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The Effect of Monetary Policy on Currency Value in Somalia

BY

FARHIA MOHAMUD HASSAN

A Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of the

Bachelor Science of Economics

Faculty of Economics

SIMAD UIVERSITY

2019

THESIS APPROVAL

FACULTY OF ECONOMICS

Bachelor of Economics

Degree

Monetary Policy on Currency Value in Somalia

Name: FARHIA MOHAMUD HASSAN, 2019

Accepted by the Faculty of Economics, SIMAD University in Partial Fulfillment of the Requirement of the Bachelor's Degree in Economics

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Abstract

The purpose of this study is to analyze the effectiveness of monetary policy to currency value in Somalia. The study used ordinary least square method to estimate the parameters. Theory used is Purchasing Power Parity (PPP) with quantity theory of money applying Dornbusch model. Time series data collected from the World Development Indicators of 45 observations was employed.

Variables in the study are exchange rate that represents the explained variable whilst independent variables are: foreign direct investment (FDI), money supply and balance of trade (BoT). The study found that money supply affects positively to exchange rate. Study also demonstrated that FDI has bigger influence on the Somali exchange rate thereby the Central Bank of Somalia (CBS) should have more concern on the foreign inflows for currency and exchange rate stabilization.

Keywords: *Exchange Rate, Money Supply, Balance of Trade, Purchasing Power Parity.*

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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Attaining sustainable economic growth, enhancing employment level, controlling inflation and balancing the payments are regarded as the most essential objectives of economic planners and policymakers. The exchange rate is always considered one of the most vital macroeconomic variables by the monetary authorities. Thereby, currency rates and the factors influencing them can be important to achieving the aforementioned economic goals (Dilmaghani and Tehranchian, 2015).

As the number of developing countries that let the value of their currency be driven by market forces has increased and the value of their currencies by these increasingly important players in the global economy has come to the forefront of the international policy debate, the need for a clearer understanding of the determinants of the value of their currencies has raised the necessity of such analysis (Kohlscheen, 2014).

When the Somali central government fell down, the country's central bank stopped functioning, and consequently, the national currency (Somali shilling) was being issued by nongovernmental authorities such as warlords and businessmen. Thus, the currency market started collapsing because of the existence of these informal monetary mechanisms (Nor, 2015).

Currently, monetary authorities' effect is fragile and ineffective as numerous private vendors deal in currency transactions, setting the exchange rate daily on the basis of localized contingent factors that control the exchange rate. The flow of remittances to and from abroad made the exchange rate even more volatile (Farah, 2009; Omer, 2010).

Table 1.1: Fifteen (15) Year Analysis of Exchange Rate (So.Sh/$1)

Years	Exchange Rate	Appreciation (-) or Depreciation (+)
2000	10,500	N/A
2001	19,000	81%
2002	21,000	10.5%
2003	19,500	-7%
2004	16,000	-18%
2005	15,500	-3%
2006	14,000	-10%
2007	18,000	28.5%
2008	30,500	69%
2009	31,500	3%
2010	31,000	-1.5%
2011	30,000	-3%
2012	23,000	-23%
2013	21,000	-9%
2014	21,000	0%
2015	22,500	7%

Source: Ishak (2017)

The table shows that exchange rate volatility is very high in Somalia. For instance, at the end of 2000, $1 was exchanged for So.Sh.10,500; in 2009, it was So.Sh.31,500; and in 2015, $1 was equivalent to So.Sh.22,500.

How monetary policy affects currency value through exchange rates is a well-documented issue in many studies, like Dombusch (1979). Ever since, others have continued to be interested in the examination; these include Korteweg (1980), Zettelmeyer (200), Mikshin (2008), Nyakerario and Nyamongo (2010), Dilmaghani and Tehranchian (2015), and Edwards (2017).

These research findings from the previous studies tested many variables like GDP per capita, inflation, interest rate, money supply, and balance of payment. Somalia's exchange rate heavily and enormously relies on remittances; thereby, we can't underestimate the importance of the omitted variable, Foreign Direct Investment (FDI), by these results. This study will contribute to testing FDI variable among all of them, except interest rate and GDP per capita.

1.2 Problem of the Statement

Monetary policy and its effect on the property market are issues that have been examined by economists for decades. Among the properties, exchange rates have drawn the most consideration in the financial approach discussed. Consequently, central banks should give careful consideration to exchange rates and the value of their domestic currency (Dilmaghani & Tehranchian, 2015).

Mostly, in an open economy, the appreciation model will have two effects: it will reduce the real GDP by expenditure switching, and it will decrease inflation because the price of imported goods will get cheaper because the imported commodity price will not substantially go up as the value of the money (appreciation). Inflation may also have been reduced by the decline in domestic production (Tylor, 2001).

Dalmar (2015) reports that the valuing of the Somali shilling by 30% against the U.S. dollar in the last three years (2014, 2013, and 2012) did not produce a corresponding decline in imported commodity prices. On the contrary, when the Somali shilling devalues, merchants adjust the prices of imported commodities immediately. Then, how can the central bank of Somalia get fixed to these adverse outcomes? (Dalmar M. , 2015).

The stability of Somalia's foreign currency exchange market is vital for the economy of Somalia, as the economy of the country is mainly dependent on trade (export and import) (Nor, 2015)

1.3 Purpose of the Study

The purpose of this study is to examine the effect of monetary policy on currency value in Somalia.

1.3 Objectives the Study

This study will investigate the effectiveness of Somali monetary policy on the exchange rate. The research will measure these variables: money supply, foreign direct investment, and balance of trade. Also, the study will suggest possible remedies for Somalia exchange rate challenges.

1.5 Scope of the Study

The scope of the research is to investigate the influence of monetary policy on currency value in Somalia. Time series data of 45 years spanning from 1970 to 2014 will be used to observe the effect

1.6 Significance of the Study

The results of this paper will benefit the central bank of Somalia and policymakers by improving the monetary plans to assure stabilization policies in general and exchange rates in particular. Also, it will help the academicians who are interested in the field.

For the central bank runners, they might use the empirical findings provided for their policy formulating by taking insights into exchange rate determination and considering the effect that its fluctuations, valuing, and devaluing have on the economy.

Other groups that the study will help are businesses, commercial banks, and foreign investors. They can use the results as the basis for exchange rate forecasting and expect consecutive effects like changing price levels and wage rates.

1.7 Organization of the Study

The study is categorized into five chapters, ordered as follows: section two reviews related literature, chapter three dedicates to theoretical framework and the model. The results and the discussions are presented in Chapter four, where the final chapter provides the conclusion and policy implications of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This is the second chapter of the study of the effect of monetary policy on currency value in Somalia. The interaction between monetary policy and asset prices is a subject of longstanding interest in financial economics. Often, but not always, the focus is directed at trying to understand how monetary policy, or shocks to policy, impact asset prices, whether these be the prices of equities, bonds, property, or currencies.

2.2 Explanatory variables and Exchange rate

The exchange rate is a widely sensitive macroeconomic variable that affects almost all economic activities. The extent of these effects substantially depends on the nature of the exchange rate, for instance, whether it's a flexible or pegged exchange rate. Explanatory variables, such as monetary policy, set out or control the exchange rates through the money supply, open market operations, and foreign exchange reserves. In our review, we will consider merely the literature about money supply and exchange rate. We will also reflect on other explanatory variables, like foreign direct investment and balance of trade, which cause the exchange rate to depreciate or appreciate. The studies conducted disagreed on the causes of exchange rate valuation or devaluation and, most importantly, the favorability of each.

2.2.1 Money supply and exchange rate

Money supply and exchange rate: Levin (1997) studied money supply growth and exchange rate dynamics. The purpose of the study was to re-examine the issue of exchange rate dynamics when the central bank undertakes a change in the growth rate of the money supply.

This paper has analyzed the effects of money supply growth on the exchange rate and other variables in a variable output version of the Dornbusch model. In this model, the domestic currency depreciates in response to money supply growth but may overshoot or undershoot its new long-run equilibrium level. Overshooting can occur because money supply growth has no immediate effect on the nominal interest rate, and therefore overshooting may be required to offset expected depreciation due to the effect of money supply growth on expected long-run inflation.

This would keep the expected exchange rate movement unchanged, thereby restoring interest parity. However, since money supply growth also raises the long-run equilibrium price level, the expectation could develop that interest rates would rise and the home currency would appreciate. Hence, undershooting might be necessary to keep the expected exchange rate movement unchanged. In addition, because the nominal exchange rate initially depreciates, the real effect of the price level gap on the exchange rate is money supply growth and exchange rate dynamics. The exchange rate on the home currency initially depreciates and overshoots its long-run equilibrium level.

