MEASURE THE IMPACT OF MONETARY POLICY ON ECONOMIC GROWTH IN SUDAN FOR PERIOD 1970-2018

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ABSTRACT

The objective of this study was to measure the impact of Monetary Policy on Economic Growth in Sudan. It based on the following hypotheses: The most critical factors impacting Economic Growth(GDP) in the long- and short-run: exchange rate, inflation, Money supply, and Lending cost . There was a statistically significant relationship between Economic Growth and: exchange rate, inflation, Money supply, and Lending cost . The study used a descriptive approach and the analytical statistical method to construct the model and Eviews8 Program for data analysis. The Data were collected from the Bank of Sudan for period 1990-2018. Using An autoregressive distributed lag (ARDL) approach was to estimate the model in the short and long run. Findings were as follows that there was a statistically significant relationship between the Economic Growth (GDP) and its factors in the long- and short-run. The money supply had a positive and statistically significance impact on the GDP growth. The exchange rate had a positive e and statistically significance impact on GDP growth. The inflation rate coefficient is negative, and statistically significance impact on GDP growth and Lending cost coefficient was a negative and statistically insignificant impact on GDP growth. Finally, correction coefficient values had high speed in overtaking shocks. The study recommended reducing inflation rate through appropriate economic policies in order to activate the effect of Total Investment Lending cost rate index.

KEYWORDS: *Inflation, Exchange Rate, ARDL, Growth, Co-integration.*

INTRODUCTION

The monetary policy pursued in many countries is principally to realize the desired economics objectives such as inflation control, steady economic growth, increasing employment level, and a favorable balance of payment (Okafor, Chinwuba 2015). Over decades, the impact of monetary policy on real variables, in particular on GDP, has remained ambiguous in the short and long-run as shown by the research (Walsh, 2003). Most studies in the developed countries have mainly focused on the monetary policy in the long run as a neutral factor (Asongu, 2014). Although the disagreement was noted among the economists on the impact of money supply on GDP, none of them ignored its effect on other variables related to economic growth. The variables associated with macroeconomics are considered necessary for the functioning of GDP, and most economics literature examined the macroeconomic variables. The most previous studies indicated that monetary policy had a positive impact on the developed economies, whereas insignificant implications found in the developing economies (Twinoburyo, Enock; Odhiambo, Nicholas 2017).

The empirical studies for the analysis of the bounds testing (ARDL) approach to estimate the study model were relatively few in Sudan. This paper intended to bridge the gap by examining the impact of monetary policy on economic growth in Sudan 1990-2018.

OBJECTIVES

1. To measure the impact of monetary policy on economic growth in Sudan.
2. To analyze the short and long-run relationships between variables.

HYPOTHESES

1. There is a significant positive relationship between money supply and economic growth.
2. There is a significant negative relationship between inflation and economic growth.
3. There is a significant negative or positive relationship between the exchange rate and economic growth.

4.   There is a positive significant relationship between Lending cost and economic growth.

THEORETICAL FRAMEWORK

The Sudan economy has witnessed significant transformations over the last six decades. In the early 1960s, the economic activities were controlled by the government and in the1970s and mid-1980s, economic strategy dominated the development policy (Ali, 1985).In 1979, Sudan adopted macroeconomic stabilization and structural adjustment programs recognized by the IMF and the World Bank. However, the economy continued to decline further during 1978-84. The annual economic growth rate dropped to 1.7%, and macroeconomics continued its deterioration. The inflation rate increased to more than 27%; to indicate the inefficiency of monetary policy pursued in Sudan. The performance of the economy inthe1980s was weak due to the increased cost of the South Sudan war, which increased the budget deficit. The external finance and the use of counterpart funds for foreign aid covered about 60% of the total debt, leading to greater dependence on foreign aid. The money supply increased as the annual rate of monetary expansion reached about 40% in 1981/82-1984/85. The average inflation rate is equal to that of the previous period (Hag Elamin & Elmak, 1997).

