

The End of Sudan's Episode of Hyperinflation in 1990s

Elwaleed Talha

Assistant Professor, Department of Economics and Finance, Elrazi University, Khartoum, Sudan

*Corresponding Author

Elwaleed Ahmed Talha

Email: elwaleed.ahmed@aol.com

Abstract: The main purpose of this paper is to examine whether Sudan's episode of hyperinflation was a fiscal or monetary phenomenon. Bulk of scholars point out that hyperinflation is a monetary phenomenon and caused and derived by monetary situations. Yet, I argue that it is a fiscal phenomenon resulted from huge budget deficit, which is financed by printing money and/or borrowing from banking system. The aim of this short run analysis is to prop my argument that fiscal policy plays an important role to end hyperinflation in Sudan. Also I try to examine the short-run fluctuation in Sudan which happened during 1996 and 1997 as I would like to figure out what factor influenced hyperinflation to decline from 164% in August 1996. It is worth mentioning that, I have carried out some amendments on the data. For example, some variables are classified on the nominal terms such as money supply, exchange rate, and price level, whereas others are classified as non-nominal variables e.g. inflation.

Keywords: Sudan, Hyperinflation, money Supply, exchange rate, money demand, monetary phenomena, fiscal phenomena.

INTRODUCTION

Since the early 1990s, Sudan had been experiencing incessant and swilling rate of hyperinflation until 1996. Some policymakers and economists have realized that this level of hyperinflation has an inordinate steam, and that either it is merely not susceptible to be treated by monetary or fiscal policy, unless the government carries out a comprehensive reform and more importantly an alternative source of finance instead of money printing. Predominantly, it is assumed that unlike exchange rate, hyperinflation responds tardily to the shocks in the economy weather they are positive or negative. In the sense that people shape their expectation by looking at past rates of inflation as well as the government's policies.

This research depicts number of changes occurred during the period of hyperinflation in Sudan by putting more emphasis on the exact timing point of stopping hyperinflation in Sudan. Likewise, the goal is to figure out what behind ending hyperinflation in Sudan and what fetched under control in 1990s. I shall portray and expound evidences in Sudan associated with the period of hyperinflation.

Sudan experienced hyperinflation since early 1990s; it is attributed to the enormous budget deficit, which used to be financed through printing money. And also referred to the high level of public debt created by the government. On the other hand, the

government had the upper hand on the economy and used to push the Central Bank to use printing press and borrow from the Banking system to finance the deficit in the sense that it used to be dependent central Bank. The deficit was because of the civil war in south Sudan, 75% of government expenditure used to go to the defense and military issues.

In 1996, hyperinflation stopped and started to fall constantly until reached two digits in one year. There were pre-implemented policies followed by the government (monetary and fiscal policies). But the main factor contributed towards ending hyperinflation was oil production at early 1996, as all the pre-implemented policies followed the announcement of oil production [See section 3].

METHODOLOGY AND DATA COLLECTION

The analysis is carried out using monthly time series data from Sudan (examined over a twenty-three year period (1990-2013) the number of observations is 277 by including Jan. 2014 in the series. The main source of data is the line ministries in Sudan such as Central Bank CBOS, Ministry of Finance MOF, and Sudan Central Bureau of Statistics SCBS. Monetary data such as inflation rate, nominal exchange rate, money supply are obtained from CBOS. Fiscal data, which includes government expenditure, tax revenue and government debt, are obtained from MOF. And price level of bread is obtained from SCBS. Dates on empirical evidences obtained from The (Methodology

of Economic Reforming in Sudan) the textbook was authored by Dr. Abd-elwahab Osman, the Sudanese Finance's Minister in 2005. In terms of the nominal exchange rate, I obtained daily data from CBOS to identify the exact timing point of the events and to test whether it consistent with the end of hyperinflation [5].

