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The Impact of Money Supply and Inflation Rate on Sustainable Development in Sudan: An Empirical Investigation (2000-2022)

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Abstract: The major aim from such study is to investigate the influence of money supplies and inflation rates on real gross domestic products in order to find out if cash supplies and inflation rates can exist used to achieve SDGs within Sudan. Technique has been utilized to yearly time chain data veil the period (1990-2022), which are gathered from the Central Bank of Sudan, Central Bureau of Statistics and World Bank. ARDL method related with error correction procedure (ECM). The findings indicate that in long-run real money supply and inflation rate own negative and significant influence in real GDP within Sudan. This means that the monetary policy is consider very weak to attain economic growth in Sudan, then decrease consumption and extremely poverty. While real investment has positively and statistically significant effects on real GDP. But during the short-term real money supplies, inflation rates and export own positive and significant effects on real GDP in Sudan. Finally the error correction from term CointEq (-1)* is passive and significant as anticipated, as it indicate the rate of modification of short-term to long-term. The study recommended that the government should utilize a proper monetarist policy so as to foster financial integration with all important sectors of the economy that will boost positive results to the Sudan economy.

Keywords: *ARDL; Economic Growth; Supply of Money; Inflation; Sudan.*

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I. INTRODUCTION

The 2030 Agenda for Sustainable Development, adopted in 2015 by 193 UN member states, sets out 17 Sustainable Development Goals (SDGs). It is a universal and transformative agenda that aims to end poverty, reduce inequality, protect the environment, as well as ensure peaceful and inclusive societies. The Agenda demands urgent and ambitious action to achieve sustainable and resilient global development (UNSSC, 2020)

To attain sustainable development goals (2030) in Sudan, envelop steady and rapid economic growth. Economic growth lead to reduce poverty and starvation; get better health and education services, affords healthy water and sanitation, warranty decent work; enables accountable consume and production; guarantees peace and justice strong institutions; among others. Whether monetary policy in Sudan depend primarily on money supply and inflation as key instruments, given their strong effect on economic growth and their role in move forward sustainable development goals.

The money supply is a very sensitive and important variable at both the macroeconomic and microeconomic level. For the reason that the speed of any economic activity depend on the volume of money, in addition to being an effective tool in central bank policy to address inflationary or deflationary gaps, it also determines investment and production growth in any economy. It is then the wonted of the theory of the monetarist the idea that, money is the question. They debated that modify in the total of money in the deliberation are the exporter of else economic modify. In another term, the variation in the size the supply of money has an abundant influence on all microeconomic and macroeconomic variables particularly on sustainable development in Sudan. The rate of inflation is an extensive phenomenon manifests itself a general as rise in price of commodity and serving. Inflation can be due to a variety of factor, as well as demand-pull, cost-push and increased money supply. In economic theory, inflation is supposed to own an adverse effect on real gross domestic products and thus economic growth Manman (2024).

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Money supplies "including quasi-money" raised from SDG 2,926,309 million by the end of the third quarter of 2021 to SDG 3,296,959 million by the end of the fourth quarter of the year 2021 appear for an increase of 13%, Quasi-money increased from SDG 1,391,740 million by the end of the third quarter of 2021 to SDG 1,463,240 million by the end of the fourth quarter of the year 2021 amount 5% (Central bank of Sudan 2021).

The objective of this paper is to examine effects of supply of money and inflation at real GDP, thus economic growth on sequence to ascertain whether money supply and inflation can be used to attain SDGs in Sudan. The study was depending on time series data covering the period (1990-2022). The important of study is because it demonstrates which money supplies a reign a big positive effects on economic growth, based on both economic theory and empirical studies. The Central Bank of Sudan can use the money supplies because it is an effective tool to achieve sustainable development in Sudan.

- *Accordingly, Hypotheses to Tested can be Arrangement as Follow:*

- *The Hypotheses to be Tested can be Stated as Follow:*

- ✓ There is a short term and long-term associated among real money supply with real GDP in Sudan.
- ✓ There is a short term and long-term associated among inflation with real GDP in Sudan.
- ✓ It is supposed that real money supply impact positively on real GDP in the long run and short run.
- ✓ It is supposed that inflation affect passively on real GDP in the long run and short run.

The importance of this paper, from the fact that money supply has acted as accelerate of growth for the countries in different stages of economic development, not only by contributing to an increased efficient allocation of resource within the countries.

