

## **The Role of Monetary policy on Economic activity in Sudan: an Empirical Investigation, 1990-2004**

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### **Abstract:**

The purpose of this paper is to examine empirically the role of monetary policy on economic activity measured by GDP in Sudan over the period (1990-2004). Annual time series data has been used in the analysis to estimate the linear form of the model for the period. Real GDP (Y) is chosen as dependent variable, money supply (M) represent monetary policy. Data for the study were obtained from different sources namely Central Bank of Sudan (CBOS) and Central Bureau of Statistics in the Republic of Sudan (CBS). Using these data OLS method is applied to the model. The empirical results provide that monetary policy has so little impact on economic activity during the period under consideration.

### الملخص:

تهدف هذه الورقة الى تقييم دور السياسة النقدية من الناحية التطبيقية على النشاط الاقتصادي في السودان, لهذا الغرض أختير اجمالى الناتج المحلى الحقيقى كمتغير تابع معبراً عن النشاط الاقتصادي بينما تم اختيار عرض النقود كمتغير تفسيري معبر عن السياسة النقدية خلال الفترة من (1990-2004). استخدمت طريقة المربعات الصغرى الاعتيادية لتحليل بيانات سلاسل زمنية للدالة في صورتها الخطية, حيث جمعت تلك البيانات من مصادر رسمية متمثلة في بنك السودان المركزى والجهاز المركزى للاحصاء بجمهورية السودان. أشارت نتيجة الدراسة الى ان السياسة النقدية تلعب دور طفيف في النشاط الاقتصادي خلال فترة الدراسة.

### 1. Introduction:-

Monetary policy is the macroeconomics tool that governments have at their disposal to manage the economy.

Sudan initiated economic reforms in early 1990s aimed at liberalizing the economy. During the first half of 1990s, a massive fiscal expansion to finance domestic borrowing led to sharp increases in money supply and a three-digit inflation rate as well as an unprecedented deterioration in the exchange rate. For example, the ratio of domestic revenue to GDP was about 8% in 1990-1992, but rose to 11% in 1993. The total expenditure as a share of GDP increased from 10% in 1990/92 to 17% in 1992/93. Despite these improvements, the budget deficit remained high and was mainly financed domestically by borrowing from central bank of Sudan with no or little external finance. Money supply during the period of national economic salvation program (1990-1993) increased from Ls 31.6 billion in 1990 / 91 to Ls 55.5 billion in 1991 /92 and an estimated Ls 133 billion at the end of the program. The money supply grew at an

Issue 44, Year 7th , Jan. - 2010 مجلة علوم انسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010  
average annual rate of 83%. This led to a high level of inflation, estimated at 114% in 1990 /91, 106% in 1991 /92 and 112% in 1992 /93.(quoted in Hag Elamin and Elmak (1997).

Furthermore, the armed conflict in Darfur and Eastern Sudan means that military spending remains high despite the end of civil war in the south. Inadequate infrastructure and limited sources of investment financing are major obstacles to the development of the economy. (Elhiraika and Abu Ismail).

### **Why is the money supply important?**

Because money is used in virtually all economic transactions, it has a powerful effect on economic activity. An increase in the supply of money works both through lowering INTRES RATE, which spurs INVESTMENT, and through putting more money in the hands of consumers, making them feel wealthier, and thus stimulating spending. Business firms respond to increased sales by ordering more raw materials and increasing production. The spread of business activity increases the demand for labor and raises the demand for capital goods. In a buoyant economy, STOCK MARKET prices rise and firms issue equity and debt. If the money supply continues to expand, prices begin to rise, especially if output growth reaches capacity limits. As the public begins to expect INFLATION lenders insist on higher interest rates to offset an expected decline in purchasing power over the life of their loans.

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL العدد 44: شتاء 2010  
Opposite effects occurs when the supply of money falls or when its rate of growth declines. Economic activity declines and either disinflation (reduced inflation) or deflation (falling prices) results (quoted from Schwartz).

The main objective of this paper is to examine empirically the role of monetary policy on economic activity in Sudan. For this purpose, a model is specified with real GDP as the dependent variable, and the real money supply as explanatory variable. Ordinary least squares shall be applied to the model using annual time series data covering the period (1990-2004).

While similar studies have evaluated the impact of monetary policy on economic activity in developed countries, very few studies have evaluated the impact of monetary policy on GDP in LDCs. As such, we need to fill this research gap.

The rest of this paper is organized as follows. Section (2) briefly reviews the literature, while section (3) discusses policy and GDP in Sudan. Section (4) specifies the empirical model and research methodology, while section (5) reports the empirical results. The summary and concluding remarks are given in section (6).

