

**THE IMPACT OF INFLATION ON SOME
MACROECONOMICS INDICATORS IN SUDAN
DURING THE PERIOD (1990 – 2018)**

Ali E.M. Nour Zaroog¹; M.K. A.Mohammed² and O.E.M.Nasir³

1. Associate Professor in Economics Department - University of Bakht-erruda.
2. Assistant Professor in Econometrics and Social Statistic Department - University of Bakht-erruda.
3. Assistant Professor in Econometrics and Social Statistic Department - University of Bakht-erruda.

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ABSTRACT:

The study aimed to examine the effect of inflation on some macroeconomics indicators in Sudan during the period (1990-2018). By focusing on the most important macro variables (money supply, exchange rate, and economic growth). The most important assumptions of the study is that there is an inverse relationship between inflation and the growth rate of the Sudanese economy represented in the gross domestic product, and positive relationship between the money supply and the deterioration of the exchange rate level. The study used the descriptive, statistical, and econometric method MANAVO over the SPSS program. The most important results proved the study hypotheses, that there is a positive relationship between inflation, money supply and exchange rate deterioration, and an inverse relationship with GDP in Sudan. The study recommended the necessity of adopting macroeconomic policies concerned with the productive sectors in order to combat the continuous rise in prices and improve the level of the exchange rate in Sudan.

1. INTRODUCTION:

High and sustained economic growth with low inflation is the central objective of the macroeconomic policy makers. Therefore, inflation has been one of the most researched topics in macroeconomics for the last many years because it has serious implications for growth and income distribution (**Mohammed, et al., 2011**). The argument of inflation hinges on two premises: in times of fixed nominal interest rates, higher inflation expectations decrease real interest rates (see Fisher equation), and lower real interest rates reduce savings and stimulate consumption (see Euler equation). However, the effect of real interest rates on consumption depends on assumptions regarding preferences. In addition, households use paper money as a medium of exchange. Higher inflation is an implicit tax on paper money, and could lower economic activity. Higher inflation might also increase inflation uncertainty, and

reduce consumption spending via a precautionary savings channel (**Francesco, et al., 2015**). Price stability is considered as the key variable to promote economic growth as well as sustainable development. The major objective for many central banks is to maintain price stability with high growth rates. As money loses its value people lose confidence in it as a medium of exchange. The resulting effect is a fall in savings and consequently lower investment as well as economic growth (**Tutoru, 2009**). Inflation was the result of weak economic and financial policies, including considerable financial (monetary and fiscal) expansion, severe import compression, extensive price and wage controls, rationing, high subsidies, and constraints on the private sector. These policies resulted in a large and active parallel market for goods and services and foreign exchange, and a surge of inflation which averaged 40 percent in the first half of the 80s only to accelerate thereafter, reaching 130 percent in 1991 and 140 percent in 1992 in Sudan. Sudan annual inflation climbed to record a high of 166.8 in August 2020. Main pressure came from food and fuel prices, aggravated by months-long Corona virus lockdown measures. Inflation has been rising in recent years amid persistent shortage of bread, beverages and fuel, as black market for US dollars. This study tried to aimed to examine the effect of inflation on some macroeconomics indicators in Sudan during the period (1990-2018).

2. Problem Statement:

Much of the empirical literature looks for a negative influence of inflation on macroeconomics variables. Inflation reduces the purchasing power of each unit of currency because it leads to increase in prices. Increase in inflation rates indicates an accelerating deterioration in economics activities and sectoral production. It leads to lower levels of investment, economic growth and impact the balance of payments by making its exports relatively more costly. Moreover, inflation can interact with the tax system to disturb borrowing and lending decisions.

3.Objectives Of the Study:

The study depends on the following objectives:

1. To examine the impact and relationships of inflation on GDP growth, money supply, and exchange rate in Sudan.
2. To explore the GDP growth performance and the historical trends of inflation in Sudan.
3. To study the polices implications that have been applied in Sudan during the period of study.

4. Hypothesis of the Study:

The hypothesis that pinned this study is that:

1. Inflation is negatively related to economic growth in Sudan.
2. There has been a positive relationship between inflation rate and the deterioration in exchange rate in Sudan.