In the 1990s, massive expenditure expanded and financed by the domestic borrowing, which led to sharp increases in money supply and inflation rate; the exchange rate was more deteriorated. To address the macroeconomic growing, imbalances, and instability and economic reform program was set up in 1997 and has been implemented more seriously since then. Among the other measures pursued by the government was tightening up and reshaping the monetary policy; to cut inflation rate, eliminate the most credit restrictions; and introduce a new indirect financial control. The program achieved an economic recovery process that resulted in the consolidation and relative stability of the exchange rate; lower inflation rate and real GDP growth doubled by 2001. The budget deficit was declined from 3.8% of GDP in 1996 to 0.7% in 1998; due to a reduction in government spending. The annual inflation rate fell to 8% by 2000; excess liquidity shown in the market that lifted during the period of high inflation rate was absorbed by two instruments: Government Participation Certificates (GMC) and Central Bank Certificates (CMC). Also, the Sudan balance of payment restrictions was significantly eased when the oil export began in 1998.The export of oil turned an annual bill of $ 300 million for petroleum products into a source of income that could earn more than $ 3.7 billion annually. Overall, the fundamentals of the Sudan economy have improved, with real GDP growth averaging 4.7% in 1990-2000 compared to 1.2% in 1985-1990. In fact, over the past six years, with an average of 6.5%, Sudan's GDP growth rate was among the highest percentage in developing countries. However, Sudan is still facing some serious economic problems. The extraneous amount remained at $ 24 billion, a massive figure for Sudan with a GDP of about $ 9 billion. Moreover, the armed conflict in Darfur and eastern Sudan showed that military spending remained high at the end of the civil war in the south. Weak infrastructure and rare investment finance aggravated the challenges of economic development in Sudan. (Elhiraika &Abu Ismail, 2005).

The Dutch disease that emerged in 2006 was resulted from the domestic currency increase due to: the oil revenues growth, the decline in non-oil export competitiveness, and the expansion of non-tradable goods.

In 2008, the world financial crisis caused severe effects on the Sudan economy such as the sharp decline in the State's revenues, further decline in oil revenues, and a decline in the global demand. The decline in non-oil exports led to wide deficits in the trade balance. Therefore, the foreign debt of Sudan increased to $45 billion by the end of 2015. In 2018, the GDP growth rate increased from 2.5% to 7.5%, and the average inflation rate increased from 4.32% in 2017 to 3.63% in 2018. The growth rate of the money supply increased from 4.68% in 2017 to 8.111% in 2018. The balance of payments deficit increased from $ 8.12 million in 2017 to $ 2.25 million in 2018 due to an increase in the current account deficit from $ 1.851.4 million to 1.928.4.

LITERATURE REVIEW

There are many previous studies discussed the Impact of Monetary Policy on Economic Growth:

Wauk, G. and Adjorlolo, G. (2019)studied the Game of Monetary Policy, Inflation and Economic Growth: Evidence from Ghana. The study used time-series data for the period 1982-2017 and also used Auto-regressive Distributed Lag (ARDL) to co-integration model. The study found that: the interest rate significantly influences the economic growth on the negative side in the long run, and so indicates that a higher interest rate tends to restrain economic growth and inflationary pressures. In this trend, the exchange rate shows an insignificant negative effect on economic growth in the long run.

Ayodeji, A. and Oluwole, A. (2018) studied the Impact of Monetary Policy on Economic Growth in Nigeria. The study used time-series data for the 1982-2012 and Vector Error Correction Mechanism (VECM). The study found that the money supply and exchange rate had an insignificant positive impact on economic growth. While the interest rate and liquidity ratio, on the other hand, had a significant adverse effect on economic growth.

Aslam, Mehvish (2018)studied the Impact of Monetary Policy on Economic Growth: Evidence from Pakistan. The study used time-series data for the period 1972-2015 and applied a multiple regression method to analyze the data and draw the results. The study found that the monetary policy has a significant effect on the inflation rate, money supply, employment, gross capital formation, foreign direct investment, saving, and other macroeconomic variables.