Dilmaghani and Tehranchian (2015) investigated monetary policies and exchange rates. The purpose of this study was to investigate the relationship between monetary policies and exchange rates in selected developing countries. Despite the theoretical explanation, the study used panel data based on a generalized method of moments. GDP, inflation, and exports were used as study

variables. The liquidity variable was used as a proxy for monetary policy. This study used the annual data of 30 selected developing countries from 2001 until 2010. They have been obtained from the latest data published by the World Bank on the basis of the maximum available information. It found that the lag of the exchange rate variable has a positive and significant relationship to the exchange rate.

Moreover, this paper shows that the liquidity coefficient as an indicator of monetary policy is positive and significant. The coefficient of this variable is about 0.04, which means that if the liquidity variable increases by 1% while holding all others constant, then the exchange rate increases by 0.04%. Thereby, if the central bank puts expansionary monetary policy into practice, this expansion in the money supply causes the domestic interest rate to decline. As a result, exports decrease and the supply of foreign currency decreases, which leads to an increase in the exchange rate.

Nucu (2011) studied the relationship between the exchange rate and key macroeconomic indicators. Case Study: Romania. This study emphasized that money supply and exchange rate relate positively, and that the evolution of monetary indicators in the period 2000–2010 is characterized by an upward trend. Thus, all monetary aggregates have had a positive development. The Romanian economy experienced a very dynamic re-monetization process, with the average annual growth of broad money (M2) almost three times exceeding the average GDP growth rate (15.83 percent to 5.5 percent).

Kohlscheen (2011) examined The Impact of Monetary Policy on the Exchange Rate: Puzzling Evidence from Three Emerging Economies. The intention of the study was to investigate the impact of monetary policy shocks on the exchange rates of Brazil, Mexico, and Chile. The change

in the foreign exchange rate turns out to be highly correlated with the daily change in the 5-year credit default swap spreads within this sample period. (The correlation over the sample period was 0.584 for Brazil, 0.702 for Mexico, and 0.708 for Chile).

The point estimates indicate an unexpected monetary tightening that leads to a 100 b.p. An increase in the 90-day DI swap rate would lead to a modest 0.5–1.2% depreciation of the Brazilian Real on impact. In the case of Mexico, a hike causes a 100 b.p. An increase in the 28-day peso interest rate would lead to marginal variations in the value of the peso. Based on the robust standard errors, neither effect differs significantly from zero. The estimates for Chile are the most surprising ones: our point estimates suggest that a tightening of 100 b.p. in the tasa de politica monetaria would lead to a 2.2 to 2.5% depreciation of the Chilean peso. This effect is always significant at the 1% confidence level. The effect of the foreign interest rate, however, is only statistically significant at 5% in the case of Mexico.

Ali, Mahmood, and Bashir (2015) tested the impact of interest rates, inflation, and money supply on exchange rate volatility in Pakistan. Johansen cointegration (trace test & eigenvalue) tests and Vector Error Correction Model (VECM) as well as the Granger causality test and Impulse Response Function (IRF) have also been applied to determine the effect and response to shock of variables on each other.

This study found that inflation has a positive relationship with the exchange rate, while interest rates and money are inversely related to the exchange rate. It has also been found that money supply (policy variable) has an inverse relationship with exchange. Therefore, to restrain exchange rate volatility, the money supply may be efficient. According to Pakistan's economy size, increasing the money supply by up to 20% is possible. An increase in money leads to a

decreased price level, resulting in an enhancement in exchange rate volatility. This may be a restraint.

2.2.2 Balance of Payment and Exchange Rates

Sandu and Ghiba (2011) analyzed The Relationship Between Exchange Rate and Exports In Romania Using A Vector Autoregressive Model. In this paper, it was analyzed how the exchange rate influences export volume in Romania using VAR. The analysis, relative to the 2003Q2-20011Q1 period, reflects a negative relationship for the first lag and a positive one for the second lag. Considering the first lag as significant, an increase in the exchange rate level has effects on decreasing export volume. Also, according to the impulse-response function, a shock in the exchange rate has a significant effect on exports after two periods. Variance decomposition shows a weaker influence, less than 10%.

Céspedes, Chang, and Velasco (2002) studied dollarization of liabilities, net worth effects, and optimal monetary policy. The quantitative results of the paper are also useful in assessing the validity of some commonly made claims about why emerging market countries "float the way they do," raising nominal interest rates in response to adverse shocks and apparently engaging in procyclical monetary policy.

It was found that the required nominal rate increase is smaller when responding to adverse export and foreign interest rate shocks than under discretionary and flexible inflation targeting. Since investment falls persistently after a bad shock from abroad, the initial rise in the nominal rate is typically very short-lived and often does not extend beyond an initial impact period. In short, highly variable nominal interest rates, or nominal rates that rise when adverse shocks hit, are not

an indication of fear of floating. The standard deviation of the real exchange rate turns out to be 2.29 percent, somewhat lower than under flexible inflation targeting.

Lugaiyamu (2015) analyzed the determinants of the real exchange rate in Tanzania". The aim of the study was to explore the determinants of real exchange rate in Tanzania. The model was conducted based on data from Tanzania and major trading partners, focusing on the flexible exchange rate regime period from 1987 to 2012. Unit root and cointegration tests confirm that the OLS regression results of a static linear specification of the theoretical model may be spurious.

Therefore, cointegration tests confirm the graphical analysis results that show the absence of long-run relationship between the real exchange rate and its structural determinants. However, granger-causality tests show past changes in the gold price, government consumption, and taxes have effects on the real exchange rate that are consistent with the predictions of the theoretical model. The model hypothesizes that the numerical value of the real exchange rate is positively related to the expenditure on imports of oil and negatively related to the earnings from gold exports.

Twarowska and Kąkol (2014) studied Analysis of Factors Affecting Fluctuations in the Exchange Rate of Polish Zloty Against Euro". The aim of the study was to analyze the determinants of the exchange rate of the Polish zloty against the euro and to find which of them play the most important role as factors affecting the zloty values. The OLS method has been used. The coefficient of determination (R-squared) accounted for 62.3%, which shows that the model is not a perfect fit. It means that only two-thirds of the variations in the EUR/PLN exchange rate in 2000–2013 can be explained by this model.

The fluctuations were caused by six factors: GDP, HICP interest rate, current account balance, financial account balance, and government deficit, whereas only 37.7% of the variation in

exchange rate was dependent on other factors that have not been taken into account. The obtained results confirm that a relative increase in the price level and faster economic growth in Poland compared to the euro area caused the zloty depreciation. The rise in the current account deficit and financial account surplus, as well as a relative increase in the Polish market interest rate and government deficit, contributed to the appreciation of the zloty. However, drawing conclusions from this analysis should be done with caution because the model is a simplified picture of reality, accompanied by errors.

Tylor (2001) conducted a study on the role of the exchange rate in monetary policy rules. The purpose of the study was to test how exchange rates should be taken into account in formulating monetary policy. New normative macroeconomic research with estimated or calibrated dynamic stochastic general equilibrium models has been used. An important and still unsettled issue for monetary policy in open economies is how much of an interest rate reaction there should be to the exchange rate in a monetary regime of a flexible exchange rate, an inflation target, and a monetary policy rule.

Research to date indicates that monetary policy rules that react directly to the exchange rate as well as to inflation and output do not work much better in stabilizing inflation and real output and sometimes work worse than policy rules that do not react directly to the exchange rate. This paper endeavors to explain this finding by positing an indirect effect of exchange rates on interest rates.

The indirect effect exists even if the central bank follows a policy rule without a direct exchange rate effect. Inertia combined with rational expectations causes this indirect effect. The indirect effect may have advantages compared with the direct effect because it results in fewer and less erratic fluctuations in the interest rate. The partial interest rate equalization is due to the lagged

impact of the appreciated exchange rate on inflation. The measured inflation rate is temporarily low because of the appreciation; however, because the decline in inflation is temporary, it is not appropriate for the central bank to ease monetary policy by any additional amount because of the lower inflation.

Dornbusch (1979) examined monetary policy under exchange rate flexibility. The purpose of the study was to present an evaluation of exchange rate theories and the empirical evidence in the field. Theories of monetary approach and purchasing power parity have been used, with monthly data for the period March 1974–May 1978. A study found that depreciation of the exchange makes a country more competitive and thus improves the current account. An increase in foreign prices leads to a precisely balanced appreciation, and an increase in our interest rate leads to an appreciation.

The exchange rate will accordingly appreciate, assuming the right elasticity, until we have an offsetting worsening of the current account. The study also indicated that monetary policy becomes quite possibly ineffective if one recognizes that the inflationary pressure of depreciation is quite soon translated into domestic price increases. These price increases limit the gain in competitiveness from depreciation. An exchange rate depreciation will, for given world prices, raise the domestic price of imports. There is thus a direct impact on consumer prices to the extent that the CPI includes importables. There are additional effects, however, to the extent that the prices of closely competing goods will tend to rise. Finally, there may be a more time-consuming adjustment as money wages rise in response to the induced CPI inflation.

