



THE IMPACT OF DEFICIT FINANCING ON MACROECONOMIC PERFORMANCE OF SUDAN (1990-2019)

Mohamed Zain Ahmed Mohamed Norain

Faculty of Economics and Administrative Sciences,
Alzaiem Alazhari University, Sudan
mohmedzainnorain@yahoo.com

Abstract

This study examined the phenomenon of deficit financing (DF) in Sudan and its impact on macroeconomic performance of Sudan during the period (1990-2019). The justification of selecting this period is that it witnessed the changes produced by the IMF reform programmes. Also, the study focuses on the reasons behind deficit financing. The study assumed that inflation rate measured by consumer price index (CPI), is influenced by money supply (M2), deficit financing (DF), real (GDP) and exchange rate (Ex). Using theoretical, analytical and empirical approaches, the findings of the study indicated that the overall fiscal statistical of the Sudan public sector shows that the deficit increased every year and was financed by borrowing from external and internal sources. Deficit financing is more expansionary than tax financing, but a monetized deficit (by money creation) is the most expansionary of all critics of deficit financing. Macroeconomic indicators postulate that deficit financing causes inflation; there is a strong positive association between deficit financing and inflation. Based on the results, some recommendations are suggested which can contribute in limiting deficit financing and its impact on macroeconomic performance of Sudan, Fiscal and monetary policies can be used to narrow deficit financing and to reduce monetary expansion, respectively. Promotion of nontax revenue, due consideration should be given to Promot and development of Khartoum Capital Market through incentives to the public companies to issue shares and equities to the private sector or government institutions.

Keywords: Deficit Financing, Macroeconomic Performance, GDP, Sudan



INTRODUCTION

Sudan like most Sub-Saharan African countries experienced severe economic crises during the late of 1970s, these crises were manifested in the deterioration of the Balance of Payments “BOPs” low level of economic growth, in-stable general prices level, and huge budget deficits. These imbalances were caused by adverse international developments at the end of the 1970s and early 1980s, such as rapid changes in oil prices, falling prices of major Sudanese export commodities, and rapid increase in the international rate of interest. Due to bad economic performance, the Sudanese Policies including devaluation of the local currency, removal of subsidies, and cutting of Government spending in order to reduce the budget deficit.

The budget deficit arises when the government spending exceeds the government revenues; in this case, the government has to find some sort either of finance to cover this deficit, either from external sources “foreign loan and grants” or from the domestic sources “borrowing from public through treasury bills or borrowing from the banking system or what so called “deficit financing”. Financing of the budget deficit through printing money by the central bank is considered to be an important factor that contributed to the growth in money supply, and this reflects the close relationship between the budget deficit and the money supply growth rate, i.e. it reflects the relationship between fiscal policy and monetary policy and how they interrelate. The impact of deficit financing on the macro economy performance of the Sudanese economy has been a major subject of concern for economists as well as policy makers, macroeconomic theory postulates that there is a positive relationship between deficit financing and inflation. So, this paper framed to analyze the deficit financing and its impact on macroeconomic performance of the Sudanese economy, causes and consequences of the deficit financing in Sudan during the period (1990-2019) by using new macroeconomic model in order to identify the impacts of deficit financing on macroeconomic indicators.

The Statement of the Problem

Most of the developing countries face deficits in budgets, and Sudan is no exception. That resulted from deficit increasing of government expenditure and decreasing of the government revenues, due to less efficient tax collection; also, the negative influence of the macroeconomic policies and the political instability.

Over the past few years, the Sudanese economy has experienced some structural problems that led to slow economic growth. These included excess demand for goods and services, unfavorable investment climate, budget deficit, and external imbalance; these problems led to increasing inflation rates, decline the production and productivity, increasing exchange rate.

Yet, as noted above, there is connection between deficit financing and inflation rate: DF tends to accumulate rather than drive away inflation, which they relate mainly to a combination of exchange rate shocks, and inflationary pressures. Macroeconomic performance in Sudan has been witnessed most serious economic problem, such as, low growth, severe budgetary imbalance, and volatile and unpredictable exchange rate high and unpredictable inflation rate. Recently, substantial heated debates have paid a concrete attention to the main causes, determinants, and consequences of weak and fluctuating macroeconomic performance in Sudan.

The Importance and Objective of the Study

There is a consensus among scholars and practitioners in developing countries in general and Sudan in particular, that there is a chronic shortage and inadequacy of data, though, no empirical work has been done on the identification of data difficulties, and its impact on the effectiveness of macroeconomic performance.

This study attempts to devise a comprehensive macroeconomic model for assessing the impact of deficit financing on Sudanese economy; and it also tries to contribute to the contemporary study efforts that may help in attaining a remarkable economic performance. Hence, the principal objective of this study is to empirically investigate the impact of deficit financing on Sudanese economy (1990-2019) using an extended and modified version of macroeconomic model. Also, this study will discuss specifically the relation between the existing budget deficit and macroeconomic performance “macro-economic indicators” with the special focus on the data problem, leading to cure the deficit.

The Study Hypotheses

The study hypothesis concentrated on the following:

- i) Inflation rate, measured by consumer price index “CPI” is influenced by money supply “ M_2 ”, budget deficit financing “DF”, real GDP and exchange rate “Ex”, Balance of Payment (BOPs).
- ii) The borrowing from the banking system (internal borrowing or external borrowing) is the main source of DF.
- iii) CMCs and GMCs are considered the main fiscal instruments that contribute to financing deficit.
- iv) The increasing of government expenditures causes the deficit of public budget.