## **2. Literature review:-**

According to Todaro (1977), “in developed nations monetary and financial policy play a major direct and indirect role in government efforts designed to expand economic activity in times of unemployment and excess capacity (economic recession) and to contrast that activity in times of excess demand and inflation. Basically monetary policy works on two principal

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010  
economic variables: the aggregate supply of money in circulation and the level of interest rate. Economic activity is thought to be directly related to supply of money (basically currency in circulation plus commercial bank deposits) in the sense that a greater money supply induces expanded economic activity by enabling people to purchase more goods and services. This in essence is so-called monetary theory of economic activity. Its advocates argue that by controlling the growth of money supply through central bank operations, governments can regulate their nation's economic activity. In contrast Keynesian argue that an expand supply of money in circulation increases the availability of loanable funds. A supply of loanable funds in excess of demand leads to lower interest rates. Since private investment is assumed to be inversely related to prevailing interest rates, businessmen will expand their investment as interest rate falls".

Until the early 1970s, there was little use and variability of the instruments of macro-economic policy, developing countries considering first the handling of balance of payment problems. Exchange rates were fixed relative to US dollar, the pound Sterling or the French franc. In the context of the monetary policy devaluation was regarded as a measure of last resort. Empirical studies of the effect of these measures include those of Dias-Aljandro (1965) and Richard (1971). These studies conclude that, the most exaggerated fears against devaluation can not be backed by substantial experience.

With regard to fiscal policy, it is observed that LDCs are characterized by underdeveloped financial markets that governments could borrow little or

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010  
nothing from the public. In some countries, however, deposit-taking banks were forced to buy government papers at low interest rates thereby depriving the private sector of the available fund. But this was not a matter of deep concern since public investment was believed to be most important for development. Thus borrowing from the central bank mainly financed budget deficit that could not be financed by foreign borrowing. As such fiscal policy largely consisted of the determination of the size of the government deficit that would have to be financed domestically. This in turn would determine the required increases in the quantity of money and its effect on inflation and economic activity (quoted in Ahmed, 2007).

One of the approaches adopted in assessing the relative effectiveness of monetary and fiscal policy variables on the economy is to specify structural equations, which describe the channels by which the variables affect the economy. An alternative to this approach is the reduced form-single equation approach, which is typified by the St.Louis type model adopted by Anderson and Carlson (1970) where their eight equations model has been reduced to a single linear equation relating changes in total nominal spending ( $\Delta Y$ ) to change in money supply ( $\Delta M$ ) and change in government expenditure ( $\Delta G$ ). They concluded that, the monetary variables have greater and faster influences and impact on economic activity than the fiscal policy variables. However despite its simplicity this form of model tells us nothing about the structural relationship in the economy and the conclusion derived may cease to be valid if there is causation from various measures of

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL العدد 44: شتاء 2010  
economic activities such as industry, price level, import and export and the  
fiscal and/or monetary policy variables.

According to Brown (undated), fiscal policy can be effective only if monetary policy is well coordinated, an unlikely event given the autonomy of the Federal Reserve (Central Bank of America). On the other hand, the relationship between total debts and nominal GNP suggests that a debt target may be superior to a monetary target-if fiscal policy ever returns to normalcy. The modern international economy probably has as large an impact on monetary policy. International capital flow can frustrate-or complement-domestic monetary policies.

Afolabi (1988) adopted the “buffer-stock” approach as a relevant alternative to assessing the impact of monetary sector impulses into the real sector of development economies. He set up a model of consumption and desired money demand function based on Nigeria experience. The results reveal that among other things, monetary variables affect a major expenditure relationship directly and not just indirectly through interest rate effect, which was found to be insignificant in most other investigation. Keran (1970) found monetary policy to be superior to fiscal policy in most of the countries studied. Moreover, in many developing countries, empirical results such as those of Darrat (1984) and Chowdhury (1986) suggested the importance and stronger impact of fiscal policy compared to monetary policy on economic activities.

Chowdhury (1988) tested the St.Louis reduced form single-equation model for six small open European economies and concluded that monetary policy

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010  
is more potent than fiscal policy. Moreover Odedokun (1989) examined the existence for the Nigerian economy of causality between each of the relevant financial variables and variables reflecting the state of the economy utilizing Granger test and quarterly data for the period (1970-1983). He concluded that, different financial variables generally have different impact on each state of the economy and that the choice of the intermediate targets of monetary policy needs to be cautiously chosen on the basis of which state of the economy is intended to be controlled.