Makin (2002) studied the balance of payments and the exchange rate. The intention of the study was to examine how the balance of payments affects the exchange rate. A study showed that from the early 1980s on, access to international financial capital and services increased greatly for many economies. Combined with the removal of capital controls abroad and the development of international capital markets, this boosted many economies' external borrowing opportunities. In effect, the decision to float currencies meant that exchange rates bore the pressure of external adjustment.

This is because if, over any period, the net demand for foreign currency arising from current account transactions does not match the net supply from capital account transactions, the exchange rate must either depreciate or appreciate. Similarly, the term "balance of payments" does not have the same meaning it had when exchange rates were generally pegged. Under the Bretton Woods system, balance of payments problems arose when there were unsustainable run-downs of the foreign currency reserves of a central bank.

Reserve holdings were necessary in order to maintain the value of the exchange rate whenever the amount of foreign currency available from inflows fell short of residents' demand for it. This could stem, for instance, from an increased demand for imports or a fall in the supply of foreign exchange coming from the sale of exports. These balance of payments deficits effectively measured the depletion of official foreign exchange reserves required to meet the foreign exchange shortfalls. Hence, the availability of foreign reserves represented the ultimate external constraint on an economy's performance.

In contrast, almost by definition, independently floating exchange rates do not demand intervention by the monetary authorities to maintain any particular exchange rate. Under the purest

of floats, the overall balance of payments should in practice be zero, with the exchange rate itself bearing all the pressure of external adjustment.

Monfaredand Akın (2017) conducted a study on the relationship between exchange rates and inflation: the case of Iran. The VAR method and Hendry's general-to-specific modeling method were applied. The results of the analysis of this study emphasize that inflation is a monetary phenomenon in the Iranian economy.

Therefore, the central bank should control the money supply to a degree that does not cause economic depression, since increased liquidity is the main reason for inflation. Since inflation is affected by exchange rates and inflationary expectations, the Central Bank must be transparent in the application of foreign exchange policy, thus avoiding the inflation stemming from inflationary expectations and protecting the exchange rate from excessive fluctuations by means of a more managed exchange rate policy.

Ravindran and Abar (2015) examined the influence of macroeconomic variables on exchange rates in three countries. The intention of the study was to investigate the influence of the interest rate, inflation rate, BOP, GDP, tax rate, borrowings, deficits and surpluses, employment rate, and corruption index on the exchange rate. Time series annual data was collected for ten years, which yielded only 30 data samples. A regression model was used. In this research, three economically sound countries with relatively low unemployment and less corrupt exchange rates are chosen to investigate. Interestingly, many variables show opposite relationships. For instance, interest rates, BOP, and inflation rates should influence the exchange rate positively, as per theory, but the results show the opposite. It was interpreted as true for these reasons:

Firstly, the currency values of these countries are reasonably stronger; the strength comes from the confidence of the public and investors and not from the economic variables prevailing in these countries. Secondly, the independent variables have complex interrelationships and interactions among themselves, which may not be captured by a weak traditional regression model. Thirdly, these countries' economies are fairly corrupt-free, stable in interest rates, and the lowest unemployment rates prevail; hence, the model gives diametrically opposite results. This may be due to the inclusion of macroeconomic variables while ignoring the psychological factor, which is the confidence of investors and traders in the performance or stability of these economies.

2.2.3 Foreign Direct Investment and Exchange Rate

Emmanuel (2013) tested the effects of foreign direct investment (FDI) on economic growth in Nigeria. The main objective of this study was to find out the effect of foreign direct investment (FDI) on economic growth, represented by GDP in Nigeria. Other objectives were to assess the effects of FDI on the exchange rate and the effect of FDI on inflation in Nigeria. The data cover the period 1986–2011 and the OLS method.

The study indicates that with a coefficient of determination (R-squared) of.465, one can say variations in FDI can explain 46.5% of changes in GDP, exchange rate, and inflation rate for the period of study. The implication is that 53.5% is explained by other factors not covered in the study. The F-statistics (6.083 < 0.05) confirm that GDP, exchange rate, and inflation respond to changes in FDI. The coefficients indicate that gross domestic product (-.089) and exchange rate (-.749) have a negative relationship with FDI, while inflation (4.538) has a positive relationship. The exchange rate (-.249) means the negative impact of FDI on the exchange rate, so a 24.9% fall in the exchange rate is caused by FDI increases.

BLONIGEN (1997) studied firm-specific assets and the link between exchange rates and foreign direct investment in Japan and the USA. The purpose of the study was to investigate the linkage between foreign direct investment and the exchange rate. Using data on Japanese acquisitions in the United States across 3-digit SIC industries from 1975–1992, maximum-likelihood estimates from discrete dependent variable models have been used. A study found that, of particular interest, the real exchange rate variable is statistically significant and has the correct sign across both models. Thus, without controlling for the conditions connected with the paper's hypothesis (market presence and firm-specific assets), there is support for a link between exchange rate movements and Japanese acquisition FDI in the United States.

Another critique may suggest that because the depreciation of the dollar in the late 1980's occurred at the same time that the Japanese economy was experiencing significantly lower costs of capital and a possible speculative bubble, the correlation of increased acquisition activity with exchange rate movements may be spurious.

Goldberg and Klein (1997) analyzed Foreign Direct Investment, Trade, and Real Exchange Rate Linkages in Southeast Asia and Latin America". The aim of this study was to assess the linkage between FDI, trade, and the real exchange rate. Data from the IMF direction of trade statistics yearbook in 199f were used. A study observed the currency depreciation of the developing countries with respect to the yen and found that there is a corresponding increase in direct investment from Japan.

However, regressions that include the dummy variable for Latin America show that the linkage between FDI and exchange rate is not statistically significant but significant in Southeast Asia. A study confirmed that there are direct (relative price) and indirect (via FDI) effects on the real

exchange rate. A 10 percent increase in direct investment from Japan increases imports from Japan by about 1.5 percent over time. Japanese direct investment is also shown to significantly increase Southeast Asian imports (real exchange rate) from the United States.

Kilicarslan (2018) conducted a study on the Determinants of Exchange Rate Volatility: Empirical Evidence for Turkey. The aim of the research is to present a theoretical framework about the determinants of exchange rate volatility and to determine the factors affecting exchange rate volatility in Turkey for a period from 1974 to 2016.

In this research, the stationary analysis of the series is determined by the Augmented Dickey Fuller Test (ADF) and the PP (Phillips-Perron test) unit root tests. In addition, the GARCH model is used to calculate the real effective exchange rate volatility. The Johansen cointegration test is used to determine whether there is a long-term relationship between variables. The coefficients of the long-run relationship between the variables are estimated by the FMOLS method. The ADF and PP unit root test results show that the series are stationary at the first difference.

According to Johansen cointegration test results, it has been found that there is a long-run relationship between the variables involved in the analysis. Results from the FMOLS method for determining the direction and severity of the long-term relationship between the variables reveal that LGFCF, LMONEY, and LTRADE positively affect significantly, while LFDI, LGDPC, and LGGEXP negatively affect real effective exchange rate volatility. Which means the rise in domestic investment (LGFCF), money supply (LMONEY), and trade openness (LTRADE) increases the real effective exchange rate volatility, while the rise in foreign direct investment (LFDI), output (LGDPC), and government expenditures (LGGEXP) also reduces the real effective exchange rate volatility.

CAMBAZOĞLU (2016) investigated the relationship between the foreign exchange rate and foreign direct investment in Turkey. The purpose of the study is to test the hypothesis that there exists a reciprocal relationship between FDI inflows in Turkey and the real exchange rate level. The autoregressive distributed lag model (ARDL) was used. Time series data for the period from January 2007 to January 2015 were used to investigate the effect of the real exchange rate on foreign direct investment in Turkey in the long run. This study could not find any statistically significant relationship between foreign direct inflows and exchange rate levels in the short run, but the results indicate that foreign exchange levels and direct investment inflows correlate in the long run.

Lily, Kogid, Molik, Sang, and Asid (2014) investigated exchange rate movement and foreign direct investment in Asean economies. The aim of the paper was to empirically analyze the exchange rate movements and foreign direct investment (FDI) relationship using annual data on ASEAN economies, that is, Malaysia, the Philippines, Thailand, and Singapore. By employing the ARDL bounds test approach, the empirical results show the existence of significant long-run cointegration between exchange rate and FDI in the case of Singapore, Malaysia, and the Philippines, with all countries recording negative coefficients, implying that the appreciation of the Singapore dollar, Malaysian ringgit, and Philippine peso has a positive impact on FDI inflows.