RESEARCH METHODOLOGY

Secondary sources of data have been given a special consideration such as Textbooks, annual reports which are considered to be the latest source of reliable economic data and statistics; the economic review of the Ministry of Finance “various issues” and the annual reports of the Bank of Sudan “various issues”, also the statistical year book of the Central Bureau of Statistics, the primary data has been collected through conducting interviews with some government officials.

The study adopts the descriptive and analytical methods, also the method applied in this study were to be a historical perspective focus on internal and external circumstances which somewhat conditioned the deficit financing; also the main methods of this study were to be positive economic analysis and narrative economic analysis.

LITERATURE REVIEW

The Concepts of the Budget

In fact, the budget is really three different budgets. First: it is a political document that dispenses favors to certain groups or regions “the elderly benefit from social security, farmers from agricultural price supports, and so on” and a place burdens “taxes” on others. Second: it is a reflection of certain goals the government wants to achieve. Third: the budget may be an embodiment of some believes about how “if at all” the government should manage the macro economy, the macroeconomic aspect of the budget is thus only a part from a more complicated story, a story that may at times be of more concern to political scientists than to economist (Schitzer & Chen, 1972).

Our concern here will be mainly on government budget, which can be defined as an estimation of revenues and expenditures during the coming fiscal year. The government budget describes what goods and services the government can buy during the coming year, and how much of transfer payments and pensions will be paid, how much it is planning to increase wages and salaries, how much it will pay for new development projects, and the rehabilitation of existing ones, these activities are usually called the government expenditures, which is financed by public revenues, but the problem is this case, the revenues doesn't financed the expenditures, this seems the deficit and increasing year by year.

Function of the Budget

The budget has four major functions:

a- Allocation function: The government is responsible for the provision of social wants, which are not satisfied by the market mechanisms. In order to produce the social good, the

government uses the budget to allocate the financial resources between consumption and investment outlays for the different sectors of the economy.

- b- Distribution function: The budget is used to distribute wealth and income in an equitable and better way through taxation and expenditure on different projects which benefit the poorest groups of the population and the less developed regions.
- c- Stabilization function: The stabilization branch differs sharply from the other two. Its concern is not with the allocation of resources between the public and the private sectors or between alternative private wants. Rather it is concerned with the maintaining of high level of resources utilization and stable value of money (Conell, 1984).

Taxes and Government Balance

Taxes are obviously not a category of aggregate demand, but they affect GNP, in at least two ways. All taxes reduce aggregate disposable income relative to GNP and thereby directly affect consumer purchases. In addition, the fact that taxes reduce the disposable income of individuals means that they may also affect incentives –to work, to save, and to invest– and thus indirectly affect consumer and investment demand. The simple structure of consolidated government accounts, which recognize only the following elements:

Government purchases of goods and services (G).

Government transfer payments (Tr).

Government expenditures (G+Tr).

Taxes (Tx).

Government deficits (Def).

Which; Yet, as above the deficit equation as follows:

$$\text{Def} = (\text{G} + \text{Tr}) - \text{Tx}.$$

With government algebraic representation of the mode becomes a bit complicated and the definition of national product is:

$$Y = C + I + G$$

Where Y = NNP,

C = Government Consumption.

I = Government Investment.

G = Government Purchases of Goods and Services.

All in constant prices, moreover, NI and DI differ from NNP, and we cannot use Y for all of them, we therefore let Y continue to represent NNP, and “ignoring NI” represents disposable income as DI of course:

$$\text{DI} = Y - \text{Tx} + \text{Tr}.$$

We will assume that these tax and transfer payment systems are flexible, that is, that the amounts of taxes, and transfers are each responsive to changes in Y , if we make these linear, we have, for taxes:

$$T_x = m + ny$$

Where n is marginal tax rate.

Where m is constant value, which is surely negative, the slope n is some positive and less than one ($0 < n < 1$). When as Y rises, taxes do not take the whole of the increment of income.

We also assume, for transfer: $T_r = Q + rY$

Where Q is constant value, which is positive.

Where r is marginal Transfer rate, which is slope, and some small negative number, which reflects the marginal rate at which transfer fall as Y rises. Obviously numerically less than one, because, as Y rises, transfer do not fall enough to keep earnings plus transfers constant or as Y falls, transfers do not rise enough to replace all, or even any very large part of the income loss. We will assume, for simplicity that the constants in these equations, M and Q are changed by legislation which, however, leaves unchanged the slopes, n and r , of the two functions.

Of course, legislation change in tax and transfer system obviously could affect both the levels and slopes of the tax or transfer functions.

Although net tax system represented by the definition:

$$T = T_x - T_r.$$

$$\text{Or } T = (m + ny) - (q - ry) = m + ny - q - ry$$

$$\text{Or } T = t_0 + t_1y$$

Where $t_0 = m - q$, and $t_1 = (n - r)$

For an economy, when m negative and q positive t_0 would in practice be substantially negative. By the previous definition of n and r , t_1 is necessary positive, and in practice less than 1.