This study consists of six sections. Section tow is literature review. Section three presents Theoretical Framework. While section four it's deal with the methodology. The results are discussed in section five and finally conclusions relevant to research findings are drawn in section six.

II. LITERATURE REVIEW

To understanding the impact some of macroeconomic variables, especially, money supplies and inflation rates, on economic growth reign amass important attention from both researchers and policy makers in global. A basic goal for economies world is to attain little inflationary pressures while a high real GDP (Saeed, 2022).

Money of supply, which consists of total quantity of currency and amount of money to be hand within an economy during certain period, includes cash in circulation as well as deposits held in banks. It plays a main role in keep price stability and affects inflation level, thereby directly impacting economic growth (Mishkin, 2019); Inflation may also influence an economy level of real gross domestic product. The regulation and significant of this effect depend on the kind of inflation and its gravity. On this consider many economists argued that a low inflation may have positive effect on economic growth, because it makes simple for firms to modify real wages reduce when the demand for their products fall. On the other hand cost-push inflation lower real output and employment, in view of the fact that inflation divert and effort toward activities (McConnell and Brue; 2005). High inflation rates lead to lower saving rates. Under high inflation, economic actors refrain from saving because the value of money today is equal to the value of tomorrow. In the long run inflation reduce economic growth for the reason that the economy needs a certain level of saving to finance investment projects which increase economic growth (Pindyck and Solimano, 1993).

Many applied studies have addressed the topic of the impact of money supply and inflation on economic growth. In this study was reviewing some of them below.

Mohamed A. and Issam A. (2001) the results showed that abroad supply of money is greatly an explanatory macroeconomic factor mainly determined by liquidity dereference of the public, but lower significant affect by price level, and insignificant with respect to real gross domestic products

Mohamed, S. E. (2004) results indicate weak association among money policy development and economics growing in Sudan. Also finding that real money of supply is negative and significant on real GDP, while the impact of credit to private sector on real GDP is negative significant. The finding may be causes to the inefficient distribution of the resources by banks, along the absence of a suitable investment climate required to increase significant private investment and enhance economic growth. Keshar (2020) used Auto regressive distribution lag (ARDL) with vector error correction (VECM) model. To investigation the existence of a significant long-run relationship between money supply and economic growth as measured by gross domestic production. Finding is that there a bi-direction causal existing among broad money with gross domestic production. Inflation also causes to broad money and gross domestic production.

Patrick, (2022) Examined the impact of money supply on economic growth in the long run, and Gerngr causality test among the variables under study. The study finding that was no long-run association between broad money supply and economic growth and no causal relationship between money supply with economic growing. Also Finds that an unidirectional causality from RGDP to M2 and bidirectional causality between the repo rate and M2. Saeed (2022) the study analyzed the effect of supply of money and price on gross domestic products in Ghana. The results shows that lag year income and price level have negative and statistically significant influence on present year output. While the results finding that supply of money have insignificant and impact

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on gross domestic products. Manman (2024) investigate the dynamic link between money supply, and economic growth in China. The finding highlights a strong association between inflation and money supply, with inflation emerging as key driver of economic activity in short run. However, the results also show that the influence of supply of money on growth is relatively limited in compression. Over the long term inflation exerts the significantly negative negative effect on economic growth. Mathias and Lawalm (2022) provided empirical evidence showing a long-term association among gross domestic product and cash supply, short-run policy interest rate and domestic credit supplied by banks in Nigeria. The findings revealed that money supply and domestic credit exerted a significant positive influence on economic growth, whereas the short- term policy interest rate had a significant negative effect on economic growth in Nigeria.

Favara and Giordani (2009) studied the output effect and price effect of money, and the results showed that money affects both output and price. Similarly, Simon. A, etal (2024) show that broad money supply has a positive with statistically significant relationship, at 1% level of significance, with economic growing in Sub-Saharan Africa both in the short-run and in the long-run within the study period.

III. THE THEORETICAL FRAMEWORK

In this part of current study talk about the theoretical foundations relevant to study, beginning with the quantity theory of money (QTM), which indicate a straight association between money supply and price. The basic equation of exchange is show as:

$$MV = PT \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where (M) denote for the money supply, (V) is the velocity of money, (P) denote to price level, while (T) show total of transactions.