Using the ECM-based ARDL approach for the causality test, both Singapore and the Philippines show long-run bidirectional causality between exchange rate and FDI in Malaysia. Furthermore, this study also found that short-run unidirectional causality running from the exchange rate to FDI exists in Singapore.

2.3 Summary of the Literature

Previous literature reviewed shows that there is a significant relationship between monetary policy and exchange rates. Most studies applied regression models, monetary models, PPP models, Dornbusch models, cointegration, unit roots, error correction models, and Granger causality tests to examine the nature and influence of monetary and exchange rates. There are different opinions among economists about whether exchange appreciation or depreciation is an effective decision under the monetary authority. Some argued that depreciation lowers the price of exports, which will give the country a balance payment surplus, and others argued that appreciation of the exchange rate is favorable since it makes the imported goods and services cheaper. All these studies focused on the effect of explanatory variables on the exchange rate in other countries; now is the time to study the effect of monetary policy on the exchange rate in Somalia.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Introduction

This is the third chapter of the study of the effectiveness of Somali monetary policy on currency value. The first section of the chapter provides the theoretical framework with a definition of the constructs of the study. The second section gives purchasing power theory, while the third section presents the description of the data, and the last section will present the model specification of the data

3.2 Theoretical Framework

3.2.1 Definition

The European Central Bank (2015) defines monetary policy as policy implications and decisions made by the European Central Banks (ECB) to have control over the cost and availability of money in the economies. The ECB helps to support general EU economic policies aiming at full employment and economic growth. These decisions substantially affect the decisions made by households or consumers as well as the decisions made by firms through their policies, either expansionary or contractionary. Central banks may also adopt non-standard monetary policy measures, such as asset purchase programs. What is true for the ECB is also true for overall central banks around the world.

An exchange rate is the price of a nation's currency relative to another currency. Thus, an exchange rate has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. In a direct quotation, the price of a unit of foreign currency is expressed in terms of the domestic currency. In an indirect quotation, the price of a unit of domestic

currency is expressed in terms of the foreign currency. Exchange rates are quoted as values against the US dollar. However, exchange rates can also be quoted against another nation's currency, which is known as a cross-currency or cross-rate (Exchange Rate, 2017).

Monetary policy, as one of the most prominent factors affecting the exchange rate, is the process by which the monetary authority of a country changes the money supply, often with the purpose of regulating interest rates and in order to reach economic goals. An increase in the money supply leads to higher demands for assets such as currencies, and, therefore, asset prices go up. The impact of monetary policies on the exchange rate is highly essential since the exchange rate is known as a channel in the direction of monetary shocks on the real sector of the economy (Dilmaghani, Tehranchian, 2015). The study will use Dilmaghani and Tehranchian (2015) as an operational definition for this relation between monetary policy and exchange rate.

3.2.2 Purchasing Power Theory

Purchasing power theory (PPP) is a straightforward theory that holds that the nominal exchange rate between two currencies should be equal to the ratio of aggregate price levels between the two countries, so that a unit of currency from one country will have the same purchasing power as one from a foreign country. The PPP theory has a long history in economics, dating back several centuries, but the specific terminology of purchasing power parity was introduced in the years after World War I during the international policy debate concerning the suitable level for nominal exchange rates among the major industrialized countries after the large-scale inflations during and after the war (Cassel, 1918).

Since then, the idea of PPP has become part of how many international economists think about the world. For example, Dornbusch and Krugman (1976) noted: “Under the skin of any international

economist lies a deep-seated belief in some variant of the PPP theory of the exchange rate" (Wang, 2014).

PPP, in other words, is the long-run notion of exchange rate determination, which holds that in the long run, one currency unit of one country must purchase the same amount of goods and services in another country(s), which means that the real exchange rate equals 1 (Cecchetti & Schoenholtz, 2015).

As Balassa (1964) concludes, there can be many reasons why deviations from PPP occur. Firstly, there may be restrictions on trade and capital movements or transfer pricing in a country that twist or ruin the relationship between home and foreign prices. Secondly, speculative activities and official intervention may cause a PPP disparity. Lastly, the productivity bias, when there is a relatively faster growth in productivity in the tradable sector than in the non-tradable sector, will cause a systematic divergence of internal prices.

The basic concept underlying PPP is that arbitrage forces will equalize the prices of goods internationally if they are measured in the same currency. Basically, there are two forms of PPP: absolute and relative (Yong & Ling, 2011). Purchasing power theory has been adopted by more than a few studies; these include Dornbusch (1979), Yong and Ling (2011), Edison, Gagnon, and Melick (1997), and Ala (2014).

3.2.2.1 Purchasing Power Theory and Quantity Theory of Money Equation

The purchasing power parity theory of the exchange rate is one of those empirical regularities that are sufficiently true over long periods of time to deserve our attention, but deviations from which are pronounced enough to make all the difference in the short run. Clearly, PPP is much like the

quantity theory of money and can indeed be viewed as the open economy extension of quantity theory thinking (Dornbusch, 1979).

Let M, P, V, and Y be the nominal quantity of money, the price level, velocity, and real income, respectively. Then the condition of monetary equilibrium can be written as:

$$\mathbf{M - V(r, Y) = Y} \ldots\ldots\ldots\ldots \textbf{(3.1)}$$

Our notation indicates that velocity may be a function of other variables, such as interest rates, r, and income, y.

We can rewrite equation **(3.1),** solving for the price level, as

$$\mathbf{p = v\ \frac{M}{Y}} \ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3.2)}$$

This states that for a given velocity, an increase in money leads to an equal and proportionate rise in the price level. A rise in velocity likewise raises the price level, while an increase in real income, by raising real money demand, would lower the equilibrium level of prices.

To go from here to a theory of the exchange rate, we draw on a strict version of PPP, which states that our price level is equal to foreign prices, P*, converted at the exchange rate, where E is the domestic currency price of foreign exchange

$$\mathbf{P = P * E} \ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3.3)}$$

Substituting **(3.2)** in **(3.1)** yields an expression for the equilibrium exchange rate:

$$\mathbf{E = \left(\frac{1}{P} *\right) V\ \frac{M}{Y}} \ldots\ldots\ldots\ldots\ldots \textbf{(3.4)}$$

The equilibrium exchange rate depends on nominal money, real output, and velocity. An increase in nominal money or in velocity will depreciate the exchange rate in the same proportion. A rise in real income will lead to appreciation.

The theory explains in this situation that domestic prices are fully flexible yet related to world prices by PPP. Given the nominal quantity of money, any variations in the demand for money must be offset by compensating changes in the level of prices and thus in the exchange rate. An increase in real money demand, because of an increase in real income, will be accommodated by a decline in the level of prices so as to raise the real value of the existing nominal money stock. With a decline in our prices, though, we are out of line with world prices and thus require an appreciation of the exchange rate.

To complete the theory, two extensions must be noted. First, there is symmetry in that the foreign price level, p*, is determined by foreign money demand and supply, so we can write **(3.2)** as:

$$\boldsymbol{E = \left(\frac{M}{M^*}\right)\left(\frac{M}{V^*}\right)\left(\frac{Y^*}{Y}\right)} \boldsymbol{\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.5)}$$

Clearly, then, what matters for exchange rate determination in this view is relative money supplies, velocities, and real incomes in the two countries.

Our exchange rate will depreciate if, other things equal, our nominal money stock rises relative to that abroad. The second extension is a specification of a velocity function. Here, the tradition has been to assume that velocity depends on real income and the alternative cost of holding money:

$$\boldsymbol{V = Y^{A-I}\exp(\theta r)} \boldsymbol{\ldots\ldots\ldots\ldots\ldots\ldots (3.6)}$$

'r' is the nominal interest rate. The functional form is a matter of expositional convenience and monetary tradition.

Substituting **(3.4)** in **(3.3)** and taking logs we obtain the standard equation of the "monetary approach":

$$\mathbf{e} = (\mathbf{m} - \mathbf{m}*) - \boldsymbol{\lambda}(\mathbf{y} - \mathbf{y}*) + \boldsymbol{\theta}(\mathbf{r} - \mathbf{r}*) \ldots\ldots\ldots\ldots \mathbf{(3.7)}$$

e, m, m* ,y, y* are logarithms of the corresponding capital letter variables, where 'e' stands for exchange rate, 'm' denotes money supply, while income is expressed by 'y' and 'r' is for interest rate.

In the final equation **(3.7)** shows that an increase in our relative money stock or a decline in our relative income will lead to depreciation, as would a rise in our relative interest rate. The last conclusion is particularly interesting since it certainly is the opposite of the conventional wisdom that a rise in interest rates will lead to appreciation. We note here the explanation: an increase in interest rates reduces the demand for real money balances. Given the nominal quantity of money, the price level has to rise to reduce the real money stock to lower the equilibrium level. With our prices thus getting out of line internationally, the solution will be depreciation to restore PPP.