I have carried out some Adjustments on the data. For example, some variables are classified on the nominal terms such as money supply, exchange rate, and price level, whereas others are classified as non-nominal variables such as inflation. Since inflation is the dependent variable, I show in my analysis changes in money supply, changes in exchange rate, and

changes in prices to make them consistent with the dependent variable. Therefore, I used the following equation-

$$\begin{aligned} \text{Nominal Exchange Rate} & \dots \log(EX_t) - \log(EX_{t-1}) \\ \text{Money Supply} & \dots \log(MS_t) - \log(MS_{t-1}) \\ \text{Money Supply} & \dots \log(P_t) - \log(P_{t-1}) \end{aligned}$$

More importantly, because Sudan changed its currency several times as it is explained on the following table, I was eager to adjust the data to be consistent with the current currency is now used (Sudanese Pound)

Table 1: Changes in the Sudanese Currency during 1956 - 2014

The currency name	The period of use	Measure of the unit
The first Sudanese pound	(Jan.1956-May 1992)	
Sudanese Dinar	(June 1992 – May 2007)	1dinnar=10 pound.
New Sudanese pound	(June2007 until now)	1pound=100dinar= 1000 old pound.

Source: Central Bank of Sudan (CBOS)

OBJECTIVES

As stated above, the main goal of this research is to figure out what ended hyperinflation in Sudan by using (Timing Method). And also to confirm that fiscal policy was behind ending hyperinflation in Sudan. The aim also is to support my arguments empirically. I argue that not only money supply, but also money demand had a key role in ending hyperinflation in Sudan. Furthermore, I set up the following assumptions, I assumed that exchange rate causes inflation rate either to increase or decrease. Unlike other scholars, I assumed that exchange rate causes growth in money supply. Since I am carrying out short-run analysis, I assumed that price level is sticky. All these assumptions are being examined in [Section-3].

I am interested in this topic because there are no many studies carried out on the end of hyperinflation in Sudan. The previous studies focused on the determinants of inflation in Sudan[7]. And found out that inflation is a monetary phenomenon, while my research finds that hyperinflation is a fiscal phenomenon and is derived by fiscal situations in the country.

LITERATURE VIEWS

There is a dispute among scholars about whether hyperinflation is a monetary phenomenon or a fiscal phenomenon. Pierre (2000) addresses that monetary and fiscal factors almost exclusively cause hyperinflation. Nonetheless, the vast majority of economists are principally in agreement with the view

that inflation is fundamentally a monetary phenomenon [1]. Culiuc and Walton [2] agree with Pierre L. Siklos [1] that inflation is monetary phenomena, but they Culiuc and Walton (2002) added that it is closely linked to fiscal rendering, and this is in turn linked to both economic institutions and to the management of underlying distributional disputes [1].

Unlike most of scholars who argue that hyperinflation is monetary phenomena, Fernando de Holanda Barbosa [3] comes up with a different notion when he addressed that hyperinflation is fiscal phenomena and said the main source of hyperinflation is the fiscal crisis. Actually, he paraphrased Friedman's argument which stated that hyperinflation is always and everywhere a fiscal phenomenon, in the sense that a hyperinflation caused by a bubble has not been observed [3]. The fiscal structure of the economy is the key determinant of the macroeconomic equilibrium and therefore of the effect of monetary policy. The failure to take fiscal effects into account could cause a misinterpretation of the expansionary and distortive character of monetary policy in the 1960s and 1970s.

Michael K. Salemi [4] addressed that hyperinflations are caused by extremely rapid growth in the supply of "paper" money. They occur when the monetary and fiscal authorities of a nation regularly issue large quantities of money to pay for a large stream of government expenditures. In effect, inflation is a form of taxation where the government gains at the expense of those who hold money whose value is declining. Hyperinflations are, therefore, very large taxation schemes [4].

THE EMPIRICAL PART

My aim in this paper is extended to figure-out what causes money supply to fall? And what causes money demand to rise during the period of hyperinflation? Given the demand of money, reduction in the money supply led inflation to go down. Given the money supply, a raise in money demand led inflation to go down. I assume that exchange rate causes money growth since there is some evident supporting this assumption and also assume that exchange rate causes inflation dynamic. In ether one, I assume that exchange rate comes first.

