BD (-1),2) + 0.037*Δ(M2(-1),2) - 0.934) + 0.019*Δ(INF(-1),3) - 0.84*Δ(BD(-1),3) + 0.03*Δ(M2(-1),3) + 0.03

Testing model

Testing the model include the economic tests, and the econometric tests:

The economic tests

The results indicate that a coefficient (contEq1=-1.560168) and significant with a negative sign, which indicates the possibility of adaptation between the short and long term, and work to correct the relationship between them, which means that any deviation from equilibrium is corrected by1.560168 during the year, meaning that returning to the state of equilibrium takes (1/1.560168) i.e., 0.641 years at the 2nd difference.

There is a positive impact of the ratio of budget deficit to on inflation (BD) as if (BD) changes by 1% the inflation will increase by 0.621% at the 2nd difference and this is consistent with economic theory, as the budget deficit is sometimes financed by printing money, which leads to inflation.

So, we can reject the 2nd hypothesis "There is a <u>negatively</u> impact of budget deficit on inflation".

This result is consistent with the study of: Dwyer (1982), Mehdi, and Reza (2011) study in the Iran's economy (1975-2006), Serfraz, and Anwar (2009), Makochekanwa, (2010) used Johnsen (1991, 1995), Sahan, and Bektasoglu (2010), Chudhary, and Ahmed (1995), and Catao, and Terrones (2003).

The econometric testing

The econometric testing includes autocorrelation, Heteroscedasticity, and stability.

Testing the auto correlation

The following table shows the results of serial auto correlation test (LM-Stat test):

Table (8) the results of serial auto correlation test (LRE-stat) test

LRE* stat	df	Prob.
14.60146	9	0.1025
21.65135	18	0.2478
33.37339	27	0.1850
46.32540	36	0.1163
60.92022	45	0.1569
75.79232	54	0.1268

***Edgeworth expansion corrected likelihood ratio statistic.**

Source: Results of statistical analysis using EVIEWS10.

The table declares that prop. > 0.05 for all lags which indicates that we cannot reject the null hypothesis that there is no correlation between residuals. i.e., the model does not suffer from the problem of autocorrelation between residuals.

Heteroscedasticity test

The following table shows the results of Heteroscedasticity test:

Table (9) the results of Heteroscedasticity test

Joint test:		
Chi-sq	**Df**	**Prob.**
40.35437	**48**	**0.7755**

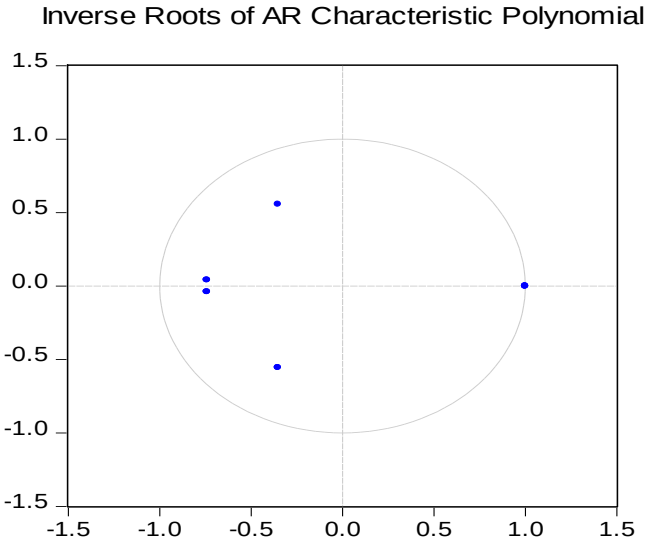
Source: Results of statistical analysis using EVIEWS10.

The table declares that prop. > 0.05 for Chi-sq concerning heteroscedasticity test indicates that we cannot reject the null hypothesis that there is no homoscedasticity between residuals. i.e., the model does not suffer from the problem of heteroscedasticity between residuals.

Stability Test

The following figure declares the stability test:

Figure (4) the stability test



Source: Prepared by the researcher using EVIEWS10 based on the study data

The figure shows that all the roots of the model lie within one circle, which indicates that the model fulfills the condition of stability.