3.3 Data Description

The source of the data study is world development indicators from the World Bank. The studied country is Somalia. Balanced time series data for 44 years ranging from 1970 to 2014 was analyzed

The dependent variable is the exchange rate, which is measured by the value of the Somali shilling in other currencies, especially the US dollar.

The study will employ four independent variables. The first is money supply (M1), which measures the quantity of supply in the economy. The second is the balance of trade, which is

measured by the current account and capital account. The third variable is foreign direct investment, which is measured by the net inflow.

3.4 Model Diagnosis hypothesis

Model Diagnosis Hypothesis Model diagnostics is a very important concept in econometrics and statistics. Since the model consists of regressors and residuals (the error term), we will consider the reliability of the residual by testing the presence of heteroskedascity, autocorrelation, and the absence of normality. So far, we have tested the presence of collinearity between the explanatory variables. The hypothesis of the study is that there is

No multicollinearity between the explanatory variables;

There is no autocorrelation between error terms;

The error term has no constant variance;

And the error term is normally distributed.

3.5 Model Specification

We will use the model developed by Dombusch (1979) at equation 3.7 to estimate the money supply effect on the exchange rate using the Ordinary Least Squares (OLS) estimator. We will modify the model by replacing existing variables and adding new ones. The values in the Dombusch model are that foreign values are deducted from domestic ones, and since we are only dealing with Somalia, we need no foreign variables to subtract them from domestic values. The basic model specification formula is:

$$\mathbf{E_t = \beta_\circ + \beta_1 (M)_t + \beta_2 (r)_t - \beta_3 (Y)_t + \varepsilon} \quad \textbf{..... (3.8)}$$

Since the selected country is Somalia, the interest rate is inactive because of religious prohibition. Therefore, it uses a zero-interest policy (Mohamud, 2015). For that reason, we expel it.

$$\mathbf{E_t} = \boldsymbol{\beta}_\circ + \boldsymbol{\beta_1}(\mathbf{M})_t - \boldsymbol{\beta_2}(\mathbf{Y})_t\boldsymbol{\varepsilon} \ldots\ldots \quad \mathbf{(3.9)}$$

As many researchers doubted the availability of Somali income levels by using per individual gross domestic product, or GDP per capita, as a proxy, we will incorporate our study into a more measurable and convenient variable than income (Y), and that is balance of trade (BoT). It is more interesting for our study to add this variable because Nor(2015) states that BoP is one of the variables that hugely contribute to the volatility of bilateral exchange rates in emerging economies. So, it's important to focus on it in the context of Somalia

$$\mathbf{E_t} = \boldsymbol{\beta}_\circ + \boldsymbol{\beta_1}(\mathbf{M})_t - \boldsymbol{\beta}_2(\mathbf{BoT})_t + \boldsymbol{\varepsilon} \ldots\ldots \quad \mathbf{(3.10)}$$

Somalia is a host of large sums of US dollars through the inflow and outflow of money through remittances, foreign aid, foreign direct investment, a hard currency of export, and any other way of doing business (Isak, 2017). Thereby, foreign direct investment (FDI) is also an essential variable for study to highlight its impact on the exchange rate. The complete econometric form of the model is given below.

$$\mathbf{E_t} = \boldsymbol{\beta}_\circ + \boldsymbol{\beta_1}(\mathbf{M})_t - \boldsymbol{\beta_2}(\mathbf{BoT})_t + \boldsymbol{\beta}_3(\mathbf{FDI})_t + \boldsymbol{\varepsilon} \ldots\ldots \quad \mathbf{(3.11)}$$

Where:

E= exchange rate

M= money supply

BoT= balance of trade

FDI= foreign direct investment

ε= error term

In Section two, we have seen the impact of these explanatory variables on the exchange rate. Yet, we want to expect these effects in context of Somalia. So, we expect that in Somalia, money supply and foreign direct investment are positively related to the exchange rate, while balance of trade is inversely related to the exchange rate.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This is the fourth chapter of the study of monetary policy's effect on currency value in Somalia. This chapter encompasses the most essential part of the study where the data is showed, diagnosed, analyzed, and interpreted.

4.2 Descriptive Statistics of the Variables

The table below describes the variables in the study measuring its mean, standard deviation and also the maximum and minimum values of the variables. Ex stands for exchange rate; BOT is for balance of trade. FDI is for foreign direct investment while MS symbolizes money supply

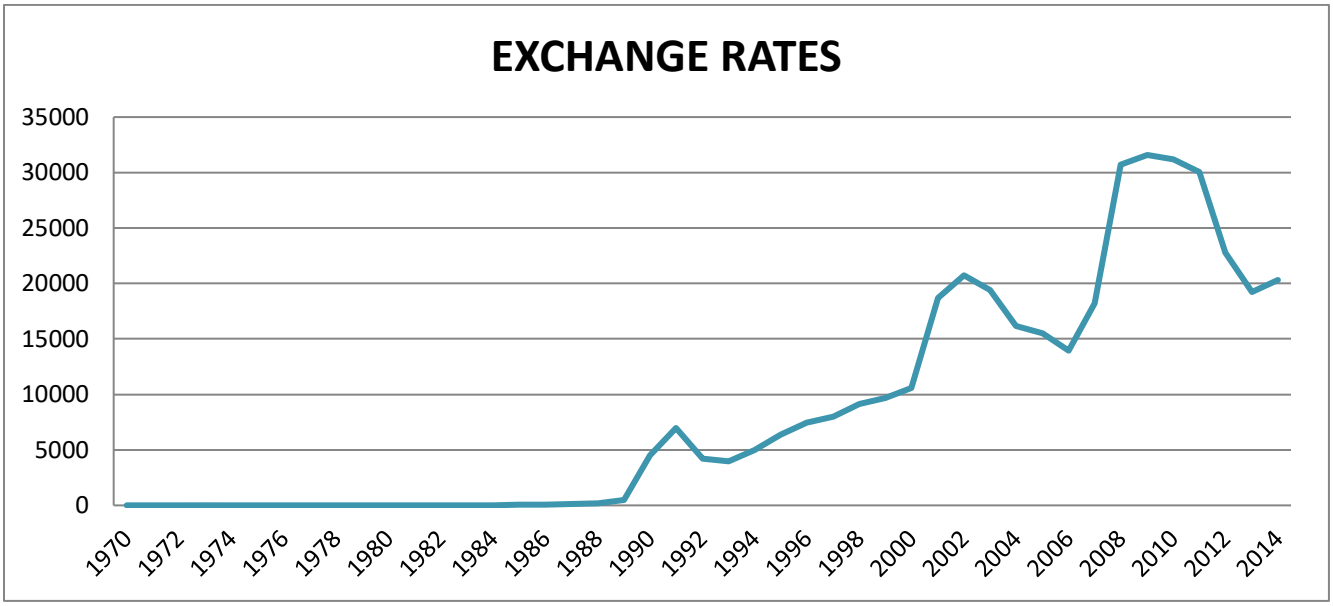
Table 4.1: Descriptive statistics of the variables (in millions of USD)

Variable	***Mean***	***Std. Dev.***	***Max***	***Min***
EX	*8566.70*	*10200.8*	*31585.42*	*6.2815*
FDI *(in millions)*	*27108667*	*42968832*	*1.41E+08*	*10000*
BOT *(in millions)*	*-52819778*	*44246756*	*-14670000*	*-1.95E+08*
MS *(in millions)*	*1.88E+11*	*2.04E+11*	*5.34E+11*	*3.90E+08*

The upper table summarizes the descriptive statistics of the response variable and the regressors. The dependent variable is exchange rate (EX), it has a mean value of (8566.70), standard deviation (std. dev.) (10200.8). The highest value of EX is (31585.42) while its least value is (6.2815).