Since the exact timing point of stopping hyperinflation is being identified (August 1996) , I attempt to test the positive shocks related to money market during this period such as currency peg, money supply, and some announcements affected people decision in terms of how much money must be held.

Since oil production in 1996, economic situation deteriorated significantly, GDP per capita grows by 2.5%, budget deficit eliminated because of oil production and economic reforming programs carried out by the government in 1997. More importantly, people's expectation shifted swiftly to the optimistic expectation especially when the government perceived that oil production comes true. Ever since the government began to implement series steps to stimulate the economy. These programs comprise both monetary and fiscal aspects by putting more emphasis on the fiscal side for short-run and long-run. In this part, I am taking into account the motives behind money demand, and try to examine people's decision (household & firms) people` demand of money, People's reaction for oil production and Central Bank policies in terms of exchange rate, money supply, and inflation and the overall effect on prices. On the top of that I display some evidences from Sudan foster that money demand played a key role to stop hyperinflation.

Vast majority of scholars tend to focus on money supply as a key determinant of creating hyperinflation and stop it and dismiss the function of money demand, which is also as important as money supply and contributes significantly to stop hyperinflation. [Figure-3] shows that in July 1990 inflation recorded 44%. In August 1990 there was crazy jump in inflation rate was 90%. Due to huge budget deficit in early 1990s because of civil war in south Sudan and high level of public debt, which was created by the government? The government used to finance the deficit through printing money and borrowing from banking system. That was mainly attributed to the fact that the government had the upper hand and forced central bank (dependent) to print money and borrow from banking system. So the high level of public debt was associated with the high level of inflation during the first half of 1990s. In August 1996, hyperinflation hit the peak of 164% then started to decline continuously until reached one digit 8% in December 1998 (during two years and 4 months). According to the definition of hyperinflation, it was ended in only 9 months.

During 1996 and 1997, there were number of positive shocks related to Macroeconomics policy. These policies had tremendous impact towards ending hyperinflation whereas fiscal policy had the upper hand. Regarding the monetary policy, Bank of Sudan (BOS) announced pegging the currency on 18th March 1996 and as exchange rate responds immediately to news and rumors being released, the official rate depreciated significantly in anticipation that during the peg period exchange rate will be fixed at certain level, at the same time growth of money supply increased from 0.1% in February 1996 until 10% in April 1996 in the sense that there is a positive relationship between growth in money supply and growth in exchange rate [Figure-2].

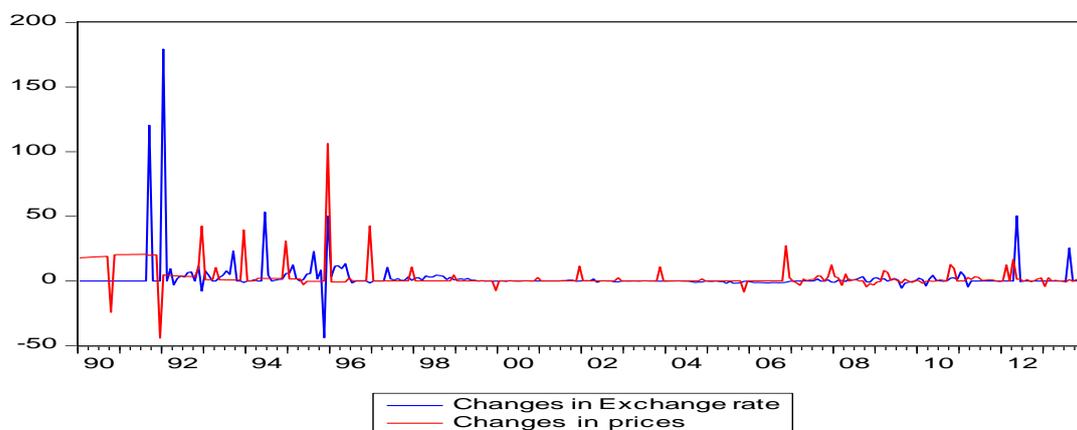


Fig-1: Price level and Nominal Exchange Rate during Jan. 1990 - Jan. 2014

Source: Data Base of Central Bank of Sudan (CBOS)