The Concept of Deficit or Surplus

A government's budget is the difference between what government spends (G) and what it collects in tax (T) in given period. When government spending "expenditures" exceeds taxes "revenues" there is a budget deficit, and when the revenues exceed spending this is a budget surplus, this can be explained in terms of the following equation: $GBD = G - NT$

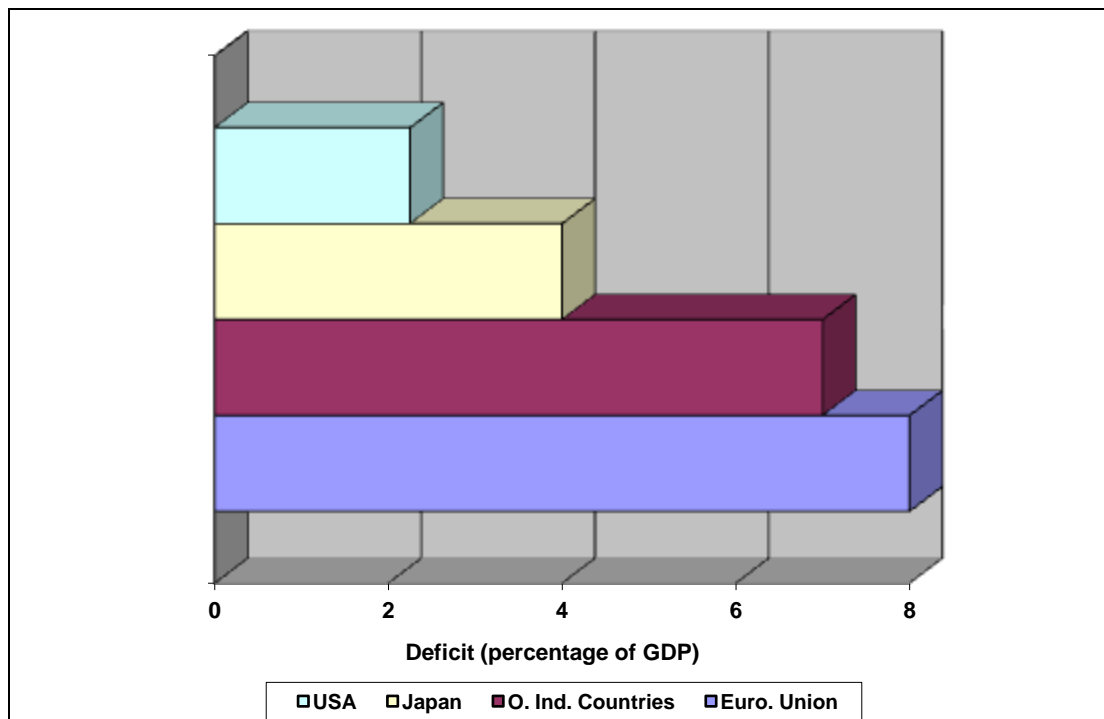
Where GBD is government budget deficit and G is government spending or expenditure on goods and services, and NT is the net taxes. Most countries experience budget deficits and very few of them maintain balanced or surplus budgets. Financing of the budget deficit could be done in one of the following way (Sheth, 1982): a - Issuing more money "create new money". b - Borrowing from internal banking system, or external such as IMF and others.

The fact that revenues automatically tend to rise and expenditure automatically tends to fall in an expansion means that the government surplus is larger, or the deficit is smaller, suppose we want to assess whether a government is practicing a policy designed to increase desired spending and income, if we fool only at the size of the government budget deficit, we might be fool into thinking that the government is trying to stimulate the economy when, in fact, the red source of the deficit is a slump in the economy that caused revenues to fall and transfer payments to increase. When the government cut tax rates this means to increase the deficit. In large part, however, the deficit grew simply because the economy was in a severe recession.