The explanatory power of the model

The explanatory power of the model according to R square value is 0.839913, i.e., the explanatory variables explain 84% from the variations that happen in the dependent variable.

Model 2 (BD) = F (BD_{t-1}, INF) (2)

The VECM model does not solve (Near singular matrix), so we can estimate it with ordinary least square, and the results is as follow:

Table (10) The results of ordinary least squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.294855	0.781218	-0.377429	0.7088
BD (-1)	0.872564	0.083626	10.43409	0.0000
INF	0.144517	0.051235	2.820647	0.0089
R-squared	0.821748	Mean dependent var		7.126667
Adjusted R-squared	0.808544	S.D. dependent var		3.722711
S.E. of regression	1.628896	Akaike info criterion		3.908322
Sum squared resid	71.63917	Schwarz criterion		4.048441
Log likelihood	-55.62483	Hannan-Quinn criter.		3.953147
F-statistic	62.23555	Durbin-Watson stat		1.191855
Prob(F-statistic)	0.000000			

Source: Results of statistical analysis using EVIEWS10.

From the table we can formulate the relation in the following formula:

$$BD_t = -0.295 + 0.873*BD_{t-1} + 0.145*INF_t + \varepsilon$$

Since that:

B_t Budget deficit to real GDP in the year t. (dependent Variables).

B_{t-1} Budget deficit to real GDP in the previous year t-1.

INF_t The inflation rate in the year t.

ε Random error.

Testing the model

We test the model in term of economical testing, statistical testing, and econometric testing.

Economic testing

The inflation has a positive impact on the BD, if the inflation increases by 1% this is follows by increasing the ration of BD to GDP by 0.145%, and this consistent with the economic theory, since the inflation reduces the real value of money, which will make it insufficient to implement the planned projects, and thus causes a budget deficit.

So, we can reject the 3rd hypothesis "There is a negatively impact of Inflation on Budget Deficit.

Statistical Testing

The model is significant *(F=62.24, Sig < 0.05), T for BD (1) = 10.434, Sig < 0.05) & T for INF = 2.821, Sig < 0.05)* so the model is significant, and the variables are significant.

R – Square = 0.822 and, Durbin-Watson = 1.192 which means that R square is less than Durbin-Watson, So the regression model is not spurious regression.

Econometric Testing

Econometric testing test for auto correlation, Multi collinearity, Heteroscedasticity.

Testing for Autocorrelation

The following table declares the test for autocorrelation:

Table (11) Testing for autocorrelation

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.296	0.296	2.9067	0.088
		2	-0.028	-0.126	2.9328	0.231
		3	-0.061	-0.016	3.0640	0.382
		4	-0.220	-0.221	4.8504	0.303
		5	-0.190	-0.070	6.2427	0.283
		6	-0.081	-0.041	6.5034	0.369
		7	-0.146	-0.166	7.3891	0.390
		8	0.043	0.095	7.4699	0.487
		9	-0.032	-0.186	7.5177	0.583
		10	0.013	0.065	7.5257	0.675
		11	0.007	-0.128	7.5278	0.755
		12	-0.070	-0.070	7.7911	0.801
		13	0.183	0.252	9.6899	0.719
		14	0.270	0.083	14.069	0.445
		15	0.057	0.014	14.277	0.505
		16	-0.156	-0.281	15.951	0.456

Source: Results of statistical analysis using EVIEWS10.

The probability > 0.05 for all lags, and the autocorrelation & partial autocorrelation are inside the two limits which means that they do not significantly differ from zero, so the model does not suffer from the problem of auto correlation.

Testing for multi collinearity:

The following table test for multi collinearity

Table (12) test for multi collinearity

	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.610302	6.900478	NA
BD (1)	0.006993	4.757811	1.011381
INF	0.002625	3.858330	1.011381

Source: Results of statistical analysis using EVIEWS10.

The table shows that variance inflation factor is less than 5 for the variables BD and INF, so the model does not suffer from the problem of multi collinearity.