Figure-1 shows that between Jan. 1990 and March 1998 the Sudanese pound depreciated swiftly and domestic prices rose rapidly. Also, it is observed that during the period of the hyperinflation, the fluctuations in domestic prices and nominal exchange rate are very high, compare to the period after hyperinflation, changes in nominal exchange rate remains stable because of the huge capital inflow in 1999 from oil exports. On the other hand, changes in domestic prices become relatively stable after 1997.

In June 1996, Bank of Sudan (BOS) formally pegged the Sudanese pound against dollar; this peg led

to huge appreciation in the currency and made it stronger and more expensive than before, consequently, money growth declined from 8% in July 1996 to 0% in August 1996. [See Figure 2] As it can be observed, there is a huge fluctuation in nominal exchange rate and money supply during the period of hyperinflation (1991 – 1996). However, both of them remain consistent after 1996. Exchange rate remains at the level of 3% while money supply had been adjusted in the range of 2% and 0%. In contrast, during hyperinflation period exchange rate used to fluctuate between 179% and 22% in February 1992 and May 1996 respectively [Figure-2].

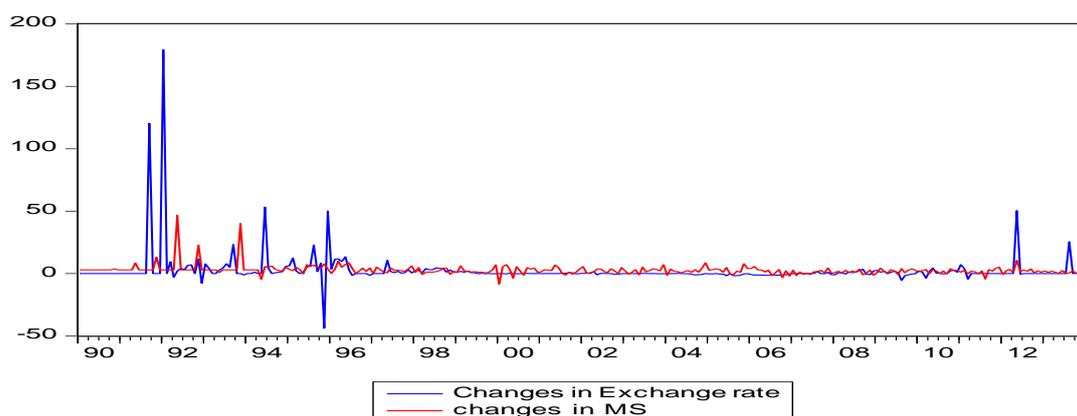


Fig-2: Money Growth and Changes in Nominal Exchange Rate during Jan. 1990 – Jan. 2014 (%)
Source: Data Base of Central Bank of Sudan (CBOS)

Because Central Bank has to do its best to keep exchange rate constant at its pegged level, BOS adjusted money supply at the level of 2.5% during the peg period. If Central Bank is unable to take over this issue by adjusting money supply, people would prefer to enter the black market where the currency is traded at the parallel market rate ignoring Central Bank peg.

On 16th June 1997, CBOS decided to follow managed floating regime instead in consideration that such a regime is suitable for foreign capital inflow. Basically, since the announcement was being released, exchange rate depreciated considerably again from 1.4 SP/\$ in May 1997 until 2.6 pound/\$ in May 1999 during this period changes in nominal exchange rate fluctuated because BOS did not intervene to control the exchange rate and leave it to the market mechanism while during the peg period BOS intervened as a seller to keep it at the level of peg or close to. Since

September 1999 and due to huge capital inflow of oil exports, exchange rate remains consistent at 2.6 pound/dollar.