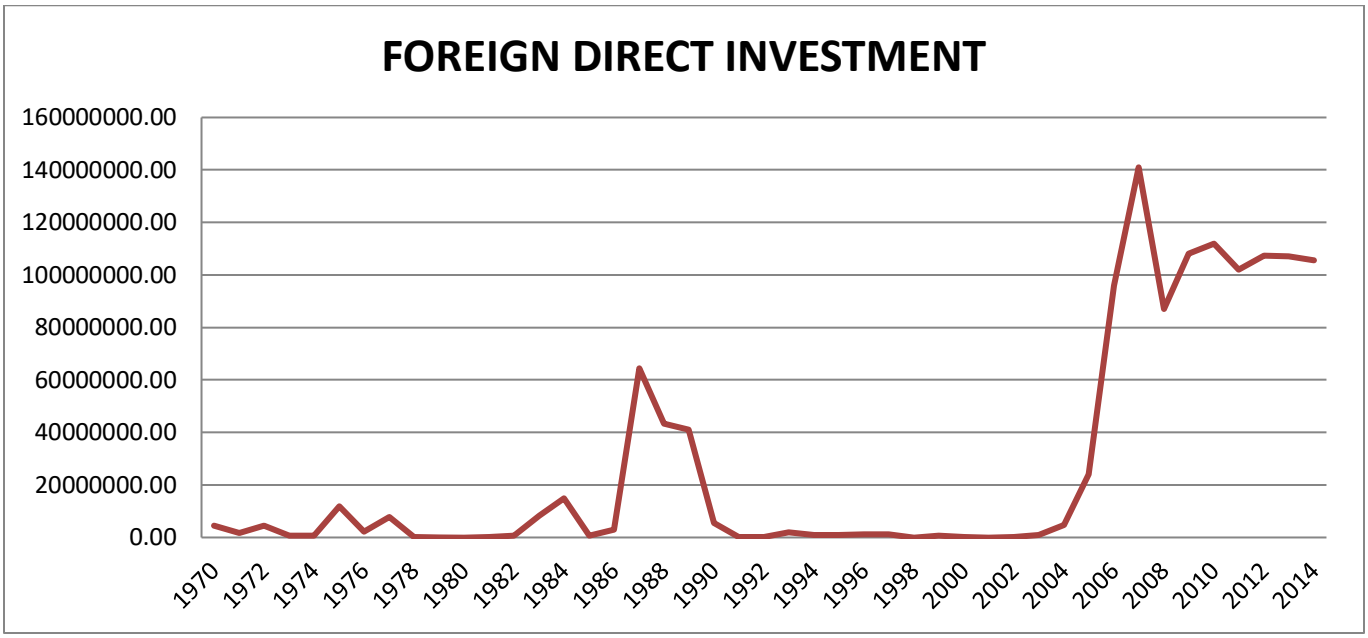
Foreign Direct Investment (FDI) has a mean value of (27108667) with std. dev of (42968832) and its highest value (1.41E+08) and lowest value (1000). Balance of Trade (BoT) has a mean value of (-52819778) with std. dev of (44246756) and its highest value (-14670000) and lowest value (-1.95E+08). Money Supply (MS**)** has a mean value of (1.88E+11) with std. dev of (2.04E+11) and its highest value (5.34E+11) and lowest value (3.90E+08).

Figure 4.1: Exchange rate trends



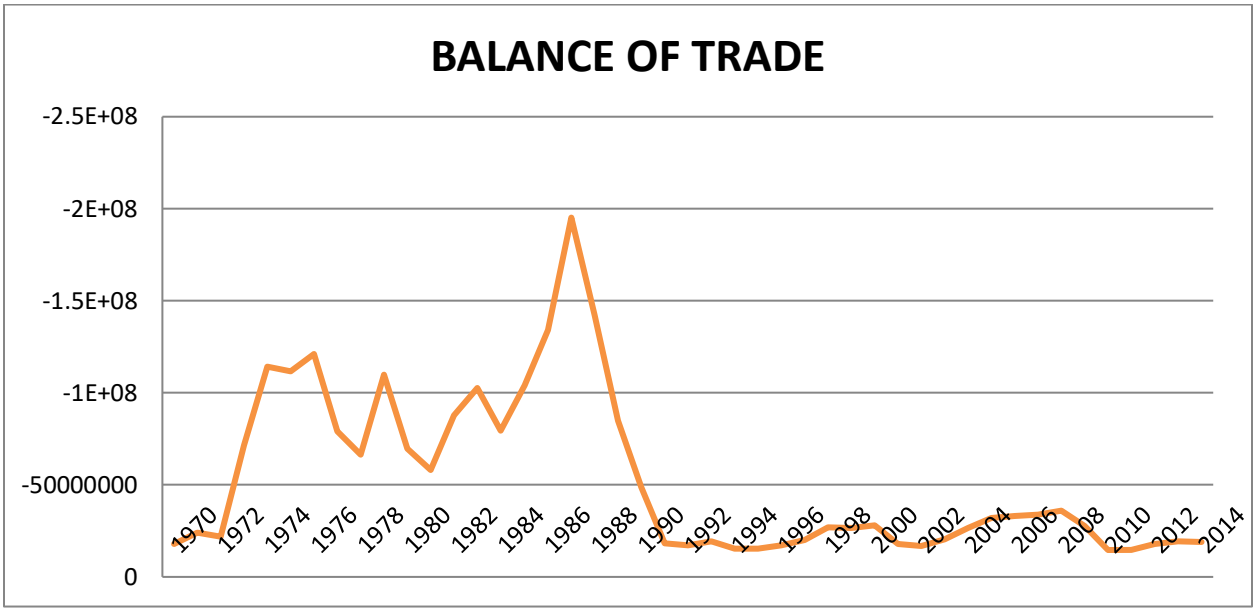
The exchange rate of Somali shillings (SOS) relative to United States dollars (USD) had a steady growth between the periods of 1970 and 1989 in this period the SOS dollar value was between (7.142) SOS to (490.674) SOS. In late 1980s the stabilization of the exchange rate had erode and begun to increase where it become (7000) in 1991 it dipped to (4200) in 1992 then it become to rise gradually until 2000 with value of (10600.5833) after this period it had had its ups and downs since 2009 where the exchange rate became (31585.41667).

Figure 4.2: Foreign Direct Investment



Unsurprisingly, the country's foreign inflow was low as the government at that time practiced the scientific socialism with command economy. The first decade and half the inflows were between (47000000) and (16830000000). In 1987 the inflows went up gradually until 2001 where the most remarkable peak of FDI happened this amounted to (5.344E+11). The reason behind this striking increase is that the confidence of investment has strengthened since a new government was built in Djibouti this colorful hope didn't last anymore as it lowered to (5.041E+11) in 2004. It's quite important to highlight that the decline in the FDI wasn't race to the bottom but gradual decrease and better than in 1970s and till the mid 1980s.

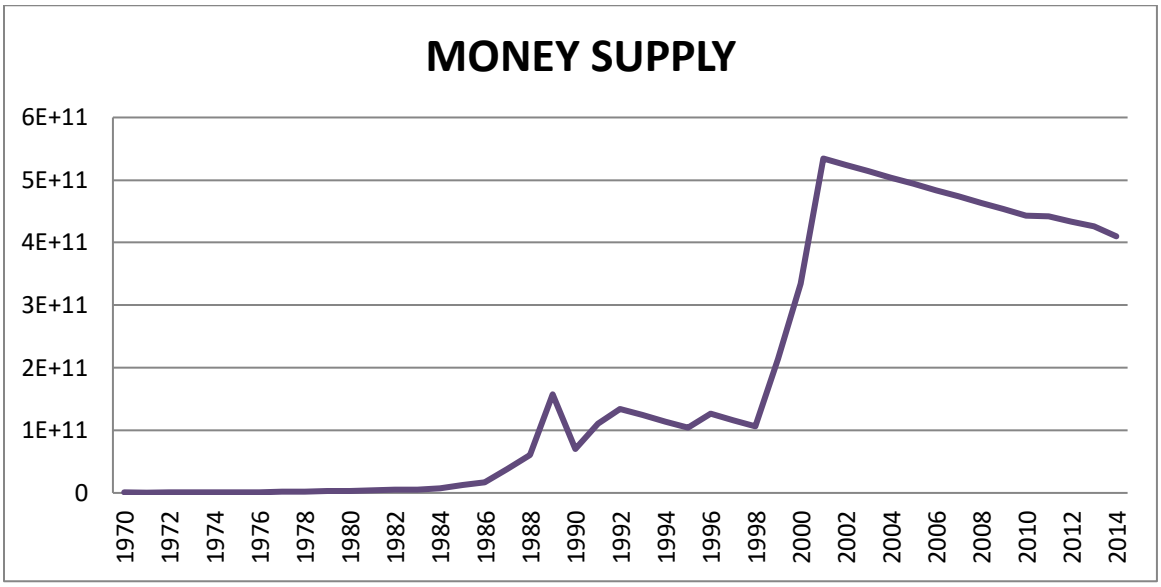
Figure 4.3: Balance of Trade



As the chart shows the country's balance of trade was never a surplus. So, we are going to discuss how deep we have been running in-deficit. In other words, what years we had a less deficit of balance is our concern. From 1970 to 1974 the country exported closely what it imported the deficit was about (-800000). From 1976 to 1985 the trade deficit balance had its ups and downs.

This fluctuation was about -1. After reaching the peak in 1988, the descending scene has begun for Somalia and that was when Saudi Arabia (Somalia's largest export market) stopped to import livestock. Right after that, the decline of the balance of trade increased this implied tremendous consumption of foreign produced goods and services. After the military government collapse in 1991 the decline from the peak resisted longer and the imports accelerated much higher than before. In 2007 and 2008 the gap between export and import increased to around (-4000).