Equation (1) suggested that change in supply f money impact on the level price and, by addition, the real domestic product.
Fisher further advance that there is affixed relationship between the number of transaction (T) and output (Y) let (T) to be substituted by (Y) the equation (1) became as:

$$MV = PY \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

According to equation (2) Fisher indicate that there is direct relationship between money supply and output remaining the price level and velocity of money constant. It is emphasizing that, increasing money supply rise cash balances and deposits of the public. Therefore, economic businesses manager will rise their spending so during the surplus amount Bhattarai, (2013)

The Monetarist approach argues that controlling the money supply is important to managing inflation, which directly influences sustainable development Fastercapital (2025). It suggested that velocity in the quantity theory of money is fixed; so, nominal income is to a huge size, determined by money supply (Friedman & Schwartz, 1965; Friedman, 1968). The monetarist's sight carries out that increasing money supply very much output and lower unemployment in the short- term, while in the long term it take to higher inflation Twinoburyo and Odhiambo, (2018). Endogenous Growth Model: focus on how supply of money effect investment technological innovation, and thus economic growth in the long term. Due to classical theory the association between money supply and inflation is positive; suggested that rising money supply would lead to increasing prices set the money demand as Function of speed and real gross domestic products.

Monetarist views suggest a single direction of causation from monetary growth to inflation. It is clear that expansion of money supply, through an open-market operation, will increase the inflation rate by the same amount if there is no effect of monetary growth on growth of output (McNabb and Mckenna, 1990).

Keynes believed in the possible of unemployment balance. In such a situation, he supposed the use of monetary policy. A rise in the money supply initially lowers the interest rate. Given the marginal efficiency of capital, a decline in interest rates stimulates investment. Higher investment, in turn, boosts aggregate demand through the multiplier process, thereby raising income, output, and unemployment (Jhingan, 2003).

➢ *Sustainable Development Goals (SDGs) and Monetary Policy*

- *No Poverty:*

Sudan's economy relies heavily on imported capital goods; volatility in monetary policy (money supply, inflation, exchange rates) increases the cost of imports, worsening poverty among low-income populations. Rising inflation erodes purchasing power, making essentials less affordable.

- *Decent Work and Economic Growth:*

Instability in monetary policy discourages foreign investment and creates uncertainty in the labor market, reducing business expansion and new project investments.

- *Responsible Consumption:*

Inflation increases the cost of goods and services, hindering sustainable consumption patterns (United Nations, 2030 Agenda).

IV. METHODOLOGY

According to theoretical framework, this study examines the impact of money supply and inflation on economic growth. The autonomous variable is real Gross Domestic Product (RGDP), while the explanatory variables include real money supply (RM2), inflation (INF), real investment (RIN), and real exports (RXP), with the last two using as control variables. Following Marshal (2016), this study hypothesizes real gross domestic product to be a

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function of independent variables. This is general form expressed in the equation below.

$$\text{RGDP} = \text{F}(\text{RM2}, \text{inf}, \text{RIN}, \text{RXP}) \dots\dots\dots\dots\dots (3)$$

Where RGDP denoted for real gross domestic product, RM2 imply real money supply, attained to inf inflation, RIN indicate real investment and RXP stand for real exports. Which the real investment and real exports were used as control variable. The model can be written as follow:

$$\text{lnRGDP} = \alpha + \beta_1 Ln1M2 + \beta_2 LnINF + \beta_3 LnRIN + \beta_4 LnRXP \dots\dots\dots\dots\dots (4)$$

The ARDL method was recently suggested by Pesaran and Shin (1999) and justifies its use for this study. ARDL is time series econometric model that is useful for analyzing the short term and long term association in the middle of the variable Pesaran et.al (2001). It is particularly helpfull when dealing for variable that may have mixed levels of stationary (some might be I(0) and I(1)). The ARDL method let for the implying of lagged values of the autonomous and vassal variable, helping grab dynamic relationships Bahmani-Oskoee and Bohi (2000). Why ARDL approach is it model ideal for studying the impact of inflation and money supply on economic indicators, as it accounts for the possibility that the effect of money supply and inflation on sustainable development may onto be immediate and could evolve over time. The calculate F- statistic for each order of the lags is contrasted with F-critical value in testing the subsistence of a long-run relationship. so, the unrestricted error correction model (UECM) frameworks for Equations (1) are;

$$\Delta\text{LnRGDP}_t = \alpha_1 + \sum_{i=1}^{p} \beta_{1i}\Delta\text{LnRGDP}_{t-1} + \sum_{i=0}^{p} \beta_{2i}\Delta\text{LnM2}_{t-1} + \sum_{i=0}^{p} \beta_{3i}\text{i}\Delta\text{LnRXP}_{t-1} + \sum_{i=0}^{p} \beta_{4i}\Delta\text{LnR}In_{t-1} + \sum_{i=0}^{p} \beta_{8i}\Delta\text{Ln Inf}_{t-1} + \delta 1\text{LnM2}_{t-1} + \delta 2\text{Ln}\, Inf_{t-1} + \delta 3\text{Ln XP}_{t-1} + \delta 4\text{Ln In}_{t-1} + \varphi it4 \dots\dots\dots\dots\dots (5)$$