Figure-3 shows that due to the positive dynamic relation between money growth and exchange rate, inflation rate declined continuously from 164% in August 1996 to 32% in August 1997 to 13% in August 1998. The decline in inflation happened two months after pegging the currency, while money supply was adjusted one month after pegging the currency and one month before inflation declines which seems logical. (The currency was pegged in June 1996, growth in money supply was adjusted in July 1996, and then inflation rate started to decline from August 1996) this support my argument that exchange rate causes money supply to be adjusted but the question remains. How these casual relationships occur?

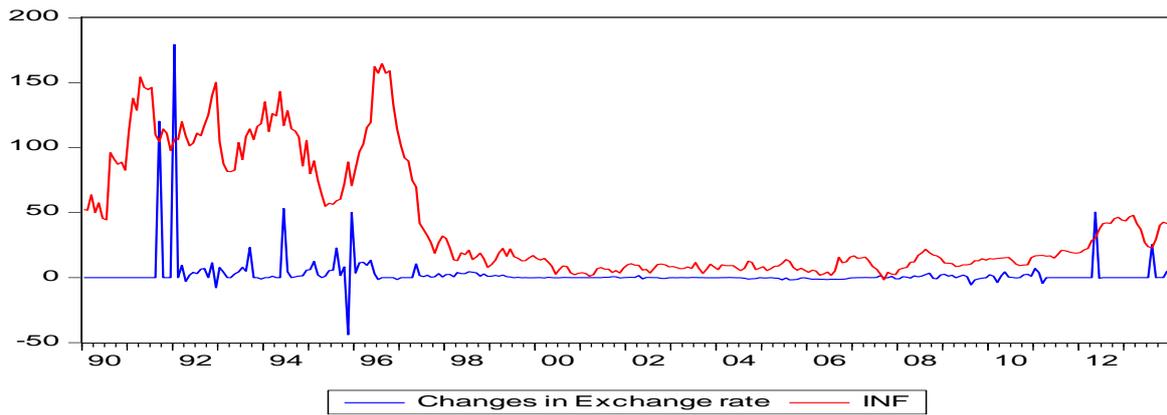


Fig-3: Inflation and Changes in Nominal Exchange Rate during (Jan. 1990 - Jan. 2014)
 Source: Data Base of Central Bank of Sudan (CBOS)

On June 10th 1996, Bank of Sudan (BOS) formally pegged the Sudanese pound against dollar, this peg led to huge appreciation in the currency and made it stronger, and the appreciation of the pound is followed by the decline in money growth by around 8% during the period from July 1996 - August 1996. As soon as the pound was pegged, market dealers responded immediately to the news, the demand of the domestic currency declined and consequently Bank of Sudan BOS adjusted the growth of money supply, thus inflation declined. In this sense, there are two stories related to the money demand as following:

THE FIRST STORY: ANNOUNCEMENTS PERIOD (MARCH 1996 – JUNE 1996)

During this period, the government of Sudan released two announcements. First, the announcement of oil production, and second the announcement of the currency peg. Due to these announcements, People rushed to the central bank to buy dollars in anticipation that the currency will be pegged at higher level so that

they can gain the margin between buying and selling rate. So people did not have incentive to hold domestic currency so during this period there was a decline in money demand. In March 1996, there was agreement signed between Chinese and Sudanese government to build pipeline for exporting oil. Actually, this announcement did not affect the demand for money as much as what the announcement of peg did. But it gave an indication for the future and changed government’s and people expectation.