3. The inflation rate related positively to money supply in Sudan.

5. Methodology and Data Collection:

GARCH-M estimation technique has been used in this study to estimate the model, whereas the sources of data were primarily based on secondary data for the period (1980-2018). The methodology and variables for the study have been selected the relative importance on theoretical and empirical basis. It is also attempted to include the variables which mostly determine the level and rate of economic growth in Sudan. Annual time series data for this study have been collected from the Ministry of Finance and Economic Planning Scurvies and Bank of Sudan reports for the period 1980-2018.

6. Literature Reviews:

Most of economists use the background of the civil war in Sudan to analyze the Sudanese economic decline in the last three decades. But a little focus upon the situation can shows that the civil war was not the main reason of the decline, as although it may be considered as one of the decline factors, but the real reason is the economic policies of the Sudanese governments which were assumed to be the principles director of the economic regulations (**Almosharaf and Fung, 2014**).

Khan and Senhadji (2001), examine the effects of inflation on growth separately for industrial and developing countries. The data set covers 140 countries from both groups and non-linear least squares (NLLS) and conditional least squares methods are used. The empirical results verify the existence of a threshold beyond which inflation exerts a negative effect on growth. Significant thresholds at 1-3 percent and 11-12 percent inflation levels for industrialized and developing countries have been found. The view of low inflation for sustainable growth is strongly supported by the study.

The negative effects of inflation have been studied in the context of models of economic growth in which the continuous increase of per capita income is the outcome of capital accumulation along with technological progress. The uncertainty associated with high and volatile unanticipated inflation has been found to be one of the main determinants of the rate of return on capital and investment (**Bruno, Pindyck and Solimano 1993**).

Fisher (1993), has investigated relationship between inflation and economic growth for 93 countries. He used data set consisting of several macroeconomic variables including inflation. He has found out that the inflation negatively affected growth by reducing investment, and by reducing rate of productivity growth.

Mukoka (2018), examined the impact of inflation on economic growth in Zimbabwe. The time series yearly data for inflation and economic growth (GDP) from 1990 to 2017 were used for the study.

Ordinary Least Squares (OLS) was used to determine the impact of inflation on Economic growth. There was also evidence of co integration between the two variables using the Johansen Co integration Test. The results of the study established no relationship between Inflation and Gross Domestic Product in Zimbabwe. In this regard the study concluded that all factors which cause an increase in the general price levels such as energy (petrol, diesel, gasoline, and paraffin), exchange rates volatility, increase in money supply, poor agricultural production and so forth, should be kept on check, with the appropriate policies so as to foster economic growth.

Kormendi and Meguire (1985), estimated a growth equation with cross section data and find that the effect of inflation on the growth rate is negative, although it loses explanatory power when the rate of investment is also included in the regression.

The negative effects of inflation have been studied in the context of the models of economic growth (**Orphanides and Solow (1990)**, **De Gregorio (1993)** and **Roubini and Martín (1995)**). The continuous increase of per capita income is the outcome of capital accumulation and the continuous improvement in the efficiency with which productive factors are used.

Michael Sarel (1995), examined the possibility of nonlinear effects of inflation on economic growth. It finds evidence of a significant structural break in the function that relates economic growth to inflation. The break is estimated to occur when the inflation rate is 8 percent. Below that rate, inflation does not have any effect on growth, or it may even have a slightly positive effect. When the inflation rate is above 8 percent, however, the estimated effect of inflation on growth rates is significant, robust and extremely powerful.

According to **Francesco, et al., (2015)**, households that expect an increase in inflation have an 8% higher reported readiness to spend on durables compared to other households. This positive cross sectional association is stronger for more educated, working age, high income, and urban households. They were documented these novel facts using German micro data for the period 2000-2013. The German government unexpectedly announced in November 2005 a three percentage point increase in value added tax (VAT) effective in 2007. This shock increased households' inflation expectations during 2006, as well as actual inflation in 2007.

Martín, et al., (2011), found a positive relationship between real exchange rate RER under valuation and economic growth. Different rationales for this association have been offered, but they all imply that the mechanisms involved should be stronger in developing countries. **Rodrik (2008)** explicitly analyzed and found evidence that the growth

relationship is more prevalent in developing countries. They were showed that his finding is very sensitive to the criterion used to divide the sample between developed and developing countries. They were used alternative classification criteria and empirical strategies to evaluate the existence of asymmetries between groups of countries and found that the effect of currency undervaluation on growth is indeed larger and more robust for developing economies. However, the relationship between RER undervaluation and per capita GDP is non monotonic.