The ARDL modeling operation, where the first difference operator is used, and residuals are supposed to be natural distributed and white noise. The F- bound test then employed to examine the significance of lagged variables. Upon establishing co-integration, the next step involves selected the optimal lag structure of the autonomous and explanatory variables to investigate the conditional (restricted) ARDL pattern usually applying the (OLS) method.

$$\Delta\text{LnRGDP}_t = \alpha_1 + \sum_{i=1}^{q} \gamma_{1i}\text{Ln M2}_{t-1} + \sum_{i=0}^{p1} \gamma_{2i}\,\text{Ln}Inf_{t-1} + \sum_{i=0}^{p2} \gamma_{3i}\,\text{Ln In}_{t-1} + \sum_{i=0}^{p3} \gamma_{4i}\,\text{LnXP}_{t-1} + \text{U}_t \dots\dots\dots\dots\dots (6)$$

➢ *Estimate Error Correction Model (ECM)*

After getting examined of the long term coefficient, the estimated equation is also used to give a testing of the error correction form (EC_{t-1}), what is obtained from above equation (7) as:

$$\text{ECT}_t = \text{LnRGDP}_t - \alpha_1 - \sum_{i=1}^{q} \gamma_{1i}\text{Ln M2}_{t-1} - \sum_{i=0}^{p1} \gamma_{2i}\,\text{Ln In}_{t-1} - \sum_{i=0}^{p2} \gamma_{3i}\,\text{LnXP}_{t-1} - \sum_{i=0}^{p3} \gamma_{4i}\,\text{Ln}Inf_{t-1} \dots\dots\dots\dots\dots (7)$$

The final stage entails testing the short-term dynamic coefficients by applying OLS on the correction form of the conditional ARDL model in equation (8). The ECM specification is expressed as follows:

$$\Delta\text{LnRGDP}_t = \propto_1 \sum_{i=0}^{q} \gamma_{1i}\,\text{LnRM2}_{t-1} + \sum_{i=0}^{p1} \gamma_{2i}\text{LnINF}_{t-1} + \sum_{i=0}^{p2} \gamma_{3i}\text{LnIn}_{t-1} + \sum_{i=0}^{p4} \gamma_{4i}\text{LnXP}_{t-1} + \varphi_1\,\text{ECM}_t \quad (8)$$

V. DATA ESTIMATE AND RESULTS

➢ *Data:*

The dataset contains all variables under examination for Sudan and spanned the period (1990-2022). The information was mainly sourced from the annual reports of Central Bank of Sudan (CBOS), the Central Bureau of Statistics, and World Bank publication. Hence the data employed are essentially secondary in nature.

➢ *Results and Discussion:*

- *Results of Unit Roods:*

The Augmented Dickey-Fuller (ADF) test indicate that ln RGDP, lnXP and lnRM2 are non-stationary at level but they become stationary after first differing with constant and trend, while lnINF is stationary at after first with constant. There is mixed integration order suppose that the ARDL model in this case.

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Table. 1 The Augmented Dikey Fuller Test (ADF)

Variable	Level		First Difference	
	Constant	Constant And Trend	Constant	Constant And Trend
LnRGDP	-1.5213 (0.5152)	-0.7286 (0.9655)	-1.7285 (0.4111)	-1.8096 (0.0672)
LnRM2	0.1195 (0.9639)	1.1833 (0.9370)	-1.8030 (0.0532)	-6.2157 (0.0000)
LnINF	-2.5222 (0.1161)	-2.8866 (0.1750)	-7.1693 (0.0000)	-7.3264 (0.0000)
LnXP	-1.5139 (0.9991)	1.0460 (0.9999)	-0.4671 (0.8873)	-7.6882 (0.0000)

Source: Author's Calculations

- *Analysis of Co-Integration:*

In the first step of the ARDL analysis we test for the presence of long-run relationships in model. Given the fact that we have annual time series data and limited number of observations (34), the lag length will be restricted to two. Table (2) bellow reports results of the bound test for the subsistence of a long run relationship.