Money demand is also affected by fiscal performance. People have less incentive to hold money when the government uses printing money to finance its budget. This is what addressed by Fernando [3] under rational expectation theory. The logic behind is that people fully know in advance that the economy will be broken down since the fiscal crisis is not tenable. In this case, people optimally choose to hold small amount of money

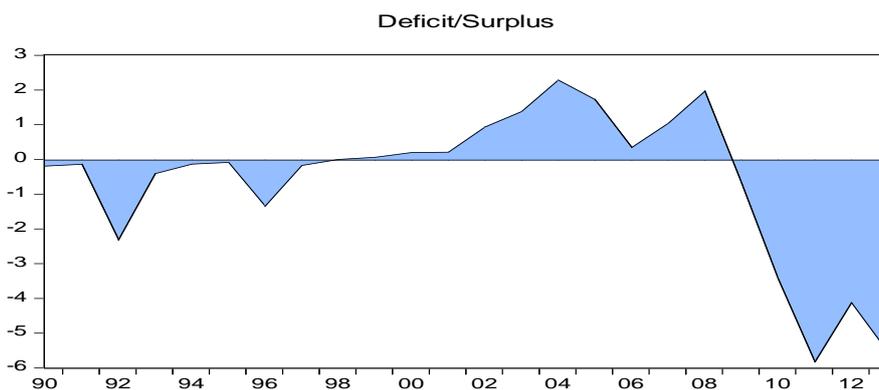


Fig-4: Government Deficit during 1990-1996 (SDG Millions)
 Source: Data Base of Ministry of Finance (MOF)

As it can be seen from Figure-4, there was a budget deficit between 1992 and 1996, since the deficit had gradually been eliminated until 2008 because of oil revenue, which used to contribute by 85% of the total

revenue, then the deficit comes up again from 2008. Due to the separation between North and South Sudan, Sudan, lost the advantage of oil production and led to a huge budget deficit especially in 2011.

The government of Sudan attempted to set up a balanced budget by following tightening fiscal policy, it succeeded to some extent to eliminate the deficit. The stabilization of the pound was associated by a proportional augmentation in the total liabilities of the central bank. However, the deliberate adjustment in the fiscal policy regime that caused the stabilization also ended hyperinflation in Sudan.

CURRENCY PEG PERIOD (JUNE 1996 – MAY 1997)

The interaction of money demand in this period had an effect on stopping hyperinflation. In June 1996 Sudanese pound appreciated by 13% change against US dollar this is attributed to the increase in the price level as dollar was cheaper and buy fewer pounds. And also attributed to the expansionary fiscal policy followed by the government.

In 1997, the government followed expansionary fiscal policy by increasing government

expenditure and reducing taxes. Income tax decreased by 5% in 1996. Capital Tax also decreased from 40% in 1996 to 35% and 30% in 1997/1998 and 1999/2000 respectively. On 15th April 1997 the announcement of VAT was released and approved in Dec. 1999 and formally became official tax in June 2000. Here I can argue that Taxation reform comes after the announcement of oil production and peg.

In terms of monetary policy, during the period of the currency peg, demand for money increased by selling the amount of dollars they have especially when Bank of Sudan started to decrease money supply to be able keep the exchange rate at its announced level. But since May 1997, there was huge depreciation in exchange rate, which was attributed to the announcement of the government to stimulate the economy by using economics reform packages which included taxation reform focusing on tax administration.