Ahmad, Dilshad, et at(2016) studied the Impact of Monetary Policy on Economic Growth Empirical Evidence of Pakistan by using the bounds testing (ARDL) approach on time-series data for 1973-2014. The study found that variables associated with the money supply and exchange rate together would have a positive influence on economic growth in the long run. The Inflation rate has insignificance effects positively while, the interest rate has adverse effect on the economic growth. The study suggested a stable exchange rate policy to ensure and enhance economic growth of the country.

Okafor, Chinwuba et at (2015)studied the Monetary Policy Innovations and Growth Rate of Output in Nigeria during 1985-2012. The study employed the VectorAutoregressive (VAR) estimation technique in the analysis of data. The result showed that the money supply exerted significant influence on the growth of output in Nigeria, while the exchange rate and interest rate were insignificant.

Agbonlahor (2014) studied the Impact of Monetary Policy on the Economy of the United Kingdom for 1940-2012 and employed the Vector Error Correction Model (VECM) for empirical estimation of the study. The study found that the relationship between money supply and Inflation rate, which a prominent instrument to the economic growth in the United Kingdome.

Abdulrahman, Badreldin Mohamed (2014) studied the impact of economic policies on the development of Sudan 2000-2013. The economic policies were represented by these variables (Money supply, Interest rate, tax, and government expenditure), while the gross domestic product (GDP) was represented by economic development. The study used the least square (OLS) for explaining the relationship between the variables of the study. The study found that economic policies have a significant impact on development.

Precious, C. and Makhetha-Kosi, P. (2014) studied the monetary policy role in promoting the economic growth in South Africa economy over the years 2000-2010 and employed the Error Correction Mechanism for empirical estimation of the study. They found that that money supply, ratio rate, and exchange rate were insignificant instruments of monetary policy that driving the economic growth in South Africa while the inflation rate was significant. The study, therefore, recommended that monetary policies should be applied to create a favorable investment climate for attracting both domestic and foreign investments to achieve sustainable economic development. The government should also increase expenditure on the productive sectors of the economy to enhance-economic growth as monetary policy alone was ineffective in boost the economic growth.

Gul, Hameed et at (2012) studied the Linkage between Monetary Instruments and Economic Growth for Period 1995 – 2010. The study used the Least Square (OLS)model to explain the relationship between the variables of the study. The monetary policy was tied with balanced adjustments in independent variables and showed a positive relationship with the dependent variable. **Kashani (2011)** studied examined of impact monetary policy on economic growth for period 1959 – 2008. The study found no significant relationship between money and real economic variables, economic growth, and employment.

Ahmed, A, Elsheikh M; Suliman Z.S. (2011) studied The Long–Run Relationship between Money Supply, Real GDP, and Price Level: Empirical Evidence from Sudan. The study used time-series data for the period 1960-2005 and, the Granger Causality test was used to examine the short-run direction of causality between the variables. The study found no causality between the real GDP and the money supply. However, the results from the co-integration analysis showed that there was an existence of a long-run relationship. **Khosravi; Karimi**(2010) studied the Relationship between Monetary, Fiscal Policy, and Economic Growth in Iran by using the bounds testing (ARDL) approach on time-series data for period 1960-2006. The study found that co-integration relations between economic growth, monetary policy, and fiscal policy in Iran. The results indicated the impact of the exchange rate, and inflation rate on economic growth was negative and the government expenditure achieved a significant positive impact on economic growth.

METHODOLOGY

Data Sources:

This study used the annual time-series data on the GDP, Money supply (Ms), Inflation (INF), Lending cost (f), and Exchange Rate (EX). The data was collected from the Central Bank of Sudan for period (1970-2018).