The Budget Deficit in Global Perspective

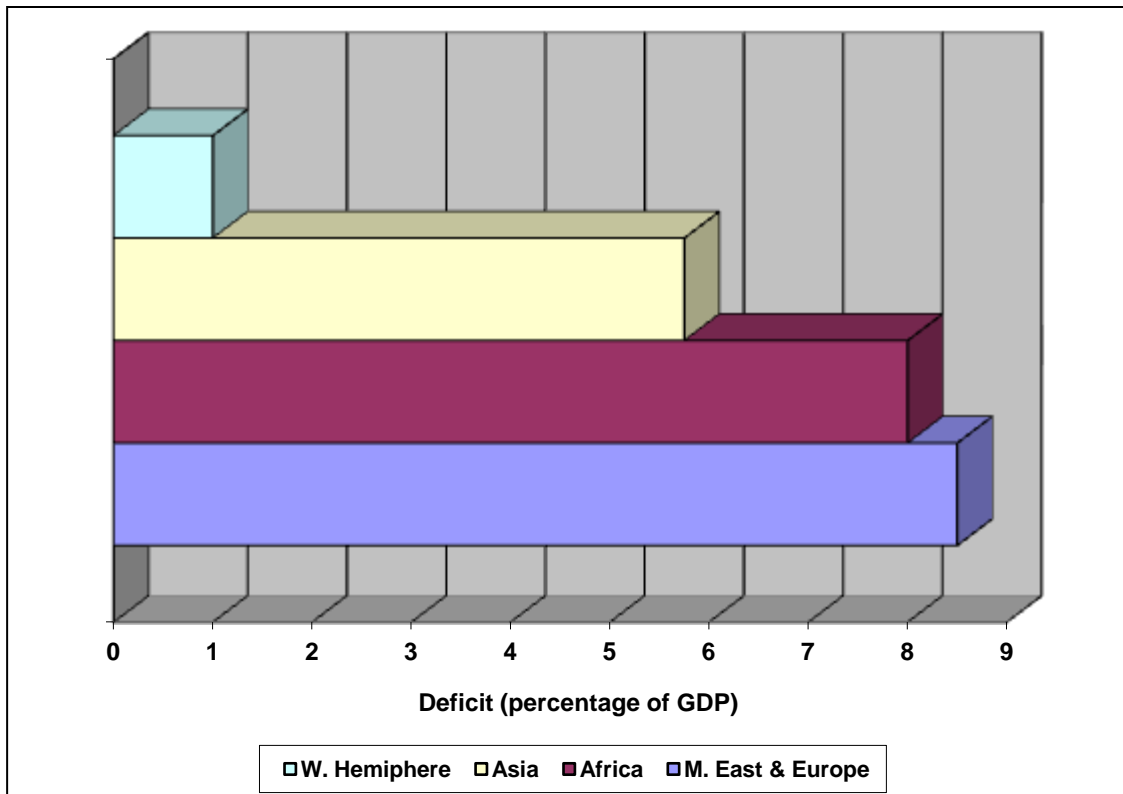
Some countries have budget deficits and other have budget surpluses, but almost all countries have budget deficit in today's world. To make the deficits comparable across countries, we measure the deficits as percentages of GDP. The biggest deficits relative to GDP are found in the Middle East and Africa and the countries of Central Europe that are making a transition from a heavily regulated economy to a market economy, the smallest deficits relative to GDP are found in the developing countries of the Western Hemisphere, the USA, we can show as a following figures.

Figure 1: Deficit in Industrial Countries



Sources: World economic outlook, October 1994, International Monetary Fund, Washington, DC, Tables (A-14 and A-19).

Figure 2: Deficit in Developing Countries



Sources: World economic outlook, October 1994, International Monetary Fund, Washington, DC, Tables (A-14 and A-19).

From the figures above, governments in most countries have budget deficit, the largest ones are in the Middle East and Europe, and the smallest are in the developing countries in the Western Hemisphere.

The balance of the government budget is related to the business cycle, when the economy is expanding quickly, incomes grow quickly and so do tax receipts, unemployment decreases and so do unemployment benefits. The government deficit shrinks though this phase of the business cycle, when the economy is in a contraction phase, tax receipts decline and unemployment benefits increase and the government budget deficit increases.

The deficit is defined as the change in the amount of investment-bearing government debt outstanding:

$$D - D_{-1} = P_y + iD_{-1} - T$$

Where,

P = the price level.

Y = real government purchases of goods and services.

i = the nominal interest rate.

D_{-1} = Outstanding nominal government debt in the previous period.

T = Nominal government tax receipts less transfers other than interest payments.

The nominal interest rate is assumed to be the same for private borrows as for the government, although actually the government would borrow at the lowest after-tax interest rate because of its unique powers to tax or issue money “or both” to pay its obligations, to avoid the complication of interest rates affecting the value of outstanding government debt, all such debt is assumed to be of one-period maturity. P can be thought of as a function of the amount of government demand debt outstanding. The real government deficit “Z” is simply the change in the real government debt per period: $Z = D/P - (D/P)_{-1}$.

When the government run a deficit, it has to find some way of paying for the excess of spending over receipts, mostly it does this by borrowing from the public through selling bonds, which are promises to pay specified amount to the holder at future dates. As a result of this borrowing, the government builds up its debts to public, the national debt consists of all government debt outstanding. As deficits have continued year after year, the national debt has continued rising to apparently astronomical levels (Fisher & Dornusch, 1983).

The Concept of Deficit Financing

A change from surplus or balanced budget financing to deficit financing may come about in three ways:

1. Expenditures may be increased while the level of prior taxes is maintained.
2. A prior level of expenditure may be maintained while taxes are reduced or while tax collections decline.
3. Both expenditures and taxes may increase with the greater fall in taxes.

In the first case we start with a clear expansive effect produced by the expenditure increase. In the second the effect of the tax reduction may range from marked to mild expansion, or even to some contraction. In the third situation there will be a combination of effects from both expenditure and tax changes. According to the taxes involved. These two sets of effects may partially offset each other or may be cumulative, and the range of possible net results is wide.

Whatever the effects of the expenditures and tax changes, upon them must be superimposed the effects of the borrowing necessary to cover the deficit. If the borrowing is accomplished by selling “savings” bonds in away to absorb purchasing power that otherwise would be spent, the borrowing itself can have a contractive effect. Otherwise it tends to be neutral or expensive. Under certain hypothetical circumstances, not likely to be realized in practice, a shift from surplus financing or a balanced budget to deficit financing by the

government could produce a net contractive effect on the economy, normally, such a fiscal development for the government as well as for states and local units tends to be sharply expensive (Jesse, 1966).

Thus, if the new levels of spending, tax collections, the initial expensive effect subsides with one important exception, there can be no adjustment of the economy to the expansion that results from continued increase of government reserve bank credit, if the government borrowing is accomplished through the sale of debt issues to government reserve bank, the expansive influence of this continues for as long as the borrowing is continued.