Evans and Antwi, (2013), the main objective of their study was to investigate the effect that changes in the inflation and interest rates have on the Gross Domestic Product (GDP) in Ghana for the period 1980-2010. The study employed multiple linear regressions to establish that there exists a fairly strong positive correlation between GDP, Interest rate and

Inflation, but Inflation and Interest rate could only explain movement in GDP by only 44 percent. They were established that, there existed positive relationship between inflation and GDP and interest rate is negative. It is recommended among others that the Government together with the Bank of Ghana should develop and pursue prudent monetary policies that would aim at reducing and stabilizing both the micro and macroeconomic indicators such as inflation targeting, interest rate, so as to boost the growth of the economy.

Mashehdul Islam (2009), considered the relationships between exchange rate and inflation and between exchange rate and GDP in Bangladesh. Bangladesh experiences of moving away from a currency board system to floating regime since 2003 offers a lesson worthy of attention from the point of view of efficiency of Floating Rate System in least developed countries like Bangladesh. Floating exchange rate regime in Bangladesh contrasts with its neighbor's currency board system. Experiences in Bangladesh and abroad show that all that a government needs in this regard is to maintain confidence in the currency, secure currency's strength and ensure its full convertibility. As long as this is backed by sufficient reserve of the foreign exchanges and there is firm political and economic will, adoption of a successful free exchange rate regime is possible.

Zaroog (2013) attempted to examine the behavioral macroeconomic functions, and the interactions between macroeconomics variables and its affect on economic growth and macroeconomics policies stability for the period 1970-2005. In this study the three stage least squares used simultaneously as estimation technique for the period 1970-2005. The results of estimated equations showed that, all equations were statistically significant. Also results showed that there was instability in Sudan economy during the periods 1979- 81 and 1996-95.

Also the complex conditions of natural disasters, civil wars, instability of governance, and the external political and economical pressures aggravated the Sudan economy situation. **Elhussein and Abdalla (2018)**, investigated the determinants of exchange rate in Sudan and assess their impact on its volatility. Their paper used the ARDL model to study the relationship between the dependent and independent variables. Their study documented that, the determinant factors of the exchange rate in Sudan are the balance of trade, gold purchases, money supply, inflation and foreign reserves. The continuous deterioration and fluctuation in exchange rate throughout the period under study suggest that the exchange rate system followed has no impact on the stability of the exchange rate

7. Sudan Economy Background:

The civil war took place in Sudan casted a negative effect on Sudan economy over years. It considered as part of the resource curse but it is not considered as a direct cause of the economic deterioration. There are many other factors lead to the tragic situation, one of the most important factors the instability of the political situation over the past fifty years and inappropriate economic policies in Sudan (**Almosharaf and Tian, 2014**).

In early 1960s, economic activities controlled by the government, in 1970s, 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 in 1980s 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. Money supply increased as the annual rate of monetary expansion reached about 40% during 1981-1985 (**Hag Elamin & Elmak, 1997 and Tomader, 2012**).

The Sudanese government adopted a number of development plans. These plans included the Ten Year Plan (1960-1970), the Five Year Plan (1970-1975), the Amended Five Year Plan (1970-1977), the Six Year Plan (1977-1982), the first Three Year Public Investment Program (1979-1982), the second Three Year Public Investment Program (1982-1985), the Four Year Salvation, Recovery and Development Program (1988-1992) and the Three Year National Economic Salvation Program (1990-

1993), and the Comprehensive National Strategy covering the period (1992-2002), (**Abdulrahman, 2013**).

The exploitation of oil since 1999 has created a remarkable shift in the structure of the Sudanese economy, from predominantly reliant on agriculture for growth and exports, to reliance on the oil sector. Because of oil Sudan experienced its longest and strongest period of growth since independence where the size of economy, in terms of its GDP, grown substantially with real GDP growth rate averaged nearly 8 percent during the nine year period ending in 2008. The strong economic expansion generated by oil has, however, been unbalanced as, the inherited regional inequality and disparity in services provision remains striking while exports of key products have fallen in large part because of reduced competitiveness, leading to economic growth and the country remains having a substantial external debt amounted to about US\$43.2 billion in nominal terms (more than 70 percent of GDP) in 2012. Although data gaps are substantial it is believed that the majority of those who are economically active are involved in the informal economy activities (United Nations Development Assistance Framework UNDAF, 2009-2012).