Table. 2 F- Bounds Test for Co-Integration:

Model	F-statistics	Critical value bounds of the F-statistics			
		1% Level		5% Level	
		1(0)	1(1)	1(0)	1(1)
Ln RGDP	8.7562	5.15	6.36	3.79	4.85

Source: Author's calculations. Critical Values are from Pesaran et al. (1999), Table CI

As showed in the table 2 the calculated F-statistics in the model is higher than the upper bound critical value at the 1% significant level. This indicates that the null hypothesis of non-co-integration cannot be accepted and that there is indeed a co-integration relationship among variables in model.

- *Estimation of Long-run Coefficients for LOG (RGDP) Model:*

From table 3 it is explicit that the F statistic is greater than it is critical value indicating a good overall significant of the estimated model at 1% percent. Also the value R^2 showed that 98% of the variation in the dependent variable RGDP has been explained by variation in explanatory variable (RM2, INF, RIN, XP).

Table. 3 Estimation of Long-Run for Log (RGDP) Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	0.595338	0.272377	2.185716	0.0477
RM2(-1)	-2.036754	0.785728	-2.592185	0.0223
INF(-3)	-1.177975	0.714779	-1.648026	0.1233
RIN(-1)	1.817183	0.741745	2.449876	0.0292
RXP(-1)	-0.237095	0.110592	-2.143877	0.0515
C	171.8576	89.35443	1.923325	0.0766
R^2	0.984330			
Adj R^2	0.961429			
F-statistic	42.98079			
Prob(F-statistic)	0.000000			

Source: Based on Author's Calculations

The estimation presented in the table (3) showed that in the long-run real supply of money has negative and statistically significant effect on real GDP in Sudan at 10%. Specifically, holding other factors constant, a 1% increase in real supply of money is associated with a 203% decrease in real GDP over the time. This result is inconsistent with economic theory, which suggests that fluctuations in the money supply can generate inflationary pressures, reducing consumption and exacerbating poverty. We conclude from this result that the increase in the money supply in Sudan during the study years was intended to cover the budget deficit, rather than to finance productive and service projects that would support the economy in achieving sustainable development.

Similarly, inflation and exports also exhibit negative and statistically significant impact on real GDP. This coefficient explains that, holding other things are constant, a 1% rise in (inflation and exports) corresponds to reduce real GDP over time by 117% and 39% respectively. Rising inflation reduce the purchasing power of citizens, making basic necessities harder to afford decent work and economic growth.

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Conversely, real investment has positively and statistically significant effects on real GDP. Other variables being constant, a 1% rise in Real investment has leads to an increase in real GDP by 181%. This result go with the Keynesians theory, explained long-run positive association among real investment and real GDP direct or indirect due to hardness in price, increased supply of money decline the interest rates, lead to an increased the investment and aggregate output, and consequently increases output. The impact negative of inflation on real gross domestic products it showed via rule of demand that confirm on the oblique association between price and output. Price of good pay rise due to determinants as income anticipation seasonality, as a result, demand for that good could lower conduct about gathering from investors. So company react by reduce production, leading to decrease output growth and rise poverty thus equality financial policy had numerous instruments that can be used to attain sustainable development goals in Sudan. Orderly to rise economic growth and reach sustainable development, money supply and inflation as long as by central bank should be extend and short-term policy cost of finance should be reduce. Increasing economic growth hold on the aim monetary policy of the central bank of Sudan can use proper monetary policy to realizing SDGs.

✓ *Diagnostic Tests of the Estimated Long-run:*

The purpose of the standard criterion is to determine the extent of conformity of the assumptions and measurement methods used, which vary according to the standard methods. Therefore, before adopting the results of the estimates, it must be ensured that there are no standard problems in the model, which are:

✓ *Normality and Functional Form Test:*

The probability value of the Jarque-Bera test is equal to (0.81), which is greater than 5% and is considered an indication that the residuals of the model follow a normal distribution.

Table 4 Normality and Functional Form Tests

Model	Normality Test				Functional form		
	(Jarque-Bera)		Kurtosis	Skewness	AIC	Ramsey Reset	
	F. statistic	Prob				F-statistic	Prob
Ln(RGDP)	0.4154	0.8124	2.9573	-0.2740	0.942828	0.085890	0.7745

Source: Based on Author's Calculation

✓ *Autocorrelation and Heteroscedasticity Tests*

Through the results in table (5) below, we finding that the probability value for Arch and Berusch-godfre tests is greater than 5%which an indicate that the model dose not suffer from problem of instability. Durbin Watson test is almost equal to 2

Table 5 Autocorrelation and Heteroscedasticity Tests

Model	Autocorrelation				Heteroscedasticity
	D-W	Breusch-godfrey			white
		F-statistic	Prob	F-statistic	Prob
LnRGDP	2.00	0.508587	0.6148	1.302988	0.2627

Source: Authors Calculation

✓ *Stability Testing of the Parameters:*

The plots of the CUSUM in Figs (1) below are obtained from a recursive estimation of the model. These plots indicate stability in the coefficients of the models.