A shift from deficit or balanced-budget financing to surplus financing operates, with one exception, exactly the reverse of a shift to deficit financing. The exception is in the effect of retiring "saving" bonds while the sale of these bonds may originally have had a contractive effect, their retirement does not have a corresponding expansive effect.

Classical Views about the deficit financing

Adam Smith views on balanced budget were conditioned very largely by his views on national debt. And his views on the latter are a clear and direct product of his antimercantilism. It is difficult to dissociate Smith, the antimercantile polemicist, from Smith the economist. His often quoted passage defining, in restrictive terms, the proper and legitimate functions of the state should probably be viewed less as an evidence of his pro-laissez-fair position than as an evidence of his antimercantilism. Smith was an antimercantilist because he saw that the state apparatus as it then existed was an inefficient organization from the standpoint of wealth and income creation. It was the bulwark of a pattern of special trading privileges, grants of monopoly, and tariffs. More importantly, the state was wasteful; it took funds from merchants and industrialist and spent these funds in riotous living. This deprived industry and commerce of capital badly needed for the furtherance of production and trade, by diverting the national product toward consumer goods and away from capital goods.

Jean-Bapist Say: conditioned no doubt by a French debt experience, which was even more irresponsible than the English, was as vehement as Smith in opposition to debts and deficits. He was very much impressed with the wastefulness of government outlay, and cited example after example to the point. The sovereign is engaged in pomp and circumstance; the preservation of etiquette and custom is a very expensive affair. The wealth, which passes from the hands of the taxpayer to the tax-gatherer, is consumed and destroyed.

Say based these views on the argument that public consumption is not, in principle, different from the consumption by individuals or families. In either case there is a destruction of values and a loss of wealth. The limitation of public consumption, like the limitation of private

consumption, the necessary to provide capital for industry and trade. Public borrowing is not only unproductive, because the capital is consumed and lost, but in addition, the nation is burdened by the annual interest payment. It cannot be argued that the annual circulation of interest payment. It cannot be argued that the annual circulation of interest payments is a net addition to capital. "The tax-payer would have spent what is now spent by the public creditor; that is all".

Ricardo's most important writing on the national debt was the essay on funding system contributed to the Encyclopedia Britannica. Dr. Robert Hamilton, his contemporary, had authored *an Inquiry Concerning the Rise and Progress, the Redemption, and Present State of the National Debt of Great Britain*, which included a critical attack of the debt retirement schemes that had been in force since 1716. The sinking fund schemes had not proved efficacious in eliminating the debt; ministers always abused the arrangements. Ricardo was apparently in essential agreement with Hamilton in his criticism of these schemes, and in this essay he elaborated Hamilton's arguments and discussed at some length the distinctions between annual revenue paid as interest on the debt or as contribution to the sinking fund, and the capital of taxpayers which was available for productive investment. Although in his "Principles" Ricardo had pointed out the limitations in the arguments of those who advocated retirement of the debt, in the Britannica article he simply assumed that debt retirement was desirable.

Keynesian Views about the deficit financing

The Keynesian attack on the classical principles of budgeting and public finance was a logical extension of the Keynesian attack on the view that the economy tends to equilibrium at full employment. If there are unemployed resources, which the private sector cannot or will not employ, these resources may be put to work by the state by means of additional public outlay, which need not be matched by additional government revenue. Orthodox financial rules be abandoned; even as orthodox economics must be abandoned (Maxwell, 1943).

Keynes himself did not elaborate the role of fiscal policy in the maintenance of full employment. This remained for Alvin Hansen and the Keynesians. Writing at the end of a decade of depression, Hansen, in *Fiscal Policy and Business Cycle*, made a number of significant contributions. He attempted to restore public finance, as fiscal policy, to its place in the mainstream of economics. He reinterpreted the 19th century experience of national and deficit financing.

The Hansenian contribution is not, however, the whole of the development of Keynesian fiscal theory. The culmination is A. P. Lerner's functional finance. This approach to fiscal policy views government revenue and expenditure and government debt solely as instruments for the

control of aggregate community expenditure. These are the tools and the goal is the maintenance of stable employment at constant prices. Taxes and expenditures should be increased or reduced solely to affect the community's rate of spending; debt instruments should be sold to the public to absorb their idle balances and reduce liquidity in times of inflation, and redeemed to increase liquidity in times of depression. Perhaps to gain currency for his views Lerner formulated his propositions in terms of "laws".

From this brief examination of the Keynesian impact on budgetary theory certain conclusions may be drawn. It is evident that the major difference between the outlook of the classical and the Keynesian turns on their analysis of the nature of economic society and the role of the state therein. The classicists, particularly Adam Smith, were completely explicit on this point: economic society is characterized by a fundamental harmony of interest. The invisible hand, operating in a competitive society, will reconcile all conflicts. The role of the state must and should be narrow. With fundamental harmony prevailing, there is no need for extensive intervention (McConnell & Brue, 1993).

Keynesian economics focuses on aggregate spending and its components, recall that the basic Keynesian equation is: $C_a + I_g + X_n + G = \text{GNP}$

Where:

C_a = the aggregate amount of after-tax consumption

I_g = Gross Investment

X_n = Net Export

G = Government spending determines the total value of goods and services sold.