Model Specification:

The model was constructed on the classical and monetary theories, models applied by Dilshad Ahmad et at(2016), ChinwubaOkafor et at(2015), Hameed Gul1et at (2012) and the characteristics of Sudan economy as the following formula:

Y= f (Ms, Inf, Ex, F)

GDP: Gross domestic product

INF: Inflation

EX: Exchange Rate.

Ms: Money Supply

F: Lending cost

Testing for stationary

Unit Root Test

The Augmented Dickey-Fuller, Phillip-Perron test were employed as well as the root of the unit in the study. The results of the tests were as follows:

Table1: Unit Root test

Variable	Unit root tests			
	ADF	Order of co integration	P P	Order of co integration
Log EX	-4.909052	1st Difference	-5.074080	1st Difference
Log GDP	-7.954047	1st Difference	8.018035-	1st Difference
Log INF	-7.970972	1st Difference	-8.444852	1st Difference
Log Ms	-5.571779	1st Difference	-5.771935	1st Difference
Log F	-4.125663	Level	-3.848978	Level

Source: Author's analysis by eviews10

The table1 provides ADF test results demonstrating that Lending cost is stationary at level, while Money Supply, Exchange rate, and Interest rate are stationary at 1st difference. Results of the PP displayed money supply, exchange rate, and interest rate are stationary at 1st difference except that Lending cost was fixed at the level. The ARDL method is suitable for estimating the different integration order of the variables.

ARDL MODEL:

$$\Delta In(GDP_t) = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta InGDP_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta InEx_{t-1} + \sum_{i=1}^{n} \alpha_3 \Delta InM_{t-1} + \sum_{i=1}^{n} \alpha_4 \Delta InInf_{t-1} + \sum_{i=1}^{n} \alpha_5 \Delta InF_{t-1}$$
$$+ \alpha_6 InGDP_{t-1} + \alpha_7 InEx_{t-1} + \alpha_8 InM_{t-1} + \alpha_9 InInf_{t-1} + \alpha_{10} InF_{t-1} + e$$

ECM MODEL

$$\Delta In(GDP) = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta InGDP_{t-1} + \sum_{t=1}^{n} \alpha_2 \Delta InEx_{t-1} + \sum_{t=1}^{n} \alpha_3 \Delta InM_{t-1} + \sum_{t=1}^{n} \alpha_4 \Delta InInf_{t-1} + \sum_{t=1}^{n} \alpha_5 \Delta InF_{t-1}$$
$$+ \alpha_6 ECT_{T-1} + e_t$$

Bounds testing for Co-integration analysis

$$H_0 : \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0$$
$$H_1 : \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq 0$$

Table2: F-statistics for testing the existence of long-run co-integration

Wald Test					
	F-statistic Value	Narayan (2005) Critical Value	Lower bound	Upper bound	decision
$f_{InGDP}(InGDP/InMs, InEx, InInf, InF)$	6.744893	10% 5% 2.5% 1%	2.45 2.86 3.25 3.74	3.52 4.01 4.49 5.06	Evidence of Co-integration

Source: Author's analysis by eviews10

The table provides test results demonstrating that all the variables have long run relationships(The F-statistic > critical upper bound value at 1% significance level; there is a long-run co-integration relationship among the GDP and its factors).

Diagnostic check for serial correlation by using the Breusch-Godfrey LM test
Table3:Perform diagnostic check for serial correlation by using the Breusch-Godfrey LM test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.775402	Prob. F(4,22)	0.1698
Obs*R-squared	10.49321	Prob. Chi-Square(4)	0.0329

Source: Author's analysis by eviews10

The LM test indicates no serial correlation problem since the p-value is greater than 0.05.