Inflation rates have fallen to very low levels of 8% in 2000, after it was 166% in 1996, a significant stability had took place in exchange rate, and the rate of GDP growth returned to rise to reach an average of about 6% during 1997-2000. This situation had made improving and some sort of relative stability in the Sudanese economy until the year 2008, in spite of internal political crises that took place in Sudan, the level of external relations, and Darfur crisis. Due to the budget deficit caused by the loss of oil revenues on the one hand (2011), the decline in agricultural and industrial production on the other hand, and because of total reliance on oil without hiring the proceeds for the benefit of the productive sectors, the inflation rate started raising until it reach in August 2012, more than 41.6%. The thing which clearly seen in the uncontrollable rising of the price levels, it also led to a decline equivalent to 45% in the monetary value, which led to the capital erosion in addition to decline in private sector investments due to the fears of instability and economic imbalance (**Almosharaf and Tian, 2014**).

Gold export by the Republic of Sudan has recently become the major foreign exchange earner following the secession of the southern part of the country and the creation of the Republic of South Sudan in July 2011. With most of the oil fields located in the south, the new state took more than 75% of the oil production capacity of the former unified country. However, by 2012, just one year after the secession, Sudan became Africans' third largest gold producer after South Africa and Ghana and among the top 15 global gold miners. It is not surprising,

therefore, that gold export has displaced oil export contributing 33% average in 2012-2017 (**Elbadawi and Kabbashi, 2018**).

In nineteen nineties the government announced the economic liberalization policy during which market mechanism is selected as a tool for setting exchange rates. During the period 2000-2006 and as a result of foreign currency inflows associated with Sudan petroleum exports, the foreign exchange market was unified with a sole exchange rate of 2.6 Sudanese pounds for the dollar. The exchange rate kept on deteriorating at an accelerating rate throughout the period 2006-2017, from 2.6 to 6.9 US dollars, with many interventions and devaluations of currency by the central bank. For instance in 2012 the Sudanese pound was devalued by 91% in one step, from 2.67 to 4.42 pounds for the dollar to minimize the difference between the official and parallel rate. Nevertheless the problem continues and the difference between the parallel and official exchange rates continued to escalate to reach 184 percent of the parallel rate by the end of 2017 (**Elhussein and Abdalla, 2018**).

Since late 2011, Sudan has observed remarkable decrease in economic growth, which increased inflation and unemployment rates. Since then, Sudan underwent economic reforms that favored adopt stabilization policies. Considering that the ongoing Five Year Economic Reform Plan (2015-2018) for growth and poverty reduction cannot be achieved unless stabilized the macroeconomic indicators. Economic recovery continues to elude Sudan. The absence of proper strategies, economic reform and lack of fiscal and monetary policies have now resulted in low levels of per capita income, where a majority of labor force involved in agricultural activities. Addressing these require structural transformation to high productivity levels and focusing on long-term sustainable sources for economic growth and inclusive development, and move towards agro-processing industries (**Elryah, 2016**).

At the start of 2018, the economic situation severely worsened due to a set of economic restructuring reforms to access foreign exchange and governmental funds as recommended by the International Monetary Fund (IMF). Among other changes, the government cut wheat and fuel subsidies and devaluated the Sudanese pound (SDG) several times; from 6.7 SDG/USD to 30 SDG/USD in February 2018, and to 47.5 SDG/USD in October 2018. Exchange rates on the parallel market, often the only available trade, rose to 70 SDG/USD in the end of 2018, restricting foreign trade even further. The shortage of hard currency intensified, adding to rising inflation rates which reached 72.9% in December 2018, a severe increase compared to 25% in 2017. In sum, high inflation rates combined with high external debts, declining national GDP, and the rapid depreciation of hard currency, decreased the private sector's and the