Government deficit in a generalized Fisherian Credit Market; Theory with an Application to Indexing Interest Taxation, William G. Dewald, P. 243. The literature on the tax adjusted Fisher equation incorporates taxes integrally Fisher analysis (1930) of interest rate determination. The argument is that increase in inflation would tend raise nominal interest rates enough to compensate lenders for their extra taxes on interest income so that real after-tax interest rates would not change Darby (1975), Feldstein (1976a) and Tanzi (1976, 1977).

The Fisher Equation (1930) is $r = i - TT$, the tax adjusted

$r = i(1 - t) - TT$, or $r = i - TT/(1-t)$

Where

r is the real interest rate

i is the nominal interest rate

t is the tax rate

TT is the inflation rate.

Overall Fiscal Operations in Sudan

The overall fiscal operations of the public sector show that the overall public sector deficit increased by LS 34.8 Million during 1978/79. This was more than accounted for the sharp deterioration of LS 73.2 Million in the position of the public entities. The ordinary budget showed a surplus of LS 59.7 Million compared with LS 41.8 Million in 1977/78. The increase in the 1978/79 ordinary budget surplus could be attributed to the marked improvement in Central Government revenue while expenditure during 1978/79 was lower than 1977/78 by LS 16.2 Million. (Bank of Sudan, 1979).

The resultant overall deficit was financed by internal resources to the extent of LS 111.5 Million which represented the Central Government indebtedness to the banking system while the balance of LS 62.6 Million was financed by drawing on external loans. compares the budgetary for the period of study (1978-2003). The surplus achieved during 1978/79 was LS 31.5 Million higher than the estimates for the same year, this was mainly due to the decline of LS 84.5 Million in ordinary expenditure than was budgeted for during that fiscal year. The 1979/80 ordinary budget is expected to achieve a surplus of LS 91.3 Million, which will partially meet development expenditures in the third year of the Development Plan (1978/78-1982/83).

The 1989/90 revised budget forecasts an increase in ordinary revenue of 36.3% compared with the provisional actuals for 1988/89. It also forecasts an increase in ordinary expenditure of 47.5% and a decrease in development expenditure of 32% to expected overall deficit of LS 9992 Million is anticipated to be met mainly from domestic financing, i.e. LS 7554 Million. The main objectives of the 1997 budget aimed at the removal of the main causes of inflation and its resulting negative economic and social effects. This is done by adopting policies directed towards containing liquidity in the economy, reducing the deficit in the budget, limiting borrowing from the central bank. On the other hand, and encouraging production by some other appropriate policies. In addition, there is the main task of completing the political and constitutional institutions of the country. The budget has also taken into consideration supporting the peace process, in addition to continuing work in the strategic development projects, the 1997 budget was formulated in the context of the following economic indicators:

- 1- Reducing the average rate of inflation to 70% by the end of 1997.
- 2- Limiting the government borrowing from the banking system to finance the budget deficit to around 0.7% of GDP.
- 3- Achieving a growth rate in GDP by 5%.
- 4- Allowing the money supply to grow by 31% during 1997.

In addition, the total revenue for the period of study 1990-2019 amounted to SD 297264.91 Million, while the total expenditure was SD 31315420 Million, resulting in a budget

deficit of SD1588929Million. The improvement was due to the reduced growth rate of overall expenditure. Following successive years of large deficits, the government implemented a variety of measures to achieve a balanced budget in the future years.

STRUCTURAL SPECIFICATIONS OF THE ECONOMETRICS MODEL

Numerous studies were conducted to explain the sources of deficit financing in Sudan, some of one about inflation, other about money supply. We can summarize the findings of tow studies as an example:

First example:

Hussain, in his preliminary evaluation of IMF economics in Sudan during the period (1972/73 – 1979/82), traced the sources of domestic inflation in Sudan by using the imports price and its impact on domestic prices, the results of his study show that a 1% change in import price will lead to 48% change in domestic price, he also estimated the contribution of the increase in money supply to the domestic inflation by comparing the rate of monetary growth with that of real in come on the assumption that, inflation is the difference between the two, he found that with the exception of 1977 excessive growth in money supply has study concludes that imported inflation plays a major part not only in initiating domestic inflation but also in leading to increase reliance on deficit financing, although structural rigidities play their part. (Hussain. 1985).

Second example:

Saeed, uses a multiple regression equation to estimate the Quantitative relation between the variation in the free exchange rate, bank's credit to the private sector, money supply, real GDP and domestic inflation, this was explained by the following equation:

$$P = - 1.98 + 0.28 M + 4.0 E + 0.37 C - 2.03 G$$

(1.3) (3.7) (1.1) (-0.4)

Where:

P = Domestic inflation rate

M = Money supple

E = Exchange rate

C = Bank's credit to the private sector

G = Real GDP

He found that about 86% of the total variation in domestic inflation was explained by the mentioned variables, the exchange rate was found to be significant variable in the equation ($B_2 = + 4.0$), where B_2 the coefficient showing that whether the dependent variable (P) increases or decreases following the change in the independent variables (Saeed, 1977).

To determine the relation between money as a dependent variable and the cross domestic product “GDP”, exchange rate “EX”, inflation rate “In” tide with deficit financing “DF” as are independent variable, that as follows:

$$M_s = F (GDP, Ex, In, Df, U_i)$$

Where

M_s = Money supply

GDP = Gross Domestic Product

Ex = Exchange rates

In = Inflation rates

DF = Deficit Financing

U_i = Residual, Call as a random variable or Error.