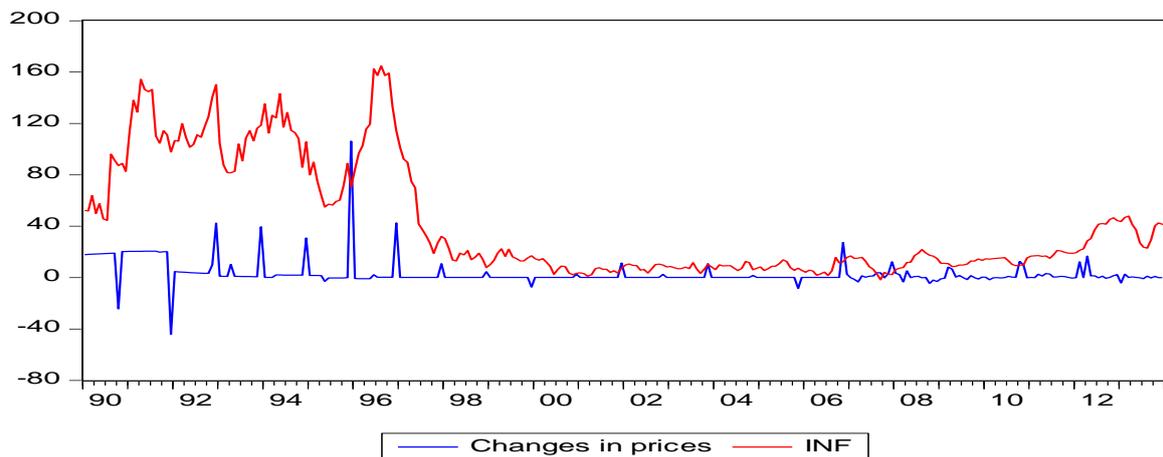


Fig-5: Changes in Price level and Inflation Rate during Jan. 1990 - Jan. 2014 (%)

Source: Data Base of Central Bank of Sudan (CBOS) and Central Bureau of Statistics (CBS)

The question remains, how can we determine people demand of money? More precisely how exchange rate determines people demand of money? According to what mentioned above, in this case I would say that exchange rate and interest rate together determine people demand of money by taking into account other factors such as risks associated to each one and the exchange rate regime followed. Also, it depends on the country economic situation. For example, in a developing country like Sudan, exchange rate is the main determinant of money demand. Interest rate also determines but not as accurate as exchange rate does. On the other hand, in developed countries, because there is no black market and inflation rate is low compare to other countries, at almost interest rate is more likely determines people demand for money.

Mankiew [6] pointed out that (there is a positive relationship between inflation and exchange rate, Countries with higher inflation rate tend to have currency depreciation). This argument matches with what I observed from the data. During the period from 1990 to 1996 when inflation is high, there was huge depreciation in the exchange rate. But the question remains, what the casual relationship between both variables? Does inflation cause exchange rate to appreciate or depreciate? Or does exchange rate cause inflation to increase or decrease?

From the data I found that Stop of Depreciation happened earlier than the decline in Inflation, which means exchange rate causes inflation the logic behind.

POLICY IMPLICATION

Economic theory tells us there is a positive relationship between money supply and nominal interest rate. For example, if Central Bank increased money supply, supply curve shifts to the right and causes interest rate to decline. The decline in money supply increases nominal interest rate for any given level of output. Therefore, LM curve shifts to the left.

As stated on Mankiew [6] and according to Fisher effect's assumption, in the long run, the decline in growth of money supply decreases inflation and makes exchange rate to appreciate. This lowers the nominal interest rate in the long run because price level is assumed to be flexible. In contrast, according to the theory of liquidity preference, when prices are sticky tighten monetary policy would lead real money balances to fall and interest rates to increase and then appreciation in the exchange rate.

Both arguments are consistent with the empirical evidence of Sudan in 1996 and during 1996 – 2013. In the second half of 1996s when Sudan economy witnessed the quickest decline of hyperinflation in the recent history from 164% in August 1996 to 13% in Dec. 1997 as a result exchange rate remains stable at 1.4 SP/US\$ through August 1996 to May 1997, then it depreciated to 2.5 SP/\$ because of changing in the regime from fixed peg to the managed floating regime. [Figures- 3 & 5]. Because Central Bank has to do its best to keep exchange rate constant, BOS adjusted money supply in one month at the level of 2.5% during the peg period [Figure-2]. And also must have enough foreign reserve to meet market mechanism. If Central Bank is unable to take over these issues, people would prefer to enter the black market where the currency is traded at the black market rate ignoring Central Bank peg.