THE RESULTS

Estimation of Long-run Coefficients

Table4:Estimation of Long-run Coefficients

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGM	0.434849	0.061681	7.049957	0.0000
LOGINF	-0.188278	0.065259	-2.885098	0.0078
LOGF	-0.024787	0.075245	-0.329415	0.7445
LOGEX	0.099180	0.011245	8.819881	0.0000

EC = LOGY - (0.4348*LOGM -0.1883*LOGINF -0.0248*LOGF + 0.0992 *LOGEX)
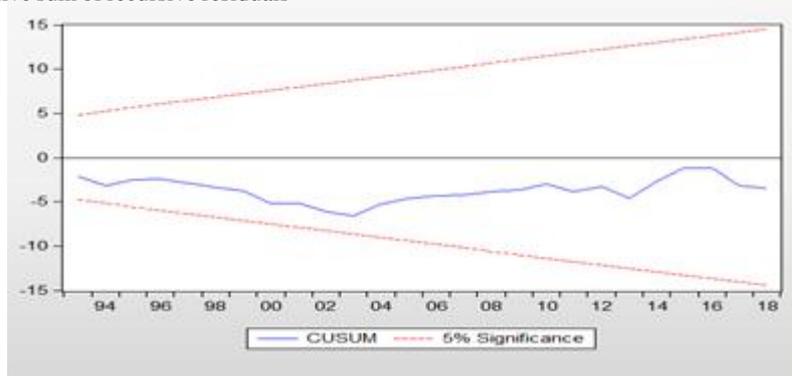
Source: Author's analysis by eviews10

The long-run results in a table (4) show that: money supply coefficient is positive and statistically has significance impact on the GDP growth, a 1% increase in money supply leads to an approximately 43% increase in the GDP. The exchange rate coefficient is positive and statistically has significance impact on the GDP growth; a 1% increase in the exchange rate leads to an approximately 10% decrease in the GDP. The inflation rate coefficient is negative and statistically has significance impact on the GDP growth; a 1% increase in the inflation rate leads to an approximately 19% decrease in the GDP. The Lending cost coefficient is negative and statistically has an insignificant impact on the GDP growth; a 1% increase in the Lending cost leads to an approximately 2% decrease in the GDP growth.

stability analysis

Figure1:Plot of cumulative sum of recursive residuals

Source: Author's analysis by eviews10

The figure1 shows that: The CUSUM graph is within the critical limits at a significant level of 5%.

Short run error correction result

Table5: Short ru''n error correction result

The short-run results in a table (5) show that: value of the ECM (-1) coefficient, which is -0.92 having a negative sign and statistically significant. It indicates a shock in the economy will be adjusted by 92% next year. Has the correction coefficient crosses a high adjustment speed after the shock. The Short-run results are not significantly different from long-run results

Diagnostic and stability analysis

table (6) Diagnostic and stability analysis

Statistics	Estimated Value	Prob
Normality (Jarque-Bera)	1.176	0.5553
Breusch -Godfrey Serial Correlation LM Test	1.775402	0.1698
ARCH Test	1.098031	0.3755
Ramsey RESET Test	0.550737	0.4649

Source: Author's analysis by eviews10

Table (6) show that: The LM test indicates no serial correlation problem since the p-value is higher than 0.05. The probability value of the Ramsey RESET test is 0.46, which means that the model is valid. The Heteroskedasticity Test ARCH indicates no Heteroskedasticity problem since the p-value is higher than 0.05. the probability value of the Normality (Jarque-Bera)test is 0.56, which means that the model is Normal distribution.

FINDINGS

The findings of this paper demonstrate that the impact of independent variables (Money supply, Inflation, exchange rate, Lending cost), and economic growth. The findings point out that the Money supply has a positive and statistically significance impact on GDP growth. This result agrees with Ayodeji, A. and Oluwole, A and Aslam, Mehvish. The exchange rate has a positive and statistically significance impact on the GDP growth, and this result agrees with Khosravi and Karimi.

The inflation rate coefficient was negative, and statistically significance impact on the GDP growth and this result agrees with Aslam, Mehvish and, Khosravi, and Karimi. The Lending cost coefficient was positive and, had a statistically insignificant impact on GDP growth. Finally, Correction coefficient values had a high speed in overtaking shocks. The study recommends reducing inflation rate through appropriate economic policies in order to activate the effect of Total Investment Lending cost rate index.

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