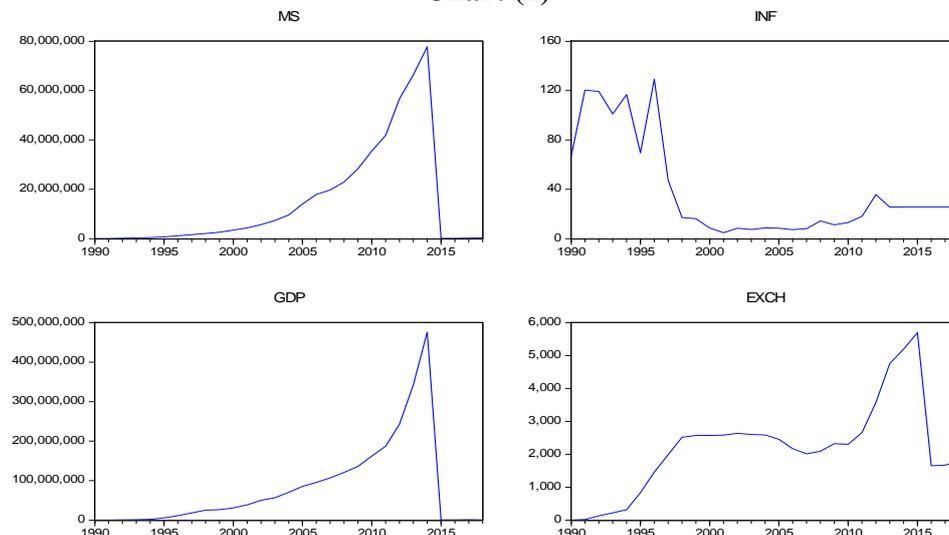
government's ability to import necessary commodities such as fuel, wheat and medicines. However, cuts in the security spending are not under consideration (UNICEF, 2018). The economic crisis not only increased food and non-food prices sharply but further impacted health services, economic and agricultural activities across Sudan. At the end of 2018, living costs were at an all-time high, leading to decreased purchasing power (ACAPS, 2018).

With large imbalances and loose policies, the outlook is alarming without policy reforms. Absent reforms, the weaknesses in competitiveness and in the business environment will persist. GDP growth would then likely remain negative in the near term, with minimal investment and subdued consumption, while bank fragility will rise. High inflation, continued exchange rate depreciation, and pervasive shortages will continue to aggravate social tensions. The fiscal imbalance would also intensify over the medium term, while the current account deficit would remain large, raising risks of disorderly adjustment. Downside risks to the outlook would dominate, albeit with large margins of uncertainty (IMF, 2018).

8. Analytical Framework and The Results:

First: Data Descriptive Statistic (Curves):

Chart (1)



Looking at the chart (1), it becomes clear that there is a general trend towards an increase in the money supply, which calls into question its non staticness, and hence the existence of unity roots. As for the exchange rate, it witnessed stability in the two years (2003-2004) according to (the Comprehensive Peace Agreement). Whereas, the value of the Sudanese pound increased in 2005, due to the implementation of

the Comprehensive Peace Agreement with the South, and the increase continued to (2006-2007), with the intervention of the Central Bank of Sudan in the market (dealing exchange rates). While the years (2011-2012) witnessed a sharp decline in the exchange rate as a result of the loss of oil production and its export revenues due to the secession of the South. The decline in the value of the Sudanese pound continued until the year (2017) due to the decrease in productivity, the increase in imports, the accumulation of external debt, and the budget deficit. Inflation recorded stability in the period (2003-2005) as a result of the political stability resulting from the Comprehensive Peace Agreement. Also it decreased in the period (2006-2009) due to the stability of the Sudanese pound, the decrease in the growth of the money supply, and the cessation of military operations. It increased in the period (2010-2017) due to the loss of oil revenues and the weak of production.

From Table (1): It is noted that the average inflation index is less than the average of money supply index, and also when comparing the two mediators, we find that the median of the inflation index is less than the median of money supply, is smaller than the GDP, and the exchange rate. It seems that the inflation index is growing greater than the money supply. The difference was great with comparing the maximum values of: money supply and the exchange rate was approximately four times of inflation. The curvature of the inflation index curve is less than the money supply, GDP, and real exchange rate. The Jarque-Bera value shows that the exchange rate index is closer to a normal distribution dependency. Here we accept the null hypothesis and reject the alternative imposition where the null hypothesis for inflation, money supply, and GDP has been rejected since it does not follow a normal distribution.