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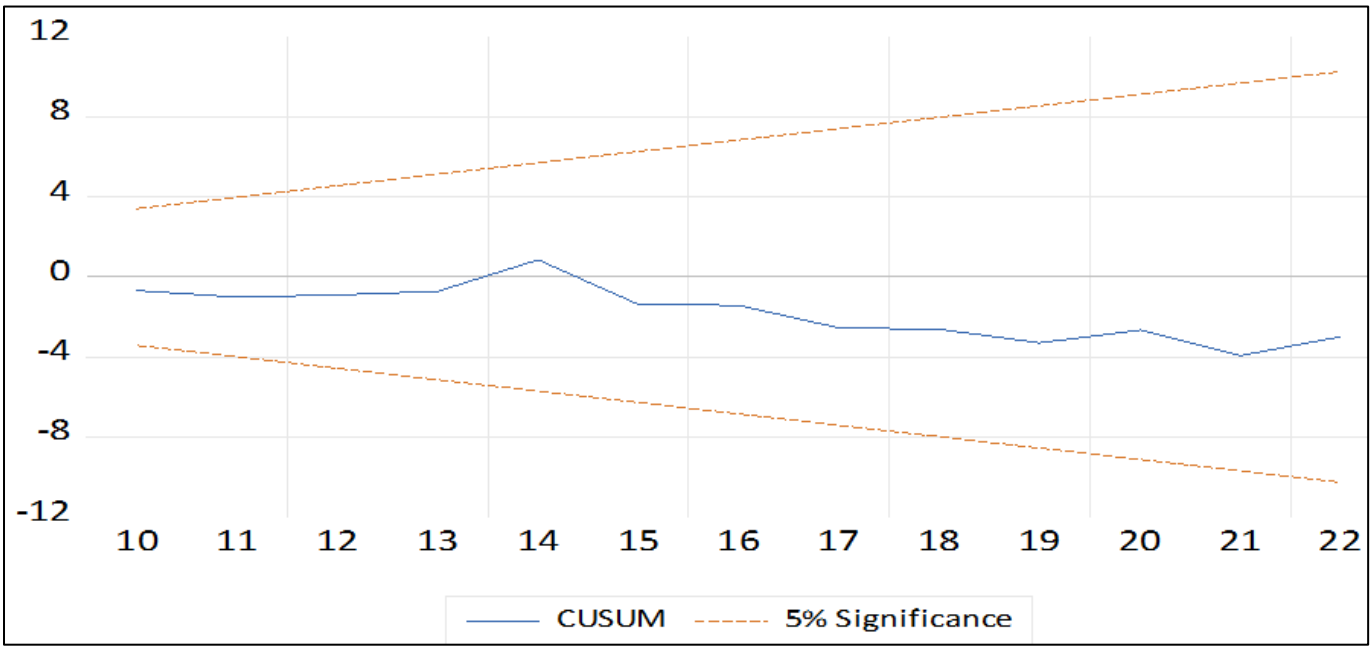

Fig 1 Cumulative Sum of Recursive of Residual

- *Estimation of the Short-Run Dynamic Coefficients:*

From table 6 it is explicit that the F statistic is greater than it is critical value indicating a good overall significant of the estimated model at 1% percent. Also the value R^2 showed that 95% of the variation in the dependent variable RGDP has been explained by variation in explanatory variable (RM2, INF, RIN, XP).