Mankiew [6] points out that the interest rate determines the amount of money people want to hold as the opportunity cost. However, I argue that not only interest rate, but also exchange rate fluctuations determines people demand for money and thus money supply. Therefore, I assumed that both interest rate and exchange rate are the opportunity costs of each other's, which means people orient towards where the higher return exists but they also take into account risks associated to exchange rate fluctuations and interest rate movements. In the case of Sudan, exchange rate was considered as a safe asset and the risk associated was relatively lower during hyperinflation period than the interest rate risks because of the oil productions and Bank of Sudan policies towards the Foreign exchange Market in 1996.

Theoretically, IS-LM model analyses the economy in the short run when prices are sticky. But practically, this relation might hold in certain situations. The most interesting thing in this short-run dynamic is that the demand for domestic currency was coincide with the announcement of the currency peg on 18th March 1996.

SUMMARY AND CONCLUSION

To sum up, Macroeconomics policy had reduced hyperinflation in 1996 and 1997 but the hidden fact behind these successful policy was oil production in the first half of 1996. So I can say that oil production changed policymakers thinking and decision from one hand and people expectation from the other hand. Likewise, it is oil production, which stopped hyperinflation in 1996 by contributing to the revenue side of the budget and helped monetary policy makers to draw an accurate policy to stop hyperinflation. More importantly, although money supply played a key role to ending hyperinflation in Sudan, money demand also played an important role to end hyperinflation and helped policymakers to draw their expectations accurately.

Fiscal policy had the upper hand to end hyperinflation in Sudan. During hyperinflation period, budget deficit used to be financed by printing money and borrowing from banking sector. These two factors created hyperinflation beside the high level of public debt, which was created by the government. But since mid and late 1990s, budget deficit had been financed automatically through oil revenue. The government took this advantage to reduce the level of public debt and carry out fiscal discipline.

Many scholars argue that money growth causes exchange rate to fluctuate like Jay (2011). According to the analysis, I argue that it depends on the exchange rate regime is adapted. In the case of currency peg, exchange rate causes money growth to be adjusted by the government otherwise, central bank would loss controlling the exchange rate and fail keep it at the announced level. If this happened, Central Bank may loss the credibility and black market would trade exchange rate at higher level so that people instead would sell dollars to the dealers in the black market then the situation would definitely get worth. In case of managed floating, I agree that money supply has effect on exchange rate because Central Bank does not intervene in the Forex market. If For example, Central Bank increased money supply by 3%, then inflation rate will increase, and exchange rate would depreciate by 2.5%.

Empirically, I found that exchange rate causes inflation to decline. In case of Sudan, exchange

rate appreciation caused money growth to decline, and then inflation to go down. Bank of Sudan pegged the currency in June 1996 then the change in exchange rate appreciated by 13% between June 1996 and August 1996 after that money supply was adjusted from 8% in July 1996 to 0% in September 1996, consequently, hyperinflation started to decline continuously from 164% in August 1996 to 13% in May 1997.

REFERENCES

1. Siklos PL; The End of the Hungarian Hyperinflation of 1945-1946. *Journal of Money, Credit and Banking*, 2002; 21(2):25 - 27.
2. Alexander C, Walton M; High and Hyperinflation; Determinants and Solutions, 2010. <http://www.michaelwalton.info/wpcontent/uploads/pdf2010/11/Highand.pdf>.
3. Barbosa FH, Cunha AB, Sallum EM; Competitive equilibrium hyperinflation under rational expectations. *Economic Theory*, 2006; 29(1):181-95.
4. Salemi MK; Hyperinflation, an economics professor at the University of North Carolina in Chapel Hill, 2010. <http://www.econlib.org/library/Enc1/Hyperinflation.html#abouttheauthor>.
5. Dr. Osman AE; The Methodology of Structural Adjustment Programs in Sudan, Ministry of Finance and National Economy, 2010.
6. Mankiw NG; *Macroeconomics*, 8th Edition, Harvard University, Worth Publishers, 41 Madison Avenue, New York, NY 10010, 2012.
7. Zamanian M, Kashkouli SM, Seddighi S; Book Review: *Designing Language and Teaching Curriculum: Based on Nation and Macalister's*, 2010.