Table (1): Descriptive Statistics for The Data

	MS	INF	GDP	EXCH
Mean	14522554	38.32414	79153149	2186.659
Median	3466700.	25.60000	31037068	2305.000
Maximum	77739000	129.2000	4.76E+08	5700.000
Minimum	31645.00	4.800000	110110.7	4.500000
Std. Dev.	21565154	40.23034	1.13E+08	1409.113
Skewness	1.665310	1.282570	2.044680	0.573416
Kurtosis	4.744918	3.118219	6.986235	3.528578
Jarque-Bera	17.08314	7.967658	39.40730	1.926829
Probability	0.000195	0.018614	0.000000	0.381588
Sum	4.21E+08	1111.400	2.30E+09	63413.10
Sum Sq. Dev.	1.30E+16	45317.44	3.59E+17	55596792
Observations	29	29	29	29

Second: Unit Roots Tests:

From Table No. (2): the probability value of inflation, GDP, exchange rate, and money supply are less than the level of significance (5%), so the null hypothesis has been rejected and accepted the

alternative one that; there is no unit root for all variables, and therefore the series is static at the first difference. For that, it is noticed; the relationship between the study variables is a logical and not a false one.

Table (2): Dickey Fuller ADF Unit Roots Tests:

Variable	ADF	Probability	ADF	Probability	ADF	Probability	Order
	Level		First Difference		2nd Difference		
INF	-1.737012	0.4025	-8.335556	0.0000			I(1)
1%	-3.689194		-3.699871				
5%	-2.971853		-2.976263				
10%	-2.625121		-2.627420				
MS	-1.972054	0.2967	-5.293079	0.0000			I(1)
1%	-3.689194		-3.699871				
5%	-2.971853		-2.976263				
10%	-2.625121		-2.627420				
GDP	3.564271	1.0000	-5.855874	0.0000			I(1)
1%	-3.752946		-3.699871				
5%	-2.998064		-2.976263				
10%	-2.638752		-2.627420				
EXCH	-2.063541	0.2599	-4.751335	0.0000			I(1)
1%	-3.689194		-3.699871				
5%	-2.971853		-2.976263				
10%	-2.625121		-2.627420				

Source: Prepared by the researchers from the product of the annexes.

Third: The Co-integration Test:

The results of the co-integration effect test indicate a rejection of the null hypothesis of the absence of any co-integration vector at a significant level (5%), and then acceptance of the alternative hypothesis that states there are two equations for the co-integration between the study variables. This indicates that the time series under study are equilibrium in the long run.

Fourth: Estimating The Model:

At this stage, the model variables will be estimated by applying MANOVA and linear regression by the SPSS statistical package to measure the effect of inflation on some macroeconomics indicators in Sudan during the period (1990-2018). (see Appendix, tables 1, 2, 3,, and 6).

Table No. (3): The Results of The Co-integration Test (Johansson).

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.878271	56.86089	27.58434	0.0000
At most 1 *	0.649031	28.27054	21.13162	0.0042
At most 2	0.219252	6.682589	14.26460	0.5273
At most 3 *	0.203484	6.142723	3.841466	0.0132

Table (4): Summary of The Results of MANOVA and Linear Regression

R ²	F	T	Coefficient	Dependent Variables	Explanatory Variable
0.999	28.321	1.674	164357.938	Money Supply	Inflation
0.999	174.238	-1.783	-912904.130	GDP	
0.999	45.228	4.103	21.707	Exchange Rate	
	28.321			Money Supply	S.D
	174.238			GDP	
	45.228			Exchange Rate	
Wilkes Lambda = 10359 Calculated F = 46.611					

Source: Prepared by the researchers from the product of Appendix No. (4)

Economic Standard:

From the results in table (4), there is a positive relationship among inflation rate and (money supply and the improvement in exchange rate) according to the parameters (164357.94 and 21.71 respectively), and this is completely compatible with economic theory. Increasing inflation reduces the value of the Sudanese pound against foreign currencies and deteriorate exchange rate in Sudan. There is a negative relationship between the rate of inflation and the gross domestic product (according to the parameter -912904.13).

Statistical Standard:

The probability value associated with (t) test is significant, and this indicates that the variables are affected by each other. Table (4) shows that there are statistically significant differences in the money supply, the exchange rate, and the GDP due to the effect of the inflation rate. The value of the value of Wilkes Lambda (10359), which is a function of the level of significance (0.00). The value of F test (46.611) indicates the existence of differences in the money supply, GDP and exchange rate combined when the effect of inflation, the value of the coefficient of determination R² (0.99) and this indicates that 99% of the change in the dependent variables is caused by inflation and 1% are variables did not included in the model.