Figure 4.4: Money Supply



The central government of Somalia maintained an amount of money supply throughout its time of governing. That period is spinning from 1970 to 1987, the central bank injected small amount until 1987 the supply increased from (3060000) to (64340000). The money supply dipped rapidly in 1990. Though the government fell down in 1991 the disputes in 1990 made the situation worse it continued until a great change occurred in 2007. STRATFOR (2008) reports that the transition government of Somalia has been printing counterfeit shillings in the city of Bossaso in the country's northern Puntland region after that the decline of money supply continued steadily.

4.3 Estimation of the Model

In this section, variables of the model are estimated employing the Ordinary Least Square (OLS) method to estimate the parameters of the study's linear regression. The model applied for the study is the Dombusch model. Results of the variables are explained below.

Table 4.2: Estimation of the Model Parameters

Dependent Variable: EX

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2799.856	1377.053	2.033224	0.0485
FDI	6.59E-05	1.66E-05	3.963686	0.0003
BOT	3.99E-05	1.55E-05	2.569616	0.0139
MS	3.23E-08	4.15E-09	7.787430	0.0000

These results show the effect of explanatory variables on exchange rate. Foreign direct investment is significant at 95% it has positive relationship with exchange rate so changing 1% in FDI will cause 659 million changes in exchange rate. Money supply also has a direct relationship with the Regressand which means 1% increase in the amount supplied of money leads to an increase of 323 million in exchange rate and significant at 5% level. likewise, Balance of trade is statistically significant at 5% level and enjoys the positive relationship with the controlled variable as the coefficient depicts 1% change in balance of trade will result in 399 million changes in exchange rate.

The fitness of model is assessed through R-squared. Our model we have 88%. This tells us that the 88% of the change in exchange rate is coming from the three independent variables employed in the study. The global test or joint significance is done by F-test. In our study F-test is statistically significant which indicates the validity of the joint relationship between the independent variables. Increase in money supply leads to increase in exchange rate our findings suit with this. Considering the balance of trade from theoretical perspective, trade balance surplus leads to increase in hard

currency towards the country this decreases the value of the currency which correspondingly increases the price of the currency; exchange rate. Thereby, the positive sign is economically convenient.

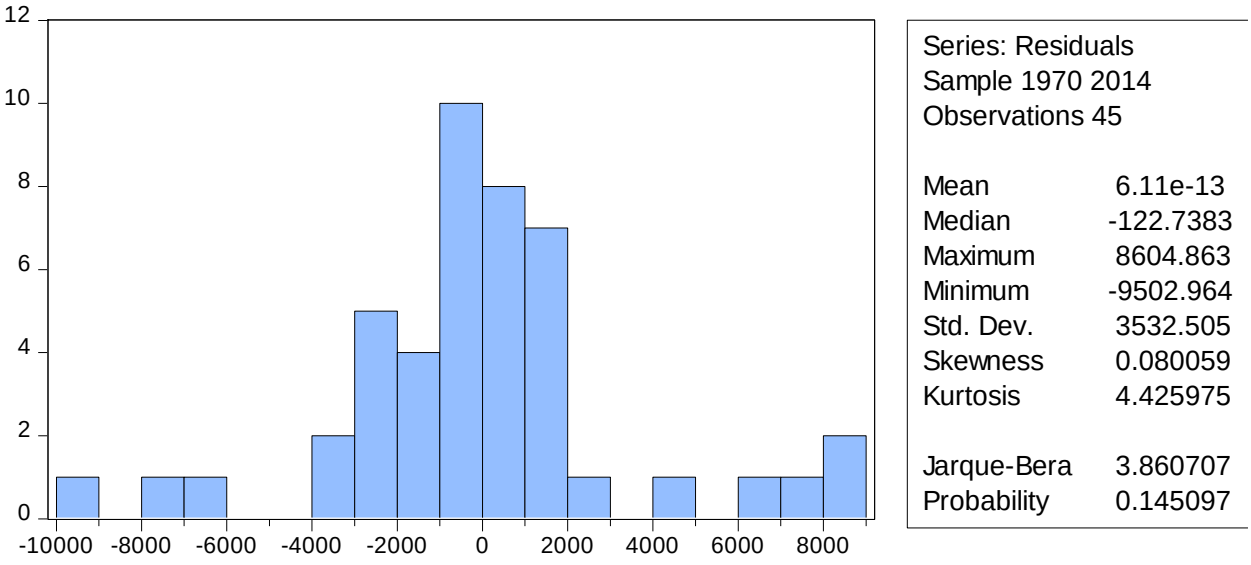
Foreign Direct Investment (FDI) is the last but not the least variable to assess. As we know higher foreign investment increases the inflow of foreign currency into the country the companies are highly willing to exchange their currency to the local currency for medium of exchange this skyrockets the demand of the money which means higher valued currency which depreciate the exchange rate. Another shocking observation is that, the shilling valuation didn't bring exchange rate devaluation instead we've got FDI as the largest influence variable with positive sign. The drive of not having negative effect is that our currency didn't appreciate in the first place because of the dollarization phenomenon.

4.4: Model Diagnostics Results

4.4.1 Normality Test

The **normal distribution** is a probability function that describes how the values of a variable are distributed. Normality test will be conducted to find out if the error terms are normally distributed with zero mean and constant variance. This is one of the assumptions of the classical linear regression model. The JargueBera test will be used to test for the normality in the time series variables used.

Figure 4.5: Normality test



We can see that our data is normally distributed with probability of 1.14%. This fails the rejection of the null hypothesis.

4.4.2 Multicollinearity

Multicollinearity is a state of very high inter-correlations or inter-associations among the independent variables. It is therefore a type of disturbance in the data, so its presence in the data makes the statistical inferences unreliable. I used correlation matrix to depict the interrelationship between the explanatory variables with the conditional limit of 75%.

Table 4.3: Correlation Test

Variables	FDI	BOT	MS
FDI	1		
BOT	0.1501461778329076	1	1

MS	0.597795647459867	0.55309833266	1

4.4.3 Hetroskedasticity Test

Hetroskedasticity exists when the error term has no constant variance. It is the opposite of Homoskedaticity or equal variance. In our study we used robust or White-Huber standard errors. So we didn't impose any assumptions on the structure of hetroskedasticity. Thereby we fail to reject the null hypothesis.

Table 4.4: Heteroskedasticity Test

Heteroskedasticity Test: White			
F-statistic	16.22041	Prob. F(9,35)	0.0000
Obs*R-squared	36.29756	Prob. Chi-Square(9)	0.0000

4.4.4 Autocorrelation Test

Autocorrelation, also known as serial correlation, is the correlation of a signal with a delayed copy of itself as a function of delay. Informally, it is the similarity between observations as a function of the time lag between them. With the help of Breusch-Godfrey Serial Correlation LM Test our model has no autocorrelation problem.

Table 4.5: Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.031636	Prob. F(26,15)	0.0142
Obs*R-squared	37.80557	Prob. Chi-Square(26)	0.0631

CHAPTER FIVE

CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

This is the fifth chapter of our study. It summarizes the most prominent results and findings, also provides policy implication to the interested and concerned groups.

5.2 Conclusion

This paper was studying how the monetary policy of Somalia affects exchange rate. Purchasing power theory and quantity theory of money was considered under the Dombusch model. Data from World Bank was used. EViews9 program was utilized and illustrated that there is positive and significant relationship between money supply which was used as an instrument of monetary policy and exchange rate. Other independent variables also affect positively to exchange rate these are foreign direct investment, balance of trade.

5.3 Policy Implication

First, for the Central Bank of Somalia (CBS)**:** since money supply is significant to effect exchange rate, urgent solution for dollarization is required to increase export.

Second, for the (CBS)**:** as foreign direct investment has major role in exchange determination in the country, facilitating rules and regulations that attract this flow is in-demand.

Third, for the Somali government: there's another inflow of money other than foreigners' and that is through remittance services this huge flow should be taken into account.