Using ordinary least squares technique and annual time series data covering the period (1970-1998), Meezan (2000) examined the impact of fiscal and monetary policy on economic activity in Sudan. He tested the hypothesis that the money supply, government expenditure and total export have a positive impact on economic activity. The results reveal that the most important single variable which has a significant positive effect on economic activity is export. This suggests that export promotion have played a significant role in economic growth over the study period. On the other hand neither monetary policy nor fiscal policy has had any significant impact on growth. This might provide an evidence of the failure of such policies and their ad hoc nature in inducing growth.

Using ordinary least squares technique and annual time series data covering the period (1982-2004), Ahmed (2007) examined the impact of fiscal and monetary policy on growth domestic product in Sudan. He tested the hypothesis that the money supply, government expenditure have a positive impact on growth domestic product. The empirical results provide strong

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL العدد 44: شتاء 2010  
evidence that fiscal policy is more potent and effective than monetary policy on GDP during the period under consideration.

### **3. Policy and GDP in Sudan:**

In 1977, the international monetary fund (IMF) diagnosed the causes of the economic crisis by noting that “ over the past few years a number of external developments affecting budgetary operations, credit expansion and cost-price relationships have resulted in structural disequilibria in the Sudanese economy; these are clearly indicated by the several imbalances in the budget and the balance of payments. In addition to taking steps to eliminate the causes of imbalances, it has become necessary to take corrective action through depreciation of the Sudanese pound. A principal aim of such a reform is accelerate the rate of growth by rationalizing the allocation of the resources so as to best utilize the Sudan’s present and potential comparative advantage particularly in agriculture and agro-industries” (quoted in Ali, 1984).

In 1978, Sudan adopted the (IMF) and World Bank macroeconomic stabilization and structural adjustment program. However, the economy continued to slide further through the 1978-84, which witnessed very active adjustment operations. Growth of pre-capita collapsed during this period while macro economic policies continued to worsen. Inflation shot to more than 27% and for the first time inflation tax (at 6.2% of GDP) exceeded seigniorage revenue by more than one percentage point, indicating the increasing inefficiency of monetary policy. The reforms emphasized two central policies: successive devaluation and trade liberalization measures

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL العدد 44: شتاء 2010  
that shifted imports (and to some extent exports) from the official market to free market. These reforms were also motivated by the emerging role of Sudan as a major labour-exporting country to the oil-surplus economies of the Middle-East.

According to Elbadawi (2002), remittances from Sudanese nationals working abroad averaged more than three times the Dollar value of official exports during 1983-1984. These huge foreign exchange resources encourage the government to adopt reforms to unify the exchange rate. Having failed to attract further investment from the oil surplus economies in the Arab region, these reforms aimed at mobilizing the resources of the remittances from these countries. However, these efforts were largely unsuccessful, and Sudanese nationals have continued to send the bulk of their remittances through the parallel foreign exchange market, attracted by its more depreciated exchange rate (quoted in Ali and Elbadawi, 2002).

Tools to Change Money Supply:

- Open market operations (buying and selling treasury bonds, notes, and bills).
- Discount rate: Interest rate banks are charged when they borrow from the Fed.
- Reserve requirement: % of deposits that must be held by a bank as vault cash or on account with the Federal Reserve.

Every instructor in introductory economics goes through some explanation of how the money supply is determined. Almost all of these explanations use multiple balance sheets of different banks, following through the cycle of loan extension and redeposit for as many of the infinite number of rounds as the instructor thinks necessary. To keep it simple, these explanations often use no cash drains or time deposits. The key results are (a) a neat and powerful money-supply multiplier that is the inverse of the cash reserve ratio, and (b) the money supply is shown to be firmly under the control of the central bank through its monopoly of cash reserve assets.

Finally it's important to make a brief definition of money: Money is a *means of final payment* for goods in most price system economies and the unit of account in which prices are typically stated. It includes currency held by the nonbank public and checkable deposits. It has been described as a social convention, like language, useful to one largely because it is useful to others. As a medium of exchange, money facilitates trade. Its economic function can be contrasted with barter (non-monetary exchange). Given a diverse array of produced goods and specialized producers, barter may entail a hard-to-locate double coincidence of wants as to what is exchanged, say apples and a book. Money can reduce the transaction cost of exchange because of its ready acceptability. Then it is less costly for the seller to accept money in exchange, rather than what the buyer produces.

Issue 44, Year 7th , Jan. - 2010 شتاء العدد 44: WWW.ULUM.NL مجلة علوم إنسانية  
At the level of an economy, theory and evidence are consistent with a positive relationship running from the total money supply to the nominal value of total output and to the general price level. For this reason, management of the money supply is a key aspect of monetary policy.