Table.6 Estimation the Short-term model log (RGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	171.8576	39.93136	4.303826	0.0009
D(RGD(-2))	-0.281526	0.193083	-1.458055	0.1686
D(RM2(-2))	1.327803	0.506865	2.619641	0.0212
D(INF(-2))	1.177975	0.570016	2.066564	0.0593
D(RIN(-2))	-1.492566	0.475563	-3.138522	0.0078
D(RXP(-2))	0.388150	0.101957	3.806996	0.0022
CointEq(-1)*	-0.202708	0.047718	-4.248038	0.0010
R^2	0.95			
Adj R^2	0.909330			
F-statistic	22.39530			
Prob(F-statistic)	0.000000			

Source: Based on Author's Calculations

The results in table 6 showed that in the short-term real supply of money has positive and significant effect on real GDP in Sudan. This result mean that a 1% rise in real money supply lead increase real gross domestic products RGDP by 133%. This result highlights the importance of money supply variable in short run for Sudanese economy. An increase in the money supply reduces cost of financing which increases demand for microfinance, lead to increased real GDP and job creation. However, most of microfinance projects stopped before the end of their productivity years due to weak economic feasibility studies and management, this result in line with Keynesians model.

As results in table 3, indicate that there is a negative relationship between RGDP and the lag tow of (D.RGDP-2), insignificant at 5% level. This manner during period of study, lag year real output has negative impact on current year RGDP. This conclusion from this result could be that real output from over year was not correctly reinvested distributed within the Sudanese economy.

According to analyze in table 3 showed that inflation and exports have positive impact and significant on the real GDP. This result explained that, assuming other variable constant 1% increase in inflation and exports guide to a decrease real GDP moreover by 117% and 39% respectively. But this finding is difference with Keynesian theory which suggested that when the short term AS curves slopes upward, price and output pass with each other.

While real investment coefficient has negative and statistically significant impact on real GDP in short term at 5% level. Suppose all other variables were constant, this result implies that a 1% an increase in investment leads to a

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123% decrease in output. Furthermore, the result is inconsistent with economic theory, particularly Keynesian theory, which establishes a direct relationship between investment and output. This is attributed to weak fiscal and monetary economic policies, in addition to political instability. Responsible consumption: high inflation leads to increase cost of goods and services, making it difficult for people to engage in sustainable consumption. It also this finding lead to increase poverty and unemployment rates because of the inability of aggregate demand, especially exports and investment. The error correction from term CointEq (-1)* is negative and significant as expected, as it indicate the rate of adjustment from the short run too thee long run, i.e. it indicate that the amount of change in real GDP resulting from the deviation of the value of the money supply and inflation in the short run from their equilibrium values in the long run.

✓ *Stability Testing of the Parameters:*

The plots cusum in the Fig 2 are finding from recursive estimation of the model. The results indicate that stability in parameters of the model.