Econometrics Standard:**Auto-Correlation Test:****Table (5): Q-Statistic Test**

Slowdown	Q-Stat	Df	Prop
1	197.6300	16	0.381
2	366.6575	32	0.410

Source: Prepared by the researchers from Eviews7.

From the result in table (5) above, it is noticed that the probability value of the autocorrelation test is greater than (0.05), and this indicates that there is no self-correlation problem in the model, which indicates that there is no self-correlation between errors.

Heteroskedasticity Test:

Table (6): Variance Variation

F-Statistic	0.77	Prop	0.54
Obs*R-squared	7.91	Prop	0.52

Source: Researchers preparation using E-views

Table (6) classifies the probability values which are associated with the two tests F and R^2 are (0.54) and (0.52) respectively, greater than (0.05), indicating that the model does not suffer from the variance variation problem.

9. The Main Results:

1. There is a positive relationship among inflation rate and (money supply and the deterioration in exchange rate) in Sudan.
2. There is a negative relationship between the rate of inflation and the gross domestic product in Sudan.

10. Recommendations:

1. To treat the problem of inflation in Sudan, we need to follow a macro policies that lead to increased production.
2. Encouraging local and foreign investment towards productive projects.
3. Interest in the agricultural sector as the backbone of the Sudanese economy.
4. The need to follow urgent monetary and fiscal policies to solve the problem in money supply and the exchange rate in Sudan.

11. CONCLUSION:

The study tried to exam the impact of inflation rate on Sudanese economy for the period (1990 – 2018). Inflation hit the Sudanese economy for a long years since the begging period after the independence from the British colonialism. There were many causes behind this problem including civil wars, political instability, drought and desertification that struck the country for various years, misuse of resources, and inappropriate macroeconomic policies. The study relied on some assumptions, the most important of them are that: there is a positive relationship between inflation, money supply and the exchange rate. And an inverse relationship between inflation and GDP. The study used the MANOVA method to analyze the data related to the study through the SPSS program. The obtained results proved the validity of the study hypotheses that there is a positive relationship between inflation and the deterioration of the exchange rate, money supply, and an inverse

relationship with the GDP. The study recommends the need to follow an economic policies that can address the problems of the Sudanese economy, with attention to productive sectors.

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تأثير التضخم على بعض مؤشرات الاقتصاد الكلي في السودان خلال الفترة (1990 - 2018)م.

علي الحسن محمد نور زروق¹ ، محمد خلف الله أحمد محمد² ،
عمر الأمين محمد ناصر³

1. أستاذ مشارك بقسم الاقتصاد، كلية الاقتصاد والعلوم الإدارية، جامعة بخت الرضا.
2. أستاذ مساعد بقسم الاقتصاد القياسي والإحصاء الاجتماعي، كلية الاقتصاد والعلوم الإدارية جامعة بخت الرضا.
3. أستاذ مساعد بقسم الاقتصاد القياسي والإحصاء الاجتماعي، كلية الاقتصاد والعلوم الإدارية جامعة بخت الرضا.

هدفت الدراسة إلى فحص أثر التضخم على بعض مؤشرات الاقتصاد الكلي في السودان خلال الفترة (1990 - 2018)م. وذلك بالتركيز على أهم المتغيرات الكلية (عرض النقود، وسعر الصرف، ومعدل النمو). أهم افتراضات الدراسة أنه توجد علاقة عكسية بين التضخم ومعدل نمو الاقتصاد السوداني ممثل في الناتج المحلي الإجمالي، وطرية مع عرض النقود وتدهور مستوى سعر الصرف. استخدمت الدراسة المنهج الوصفي، والإحصائي، وطريقة الاقتصاد القياسي MANAVO عبر برنامج SPSS. أهم النتائج أثبتت صحة فروض الدراسة بأنه توجد علاقة طردية بين التضخم وعرض النقود وتدهور سعر الصرف، وعكسية مع GDP في السودان. أوصت الدراسة بضرورة إتباع سياسات اقتصادية كلية تهتم بالقطاعات الإنتاجية وذلك لمحاربة ارتفاع الأسعار المستمر وتحسين مستوى سعر الصرف في السودان.