Testing for heteroscedasticity:

The following table declares Breusch-Pagan-Godfrey to test for heteroscedasticity

Table (13) Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	**1.997589**	**Prob. F (2,27)**	**0.1552**
Obs*R-squared	**3.866903**	**Prob. Chi-Square (2)**	**0.1446**
Scaled explained SS	**2.553486**	**Prob. Chi-Square (2)**	**0.2789**

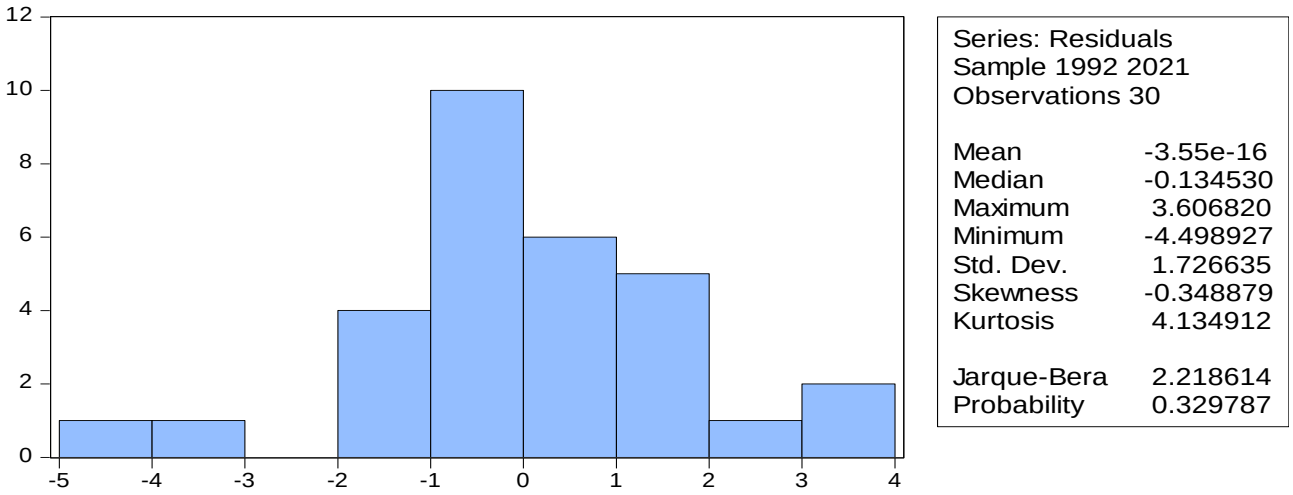
Source: Results of statistical analysis using EVIEWS10.

From the table we conclude that the probability for F test = 0.1552 > 0.05 which indicates the model does not suffer for heteroscedasticity problem.

Testing the normality of residuals

The following figure tests the normality of residual:

Figure (5) Testing the normality of residuals



Source: Results of statistical analysis using EVIEWS10.

The Explanation powers

The independent variables (BDt-1, INFt) explain approximately 82.2% of the variance of BD *(R^2 = .822)*.

Error Correction Model (BD) = F (INF)

We conduct error correction model to test the impact of inflation on budget deficit and obtained the following results:

Table (14) Results of Vector Error correction VECM Model (BD) = F (INF)

Cointegrating Eq:	**CointEq1**	
BD (-1)	**1.000000**	
INF (-1)	**-0.288226**	
	(0.15141)	
	[-1.90367]	
@TREND (91)	**-0.507297**	
	(0.13321)	
	[-3.80830]	
C	**4.147986**	
Error Correction:	**D(BD)**	**D(INF)**
CointEq1	**-0.618562**	**1.989772**
	(0.24390)	**(0.99402)**
	[-2.53612]	**[2.00174]**
D (BD (-1))	**0.187414**	**-2.239426**
	(0.23536)	**(0.95919)**