A multiple linear regression can be formulating as follows:

$$M_s = B_0 + B_1 GDP + B_2 Ex + B_3 In + B_4 DF + U_i$$

Where B_1, B_2, B_3, B_4 are coefficients or parameter need to estimate.

Also we have the following equation in logarithmic from:

$$\ln M_s = B_0 + B_1 \ln GDP + B_2 \ln Ex + B_3 \ln In + B_4 \ln DF + U_i$$

$B_1 > 0$ and, $(B_2, B_3, B_4) < 0$

From the above model, there are a positive relation between money supply “ M_s ” and each of Ex, In, Df, if there is increases in each of them, money supply increase also. However, there are negative relation between M_s and GDP. When GDP increases, M_s decreases, the scale of this relation depend on coefficient model, the negative effect provide to decline GDP, and the weakness of Sudan macroeconomic performance (the impact negatively on macroeconomic performance).

In this study about the impact of deficit financing on macroeconomic indicators such as GDP, M_s , Ex, BoPs. In its general mathematical from the model can be expressed as follows:

$$CPI = f(BoPs, Ex, GDP, Ms, Df, U_i)$$

$$CPI = B_0 + B_1 BOPs + B_2 EX + B_3 GDP + B_4 Ms + B_5 DF + U_i$$

B_1, B_3, B_4, B_5 = are coefficients or parameters need to estimate.

$$E(u_i) = 0$$

$$E(u_i^2) = \delta^2$$

$$E(u_i u_{i-1}) = 0; \delta = 0$$

Also, we have the following equations in logarithmic form:

$$\ln CPI = B_0 + B_1 \ln BOPs + B_2 \ln EX + B_3 \ln GDP + B_4 \ln Ms + B_5 \ln DF + u_i$$

This is Deterministic equation, the dependent variable is CPI, which is Endogenous variable determined into the model, the independent variables are BOPs, EX, GDP, Ms, DF, which are determined out of the model, that is the CPI related to a set of independent variables.

A multiple linear regression model is used to find the quantitative relationship between dependent variable and independent variables, these independent variables considered to explain the effects between variables. Therefore, the sign on he estimated parameters should be negative, B_3 parameter is expected to have a negative sign in the equation, because the amount requested; and DF parameter is expected to have a positive sign, this result is expected because worthy borrows is assumed to pay back in due time, the additional explanatory variable, the delay in repayment is expected to have a negative or positive sign.

The Estimation of the Model

The Empirical model will be estimated with annual time series data from 1978-2004. The choice of the sample period is justified by the desire to take a long-term view to establish a robust framework for analyzing the major determinants of macroeconomic performance in Sudan, such period, is necessary because with less than 25 observations of a single equation, it would otherwise be difficult to attain sound outcomes of a broad macroeconometric model without having results excessively influenced by the number of observations

We can use E views programming for general statistical analysis time series, estimation and forecasting, cross section or panel data analysis. We can estimate the model by ordinary least squares (OLS), because this method is best and linear and unbiased estimator (BLU), in the logarithm form, results are obtained as follows:

Table 1: Ordinary least squares output

Ln CPI =	23.94	–	+	–	+	+
		0.15LnBoPs	0.12LnEx	4.45LnGDP	1.35LnMs	0.12LnDF
Std. Error:	(1.67)	(0.02)	(0.03)	(0.30)	(0.05)	(0.02)
	***	***	***	***	***	***
T. Statistic:	14.30	8.74	3.86	14.82	26.36	6.01

*** *T-Statistics is significant at 1%.*

$$R^2 = 0.99$$

$$\text{Adjusted R – squared} = 0.99$$

$$\text{SE of regression} = 0.042$$

$$\text{Durbin – Watson state} = 2.114$$

Figures between brackets are Std. Error.

F – Statistic	= 14065.37
Prob (F – statistic)	= 0.000000
Sum squared resid	= 0.007
LDF (-2)	= Lagged two years effect
Lms (-1), LBoPs (-1)	= Lagged one-year effect

The equation shows that total variations in CPI are responsive to change money supply deficit finance through borrowing from the banking system, real GDP and exchange rate. The explanatory power of the model is 99%, which means that the model explains 99% of variation in CPI. Durbin-Watson statistic is more than 2 which indicates that the absence of auto-correlation problem.

The signs of the coefficients of MS, DF, EX are positive as expected implying a positive relation between the rate of inflation and explanatory variables, but the signs of the GDP and BoPs are not as expected implying a negative relation. According to the results of the equation, the relative effect of money supply is higher than the effect of the other variables ($B_4=0.05$). This indicates that the coefficient of money supply is significant at 1% significant level. The higher effect of money supply could be attributed to the transfer of liquidity from the banking system to the government to finance its expenditure and thereby increases aggregate demand. The regression coefficient of deficit financing ($B_5=0.125$) is positive, and it is statistically significant, its influence is reflected in the CPI, this indicates that the deficit finance has increased inflation during the period of study, this result showed that deficit financing is one of the major forces driving the inflation rate up.