13. APPENDIX:

Table (1): GDP, Exchange Rate, Money Supply, and Inflation
(Million SD)

Year	GDP	EXCH	MS	INF
1990	110110.7	4.500000	31645.00	67.00000
1991	192060.3	15.10000	52696.00	120.4000
1992	421818.0	132.0000	141595.0	119.3000
1993	948466.0	216.0000	268583.0	101.1000
1994	1881289.	315.0000	405353.0	116.8000
1995	5522838.	832.0000	705866.0	69.50000
1996	11194938	1460.000	1166000.	129.2000
1997	18318179	1989.000	1597100.	47.19000
1998	25080913	2520.000	2069500.	17.01000
1999	26301423	2572.300	2579200.	16.16000
2000	31037068	2574.000	3466700.	8.600000
2001	38763329	2584.000	4322100.	4.800000
2002	50204397	2637.000	5632700.	8.400000
2003	56720953	2602.000	7340900.	7.400000
2004	70383228	2586.000	9604500.	8.700000
2005	85105084	2456.000	14031400	8.400000
2006	95396107	2171.000	17871800	7.200000
2007	1.07E+08	2016.000	19714600	8.100000
2008	1.21E+08	2091.000	22933200	14.30000
2009	1.36E+08	2325.000	28314500	11.20000
2010	1.62E+08	2305.000	35497900	13.00000
2011	1.87E+08	2660.000	41853100	18.10000
2012	2.43E+08	3573.000	56663300	35.60000
2013	3.43E+08	4754.000	66445700	25.60000
2014	4.76E+08	5200.000	77739000	25.70000
2015	582937.4	5700.000	93642.60	25.65000
2016	693514.0	1650.900	120800.1	25.67000
2017	823938.0	1672.300	203367.5	25.66000
2018	758726.0	1800.000	287312.1	25.66000

Source: Bank of Sudan Annual Reports Various Years

Table (2): Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	20821430.083	5406305.341		3.851	.001
inf	164357.938	98192.484	.307	1.674	.060.

a. Dependent Variable: ms

Table (3)
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	114139412.630	28197826.194		4.048	.000
inf	-912904.130	512145.432	-.324	-1.783	63.0

a. Dependent Variable: gdp

Table (4)
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3018.551	291.273		10.363	.000
inf	21.707	5.290	.620	4.103	.000

a. Dependent Variable: exch

Table (5)
Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	1.000	10673.555 ^b	2.000	1.000	.007
	Wilks' Lambda	.000	10673.555 ^b	2.000	1.000	.007
	Hotelling's Trace	21347.110	10673.555 ^b	2.000	1.000	.007
	Roy's Largest Root	21347.110	10673.555 ^b	2.000	1.000	.007
Inf	Pillai's Trace	1.993	22.711	52.000	4.000	.004
	Wilks' Lambda	.000	47.611 ^b	52.000	2.000	.021
	Hotelling's Trace	10359.938	.000	52.000	.000	.
	Roy's Largest Root	10210.635	785.433 ^c	26.000	2.000	.001

Table (6)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	Ms	12986292240054090.000 ^a	26	499472778463619.060	28.321	.035
	Exch	55572257.725 ^b	26	2137394.528	174.238	.006
	Gdp	358092237514832700.000 ^c	26	13772778365955100.000	45.228	.022
Intercept	Ms	6499385731898682.000	1	6499385731898682.000	368.523	.003
	Exch	134477312.200	1	134477312.200	10962.462	.000
	Gdp	190750300628969984.000	1	190750300628969984.000	626.406	.002
Inf	Ms	12986292240054090.000	26	499472778463618.900	28.321	.035
	Exch	55572257.725	26	2137394.528	174.238	.006
	Gdp	358092237514832770.000	26	13772778365955100.000	45.228	.022
Error	Ms	35272604192934.580	2	17636302096467.290		
	Exch	24534.145	2	12267.073		
	Gdp	609031102838456.500	2	304515551419228.250		
Total	Ms	19137797344494480.000	29			
	Exch	194259593.650	29			
	Gdp	540392676791332100.000	29			
Corrected Total	Ms	13021564844247030.000	28			
	Exch	55596791.870	28			
	Gdp	358701268617671170.000	28			

a. R Squared = .997 (Adjusted R Squared = .962)

b. R Squared = 1.000 (Adjusted R Squared = .994)

c. R Squared = .998 (Adjusted R Squared = .976)