	[0.79630]	**[-2.33470]**
D (BD (-2))	**0.309629**	**-0.697693**
	(0.25956)	**(1.05785)**
	[1.19288]	**[-0.65954]**
D (BD (-3))	**0.268372**	**-1.456908**
	(0.19817)	**(0.80763)**
	[1.35427]	**[-1.80393]**
D (BD (-4))	**0.267939**	**0.798128**
	(0.19043)	**(0.77609)**
	[1.40704]	**[1.02840]**
D (INF (-1))	**-0.124285**	**0.019766**
	(0.05570)	**(0.22700)**
	[-2.23134]	**[0.08708]**
D (INF (-2))	**-0.106194**	**-0.026038**
	(0.05776)	**(0.23539)**
	[-1.83863]	**[-0.11062]**
D (INF (-3))	**-0.079013**	**0.080331**
	(0.05847)	**(0.23829)**

	[-1.35134]	[0.33711]
D (INF (-4))	-0.015633	0.277382
	(0.07095)	(0.28916)
	[-0.22033]	[0.95927]
C	1.984198	-1.470057
	(0.57355)	(2.33752)
	[3.45948]	[-0.62890]
M2	-0.001395	0.001161
	(0.00038)	(0.00154)
	[-3.68539]	[0.75245]
R-squared	0.547151	0.569381
Adj. R-squared	0.245251	0.282302
Sum sq. resids	21.99542	365.3384
S.E. equation	1.210934	4.935169
F-statistic	1.812360	1.983359
Log likelihood	-34.71799	-71.24786
Akaike AIC	3.516769	6.326758
Schwarz SC	4.049040	6.859030
Mean dependent	0.126923	-0.405470
S.D. dependent	1.393860	5.825472

Determinant resid covariance (dof adj.)	**32.73041**
Determinant resid covariance	**10.89400**
Log likelihood	**-104.8316**
Akaike information criterion	**9.987043**
Schwarz criterion	**11.19675**

Source: Results of statistical analysis using EVIEWS10.

From the table we conclude that long time equilibrium relation can be formulated as follow:

$$BD_{t-1} = -4.148 + 0.288*INF_{t-1} + 0.507*t$$

The variation from equilibrium can be corrected in the short run term as follow:

Δ(BD) = - 0.62*(BD (-1) - 0.29*INF (-1) - 0.51*@TREND (91) + 4.15) + 0.19*Δ(BD(-1)) + 0.31*Δ(BD(-2)) + 0.27*Δ(BD(-3)) + 0.27*Δ(BD(-4)) - 0.12*Δ(INF(-1)) - 0.11*Δ(INF(-2)) - 0.08*Δ(INF(-3)) - 0.02*Δ(INF(-4)) + 1.98 - 0.001*M2.

Testing model

Testing the model include the economic tests, and the econometric tests:

The economic tests

The results indicate that a coefficient (contEq1=-0.618562) and significant with a negative sign, which indicates the possibility of adaptation between the short and long term, and work to correct the relationship between them, which means that any deviation from equilibrium is corrected by 0.618562 during the year, meaning that returning to the state of equilibrium takes (1/0.618562) i.e., 1.617 years.

There is a positive impact of the ratio of budget deficit to on inflation (BD) as if (INF) changes by 1% the (BD) will increase by 0.288% and this consistent with the economic theory, since the inflation reduces the real value of money, which will make it insufficient to implement the planned projects, and thus causes a budget deficit

The econometric testing

The econometric testing includes autocorrelation, Heteroscedasticity, and stability.

Testing the auto correlation

The following table shows the results of serial auto correlation test (LM-Stat test):

Table (15) the results of serial auto correlation test (LM-stat) test

Lags	LM-Stat	Prob
1	2.248909	0.6901
2	3.153200	0.5325
3	5.213473	0.2661
4	5.987511	0.2001
5	5.221358	0.2653
Probs from chi-square with 4 df.		

Source: Results of statistical analysis using EVIEWS10.

The table declares that prop. > 0.05 for all lags which indicates that we cannot reject the null hypothesis that there is no correlation between residuals. i.e., the model does not suffer from the problem of autocorrelation between residuals.