The regression coefficient of the exchange rate ($B_2=0.12$) is positive, the rise in the exchange rate explains short-term variations in the rate of inflation. As for the coefficient of GDP ($B_3=0.03$) is negative, it shows that the decrease in the real GDP growth rate has been accompanied by a rise in domestic price level, this could be attributed to the high cost associated with the production of goods and services. Moreover, a reasonable portion of the increase in money supply caused by the expansion of credit to the private sector has been directed towards the utilization of excess capacities in the agricultural and industrial sectors. With respect to the other factors causing inflation in Sudan, such as structural rigidities, wages and salaries, increase in the number and structure of population, social changes, and political stability are captured in the error term.

The above analysis proves that the equation is useful in interpreting the quantitative response of the rate of inflation to the change in the five variables, it also indicates that inflation rate is highly responsive to the increase in money supply where ($B_4=1.35$). Hence, this proves

the argument that money supply is a significant factor contributing to the increase in the rate of inflation in Sudan.

Regarding the contribution of deficit financing (net claims on the government) to the increase in the money supply, deficit financing (DF) of the budget through borrowing contributes significantly to the growth of money supply. Accordingly, some policies targeting at narrowing the budget deficit and control of money supply should be recommended.

RESULTS

- Sudan economy performance in general (during the period of the study), was not satisfactory as it has been influenced by the international economic.
- The overall public sector deficit increased year by year, the resultant overall deficit was financed by internal and external resources.
- The governments expenditures grow at rate higher than the rate of growth of national product, the extra-budgetary expenditures depend on deficit finance, where the gap between actual revenues and expenditures is financed through borrowing.
- Deficit financing is more expansionary than tax financing, but a monetized deficit (create a new money) is the most expansionary of all.
- The effect of borrowing from Banking Systems (external or internal borrowing), is less expansionary than the effect of directly monetizing the deficit.
- The fundamental problem of taxation in Sudan is that it has a low-income elasticity, this was partly due to the low-income elasticity of indirect taxes, which account for the highest proportion of the tax revenue.
- Macroeconomic indicators postulate that fiscal deficit cause inflation, there are relationship as intrinsically dynamic between short and long run effect of fiscal deficit, it's a strong positive association between deficits and inflation (see the estimation of the model).
- Estimation of the model, shows that total variations in Consumer Price Index (CPI), are responsive to change money supply and deficit finance though borrowing from Banking System, real GDP and exchange rate by 99% ($R^2=99\%$), Durbin Watson state is more than two indicating the absence of auto-correlation problem.
- According to the results of the model, the relative effect of money supply is higher than the effect of the other variables ($B_3=1.350$), this indicates that the coefficient of money supply is significant at 1% significant level, the regression coefficient of deficit financing ($B_2=0.125$) is positive, but it is not statistically significant because its influence is reflected in money supply because multi-co linearity persists, if we

remove deficit financing from the model the same result is approximately obtained ($R^2=99\%$, $B_1=0.145$).

- In the case of unavoidable deficits, the Sudan government owned enterprises could obtain finance by way of Government Musharakah Certificates (GMCs).
- After the oil export, Sudan's economic performance has been strong over the past few years, in 2002 the country's real GDP grew by 5%, increasing to 6.5% in 2003 and reached to 7.2% in 2004.

RECOMMENDATIONS

Fiscal and monetary policies can be used to narrow the budget deficit, and to reduce the monetary expansion.

- Reduction of less productive forms of government consumption, beside the continuation in the expenditure reducing.
- Promotion of non tax revenue such as fees on services, by the government agencies, as well as proceeding in encouraging the remittance by the Sudanese working abroad and the inflow of foreign financial resources.
- Enhancing the role of the Bank of Sudan in the control and supervision of money supply and exchange rate.
- More due consideration should be given to the promotion and development of Khartoum Capital Market through incentives to the public companies to issue shares and equities to the private and liberalization policies can be connected with the market by issuing the shares of the meant companies in the market.
- Create a fund that would be used to finance public sector activities through profit sharing as well as markup modes.
- Own income generating assets, which the government may use to generate marketable goods and services, the government may create an independent legal entity that floats public property certificates beside GMCs and uses the proceeds to purchase those assets and rent them back to the government, to see the sales proceeds to cover it budget deficit, certificates issued for this purpose would be marketable.

REFERENCES

- Bank of Sudan (1979). Twentieth Annual Report, P. 45.
- Conell, C.R.M. (1984). Economics Principles & Problems. 9th Edition, Mcgraw-Hill Book Company, USA, P. 360.
- Fisher, S. & Dornusch, R. (1983). Economics. McGraw-Hill, Japan, P. 330.

Hussain, M.N. (1985). IMF Economics in Sudan: A preliminary Evaluation. In Ali Abdel Gadir Ali, (Editor), the Sudan economy in Disarray, Biddles, Guild ford and King's Lynn, U.K, P. 71.

Jesse, B. (1966). Government Budgeting. John Wiley & Sons, New York, P. 635.

Maxwell, J.A. (1943). The Capital Budget. Quarterly Journal of Economics, P. 188.

Mcconnel, C.R. & Brue, S.L. (1993). Economics. 12th Edition. Von Hofman Press, USA, P. 307.

Saeed, A.R.M. (1977). Causes of Inflation in Developing Countries with special Emphasis on Sudan (1970–1990). Master Thesis, Faculty of Economics and Social Studies, University of Khartoum.

Schitzer, M. & Chen, Y.P. (1972). Public Finance and Public Issues. In text Educational Publishers, London, P. 178.

Sheth, C.S. (1982). Theory and Practice of Public Finance. Himalaya Publishing House, India, P. 37.