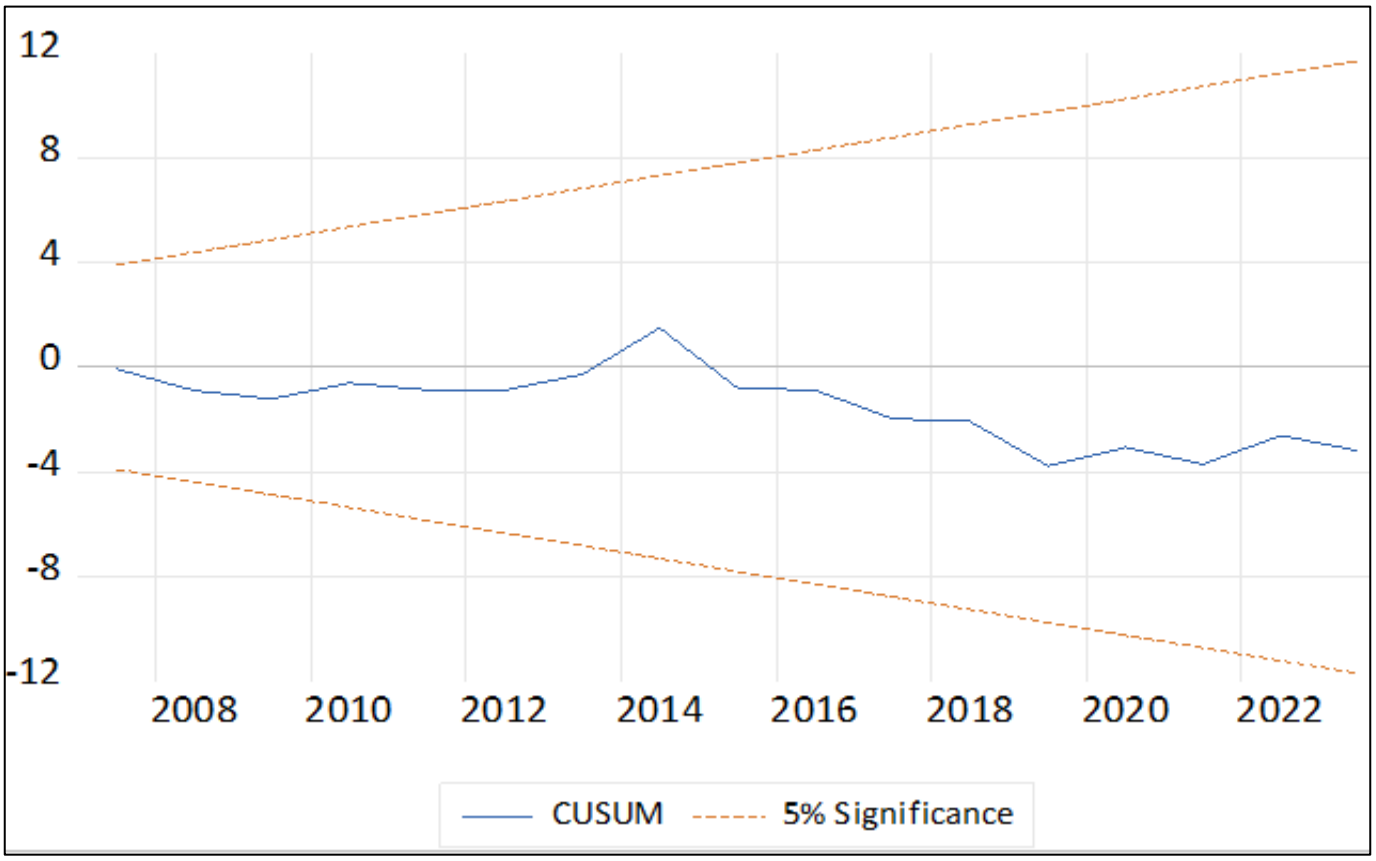

Fig 2 Cumulative Sum of Recursive of Residual

VI. CONCLUSIONS AND RECOMMENDATIONS

➢ *Conclusions:*

The main objective of this paper is to investigate the impact of money supply and inflation on economic growth in order to find out if money supply and inflation can be used to achieve SDGs in Sudan. This approach utilizes time series data covering the years (1990-2022).

- *The Results in the Long-Run:*

✓ In the long-run real supply of money has negative and statistically significant effect on real GDP in Sudan at 10%. Specifically, holding other factors constant, a 1% increase in real supply of money is associated with a 203% decrease in real GDP over the time. This means that any fluctuations in supply of money led to have inflationary pressure and then decrease consumption and extremely poverty.

✓ Inflation and exports also exhibit negative and statistically significant impact on real GDP. This coefficient explains that, holding other things are constant, a 1% rise in (inflation and exports) corresponds to reduce real GDP over time by 117% and 39% respectively. Other variables suppose constant, a 1% rise in Real investment has leads to an increase in real GDP over time by 181%.

✓ Real investment has positively and statistically insignificant effects on real GDP. Other variables remaining constant, a 1% rise in Real investment has edge to an increase in real GDP by 181%.

- . *The Outcome of Short Run:*

✓ In the short-term real supply of money has positive and significant effect on real GDP in Sudan. This result mean that a 1% rise in real money supply lead increase real gross domestic products RGDP by 133%. This finding

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highlights the importance of money supply variable in short run for Sudanese economy.

- ✓ Inflation and exports have positive impact and significant on the real GDP. This result explained that, assuming other variable constant 1% increase in inflation and exports guide to a decrease real GDP moreover by 117% and 39% respectively.
- ✓ Real investment coefficient has negative and statistically significant impact on real GDP in short term at 5% level. Holding all other variables constant, this result implies that a 1% increase in investment leads to a 123% decrease in output.
- ✓ The error correction from term CointEq (-1)* is negative and significant as expected, as it indicate the rate of adjustment from the short run too thee long run.

➢ *The Recommendations:*

- The Central Bank of Sudan should carefully monitor the growth of the money supply and control inflation. Also seek to lower short-term interest rates. These measures reinforce the monetary policy objectives of achieving sustainable growth and development.
- Central Bank should direct and monitor the growing money supply toward productive sectors, rather than government expenditure. Mass production will lead to boost exports, strengthen its local currency, create jobs, reduce imported inflation, and, most importantly, promote economic growth and sustainable development.
- The government should prioritize the reconstruction of essential infrastructure especially that harm after current war, and make efforts to restore and improve basic services. Overhead, attaining security and peace will generate a more stable and attractive investment environment, bulling local and foreign investors to main sectors that accelerate real gross domestic products and consequently sustainable development in Sudan.

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