Heteroscedasticity test

The following table shows the results of Heteroscedasticity test:

Table (16) the results of Heteroscedasticity test

Joint test:		
Chi-sq	**df**	**Prob.**
52.08047	**60**	**0.7567**

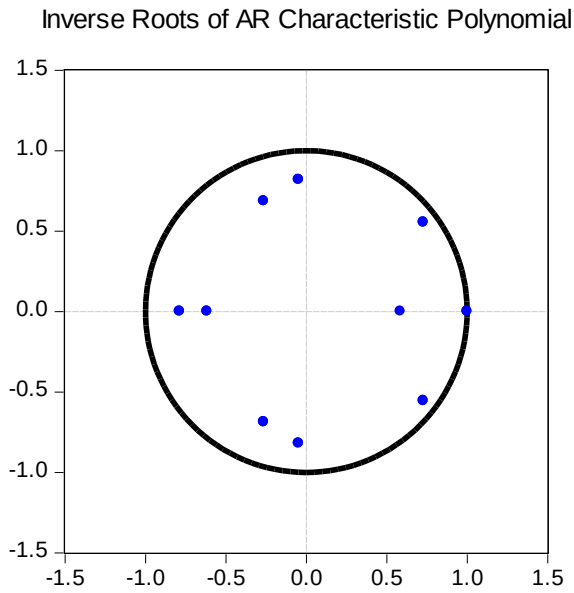
Source: Results of statistical analysis using EVIEWS10.

The table declares that prop. > 0.05 for Chi-sq concerning heteroscedasticity test indicates that we cannot reject the null hypothesis that there is no homoscedasticity between residuals. i.e., the model does not suffer from the problem of heteroscedasticity between residuals.

Stability Test

The following figure declares the stability test:

Figure (6) the stability test



Source: Prepared by the researcher using EVIEWS10 based on the study data

The figure shows that all the roots of the model lie within one circle, which indicates that the model fulfills the condition of stability.

The explanatory power of the model

The explanatory power of the model according to R square value is 54.7%, i.e., the explanatory variables explain 54.7% from the variations that happen in the dependent variable.

10. Conclusion and Policy Implication:

After analyzing the data, the researcher reached the following results:

- **The mean value of budget deficit to the real gross domestic product (BD) through the years 1991 to 2021 is 7.05%, standard deviation is 3.69 with minimum 0.9% and maximum 13.7%.**
- **The mean value of Consumer Product Index (INF) through the years 1991 to 2021 is 9.65%, standard deviation is 5.9% with minimum 2.27% and maximum 29.5%.**
- **The mean value of Money Supply (M2) through the years 1991 to 2021 is 1201.62 billion, standard deviation 1487.57 billion with minimum 98.4 billion and maximum 5650 billion.**
- **By conducting unit root test, we conclude that the variables INF, BD, & M2) are stationary at 2nd difference i.e., they are integrated in order two I (2).**
- **By conducting granger causality test, we can reject the 1st null hypothesis (INF does not Granger Cause BD) and accept the alternative hypothesis (P-value = 0.0389 < 0.05), and, we can reject the 2nd null hypothesis (BD does not Granger Cause INF) and accept the alternative hypothesis (P-value = 0.0121 < 0.05)**

  So, we accept the 1st research hypothesis "There is two ways relationship between budget deficit and inflation.

- **By conducting co-integration test the value of trace statistic at most 1 is 14.78 while the critical value at 0.05 level is 15.49, calculated significant is 0.0638 >0.05. Also, the value of Maximum Eigen Statistic at most 1 is 11.48 while the critical value at 0.05 level is 14.26 and calculated significant id 0.13.18 > 0.05. Both trace test and maximum Eigen value which indicates 1 co-integrating equation at the 0.05 level**

- **Lag Structure Criteria indicates that the optimum length of lag is one period according to LR "sequential modified LR test statistic (each test at 5% level)", FPE "Final prediction error", AIC "Akaike information criterion", SC "Schwarz information criterion", HQ "Hannan-Quinn information criterion" criterions**
- **By estimating the Vector Error Correction model for the 1st model (INF) = f (BD, MS) (1)**

  We obtained the following the following results:

- **The formula for the long run relationship is:**

$$\Delta(INF_{t-1},2) = 0.934065 + 0.621352^{*}\ \Delta(BD_{t-1},2) - 0.037234^{*}\ \Delta(M2)_{t-1},2)$$

The variation from equilibrium can be corrected in the short run term as follow:

Δ(INF,3) = - 1.56*(Δ (INF (-1),2) - 0.621*Δ(BD(-1),2) + 0.037*Δ(M2(-1),2) - 0.934) + 0.019*Δ(INF(-1),3) - 0.84*Δ(BD(-1),3) + 0.03*Δ(M2(-1),3) + 0.03

- **The results indicate that a coefficient (contEq1=-1.560168) with a negative sign, which indicates the possibility of adaptation between the short and long term, and work to correct the relationship between them, which means that any deviation from equilibrium is corrected by1.560168 during the year, meaning that returning to the state of equilibrium takes (1/1.560168) i.e., 0.641 years at the 2nd difference.**
- **There is a positive impact of the ratio of budget deficit to on inflation (BD) as if (BD) changes by 1% the inflation will increase by 0.621% at the 2nd difference and this is consistent with economic theory, as the budget deficit is sometimes financed by printing money, which leads to inflation.**
- **The explanatory power of the model according to R square value is 0.839913, i.e., the explanatory variables explain 84% from the variations that happen in the dependent variable.**

So, we can reject the hypothesis "There is a <u>negatively</u> impact of budget deficit on inflation".

- **We tried to conduct VECM model for the model 2 (BD) = F (BD_{t-1}, INF) but the model does not solve (Near singular matrix), so we can estimate it with ordinary least square, and the results is as follow:**

$BD_t = -0.295 + 0.873*BD_{t-1} + 0.145*INF_t + \varepsilon$

T test -0.377 10.434 2.821

F (4, 379) = 62.236 Sig. = .000

R square = .872

Since that:

B_t Budget deficit to real GDP in the year t. (dependent Variables).

B_{t-1} Budget deficit to real GDP in the previous year t-1.

INF_t The inflation rate in the year t.

ε Random error

The independent variables explain approximately 82.2% of the variance of Budget deficit to real GDP *(R^2 = .822).*

- **By estimating the Vector Error Correction model to test the impact of inflation on budget deficit We obtained the following the following results:**

- **The formula for the long run relationship is:**

$BD_{t-1} = -4.148 + 0.288*INF_{t-1} + 0.507*t$

The variation from equilibrium can be corrected in the short run term as follow:

Δ(BD) = - 0.62*(BD (-1) - 0.29*INF (-1) - 0.52*@TREND (91) + 4.15) + 0.19*Δ(BD(-1)) + 0.31*Δ(BD(-2)) + 0.27*Δ(BD(-3)) + 0.27*Δ(BD(-4)) - 0.12*Δ(INF(-1)) - 0.11*Δ(INF(-2)) - 0.08*Δ(INF(-3)) - 0.02*Δ(INF(-4)) + 1.98 - 0.001*M2

- **The results indicate that a coefficient (contEq1=-0.618562) with a negative sign, which indicates the possibility of adaptation between the short and long term, and work to correct the relationship between them, which means that any deviation from equilibrium is corrected by 0.618532 during the year, meaning that returning to the state of equilibrium takes (1/0.618532) i.e., 1.617 year.**

There is a positively impact of the ratio of budget deficit to on inflation (BD) as if (BD) changes by 1% the inflation will increase by 0.288%. and this consistent with the economic theory, since the inflation reduces the real value of money, which will make it insufficient to implement the planned projects, and thus causes a budget deficit.

The paper introduces policy implication for the policy makers, which is:

- **Attempting to exploit internal and external loans in investment projects instead of using for consumption with the aim of raising the level of domestic product and national income, increasing direct and indirect tax revenues to reduce the budget deficit.**
- **Stabilizing the price of the pound at the long run through increasing production capacity, increasing exports.**
- **Rationalizing government spending by eliminating corruption related to public finance.**
- **Establishing a set of financial and supervisory controls through which public deficit can be avoided.**

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