#### 4. The Empirical Model and Research Methodology:-

Here we specify and outline the research methodology that will be adopted in the analysis. The model takes the following form:

$$Y = f(M) \quad (1)$$

$$F_1 > 0 \quad (2)$$

Where:

Y: Real Gross Domestic product

M: Real Money supply defined as broad money  $M_2$  (includes currency with public, demand deposits, margins on letters of credit and time deposits).

It's important to note that, the definition of money has varied. For centuries, physical commodities, most commonly silver or gold, served as money. Later, when paper money and checkable deposits were introduced, they were convertible into commodity money.

Monetary policy includes money supply and interest rate. But in this study we use money supply. According to economic theory, real money supply impacts positively on GDP. Thus according to economic theory as (M) increases, GDP will increase, so that  $F_1$  is expected to be positive, thus

Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010  
money supply is have positive impact on economic activity measured by GDP.

### 5. The Empirical Results:

Applying ordinary least squares (OLS) technique to the data covering the period (1990-2004) on the variables mentioned above, we estimated equation (1). The regression results are given in equation (3) below, where the figures inside the brackets are the t- ratio of the parameters:

$$Y = 67.32 + 0.36 M \quad (3)$$

(2.02) (1.39)

$$R^2 = 0.13 \quad F = 1.93 \quad DW = 0.08$$

Equation (3) is statistically significant at the 1% level as indicated by the F ratio. The value of R<sup>2</sup> suggests that 13% of the variation in economic activity (y) is explained by variation in money supply (M). this means that the monetary policy variable (Y) had a role but not crucial role on economic activity in Sudan.

## 6. Conclusion:

This paper attempted to assess the role of monetary policy on economic activity measured by GDP in Sudan over the period (1990-2004). Annual time series data has been used in the analysis to estimate the linear form of the model for the period. Real GDP is chosen as dependent variable, money supply represent monetary policy. Data for the study were obtained from different sources. Using these data OLS method is applied to the model. The empirical results provide that monetary policy has so little impact on economic activity during the period.

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- Issue 44, Year 7th , Jan. - 2010 [WWW.ULUM.NL](http://WWW.ULUM.NL) مجلة علوم انسانية: العدد 44: شتاء 2010
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- Issue 44, Year 7th , Jan. - 2010 مجلة علوم إنسانية WWW.ULUM.NL السنة السابعة: العدد 44: شتاء 2010
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## Appendices:

**Table (A.1):**

**Nominal Gross Domestic Product, and Money Supply (in SDD Million),  
 1990-2004**

Years	Gross Domestic Product	Money Supply
1990	11011.1	3164.5
1991	19266.1	5269.6
1992	42181.8	14159.5
1993	94844.8	26858.3
1994	188128.9	40535.3
1995	404973.9	70586.6
1996	1047814	116598.1
1997	1613737	159714.0
1998	2193591	206951.0
1999	2705881	257918.0
2000	3366271	346670.6
2001	4065856	432213
2002	4561377	563266
2003	5070561	734086
2004	5725014	960446

Source: Central Bureau of Statistics and Central Bank of Sudan

**Table (A.2):**

**Consumer price Index (CPI) (in SDD Million), 1990-2004**

Years	CPI
1990	3164.5
1991	5269.6
1992	14159.5
1993	26858.3
1994	40535.3
1995	70586.6
1996	116598.1
1997	159714
1998	206951
1999	257918
2000	346670.6
2001	432213
2002	563266
2003	734086
2004	960446

Source: Central Bureau of Statistics

**Table (A.3):**

**Real GDP (Y) and real Money Supply (M) (in SDD Million), 1990-2004**

Years	Y	M
1990	81.6	23.47
1991	63.6	17.39
1992	63.5	21.31
1993	71.0	20.10
1994	65.2	14.04
1995	83.0	14.47
1996	93.3	10.38
1997	98.0	9.69
1998	113.8	10.74
1999	120.9	11.52
2000	139.2	14.33
2001	160.2	17.03
2002	165.6	20.45
2003	171.4	24.82
2004	178.1	29.88

Source: own calculation based on data from table (A.1) and table (A.2)

**Model Summary(b)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.359(a)	.129	.062	40.75159	.077

a Predictors: (Constant), m

b Dependent Variable: y

**ANOVA(b)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3194.988	1	3194.988	1.924	.189(a)
	Residual	21589.002	13	1660.692		
	Total	24783.989	14			

a Predictors: (Constant), m

b Dependent Variable: y

**Coefficients (a)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	67.321	33.357		2.018	.065
	m	2.537	1.829	.359	1.387	.189

a Dependent Variable: y