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Appendences

APPENDIX A

List of Tables

Table 4.1: Descriptive statistics of the variables

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(*in millions)*				
FDI	*27108667*	*42968832*	*1.41E+08*	*10000*
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2799.856	1377.053	2.033224	0.0485
FDI	6.59E-05	1.66E-05	3.963686	0.0003
BOT	3.99E-05	1.55E-05	2.569616	0.0139
MS	3.23E-08	4.15E-09	7.787430	0.0000

Table 4.3: Correlation Matrix

Variables	FDI	BOT	MS
FDI	1		
BOT	0.1501461778329076	1	
MS	0.597795647459867	0.55309833266	1

Table4.4: Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	16.22041	Prob. F(9,35)	0.0000
Obs*R-squared	36.29756	Prob. Chi-Square(9)	0.0000
Scaled explained SS	51.61481	Prob. Chi-Square(9)	0.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/05/19 Time: 14:51

Sample: 1970 2014

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3501725.	9785034.	0.357865	0.7226

FDI^2	-7.10E-09	2.45E-09	-2.897046	0.0065
FDI*BOT	-7.93E-09	4.39E-09	-1.805803	0.0796
FDI*MS	4.53E-12	1.10E-12	4.115386	0.0002
FDI	-1.034714	0.448315	-2.308005	0.0270
BOT^2	-1.30E-09	1.87E-09	-0.693894	0.4923
BOT*MS	-1.77E-12	1.45E-12	-1.221082	0.2302
BOT	-0.117592	0.279416	-0.420847	0.6764
MS^2	-1.30E-17	1.11E-16	-0.116259	0.9081
MS	-4.68E-05	8.35E-05	-0.560688	0.5786

R-squared	0.806612	Mean dependent var	12201287
Adjusted R-squared	0.756884	S.D. dependent var	22839032
S.E. of regression	11261191	Akaike info criterion	35.50475
Sum squared resid	4.44E+15	Schwarz criterion	35.90623
Log likelihood	-788.8569	Hannan-Quinn criter.	35.65442
F-statistic	16.22041	Durbin-Watson stat	1.662308
Prob(F-statistic)	0.000000		

Table 4.5: Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.031636	Prob. F(26,15)	0.0142
Obs*R-squared	37.80557	Prob. Chi-Square(26)	0.0631

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/05/19 Time: 15:01

Sample: 1970 2014

Included observations: 45

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3492.420	1572.566	-2.220842	0.0422
FDI	-4.16E-05	2.91E-05	-1.429413	0.1734
BOT	-1.50E-05	1.62E-05	-0.927490	0.3684
MS	1.03E-09	4.72E-09	0.219218	0.8294
RESID(-1)	0.035248	0.258202	0.136513	0.8932
RESID(-2)	-0.421646	0.285415	-1.477310	0.1603
RESID(-3)	-0.285911	0.280722	-1.018485	0.3246
RESID(-4)	-0.731117	0.356461	-2.051044	0.0582
RESID(-5)	-0.742122	0.410092	-1.809648	0.0904
RESID(-6)	-1.089352	0.424222	-2.567883	0.0214
RESID(-7)	-0.941785	0.509533	-1.848330	0.0844
RESID(-8)	-0.865527	0.495894	-1.745387	0.1014
RESID(-9)	-1.373855	0.494117	-2.780424	0.0140

RESID(-10)	-1.131825	0.574678	-1.969492	0.0677
RESID(-11)	-0.699821	0.587673	-1.190834	0.2522
RESID(-12)	-1.001900	0.603483	-1.660197	0.1176
RESID(-13)	-1.072275	0.603672	-1.776255	0.0960
RESID(-14)	-0.858283	0.643912	-1.332920	0.2025
RESID(-15)	-1.454144	0.629576	-2.309719	0.0355
RESID(-16)	-1.264836	0.708413	-1.785450	0.0944
RESID(-17)	-0.564176	0.731027	-0.771759	0.4522
RESID(-18)	-0.913254	0.710644	-1.285109	0.2182
RESID(-19)	-1.803804	0.642476	-2.807582	0.0133
RESID(-20)	-1.029061	0.779794	-1.319659	0.2067
RESID(-21)	-1.307965	0.723944	-1.806721	0.0909
RESID(-22)	-1.122751	0.936943	-1.198313	0.2494
RESID(-23)	-0.372208	0.722273	-0.515329	0.6138
RESID(-24)	-0.117416	0.687515	-0.170783	0.8667
RESID(-25)	-1.207597	0.830546	-1.453981	0.1666
RESID(-26)	-0.066008	1.236974	-0.053362	0.9581

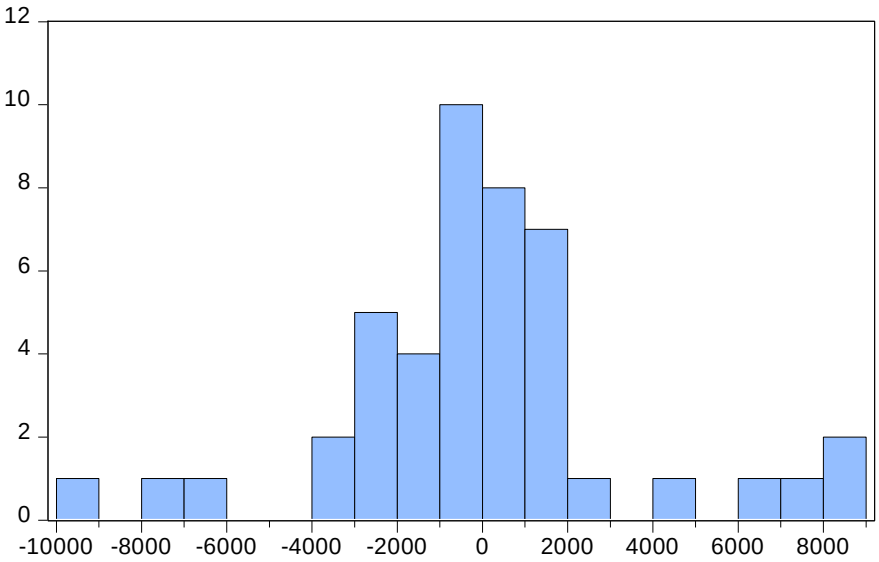
R-squared	0.840124	Mean dependent var	6.11E-13
Adjusted R-squared	0.531030	S.D. dependent var	3532.505
S.E. of regression	2419.109	Akaike info criterion	18.65491
Sum squared resid	87781351	Schwarz criterion	19.85935
Log likelihood	-389.7354	Hannan-Quinn criter.	19.10391
F-statistic	2.718018	Durbin-Watson stat	1.605531

Prob(F-statistic) 0.022380

APPENDIX B

List of Figures

Table 4.1: Normality Test



Series: Residuals	
Sample 1970 2014	
Observations 45	
Mean	6.11e-13
Median	-122.7383
Maximum	8604.863
Minimum	-9502.964
Std. Dev.	3532.505
Skewness	0.080059
Kurtosis	4.425975
Jarque-Bera	3.860707
Probability	0.145097

Figure 4.2: Exchange rate

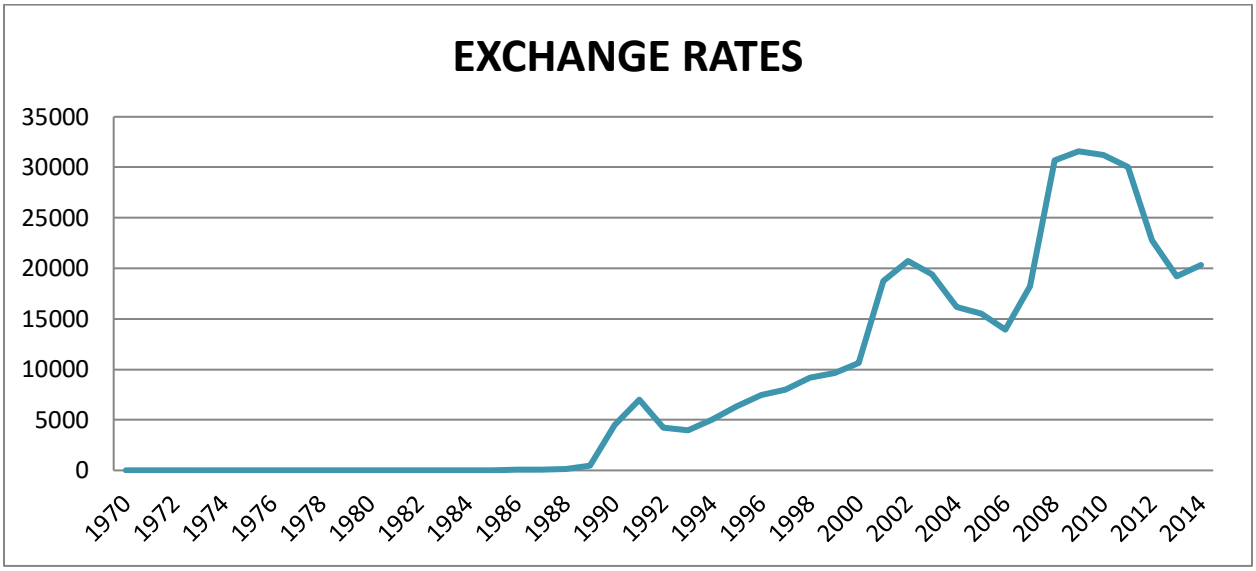


Figure 4.3: Foreign Direct Investment

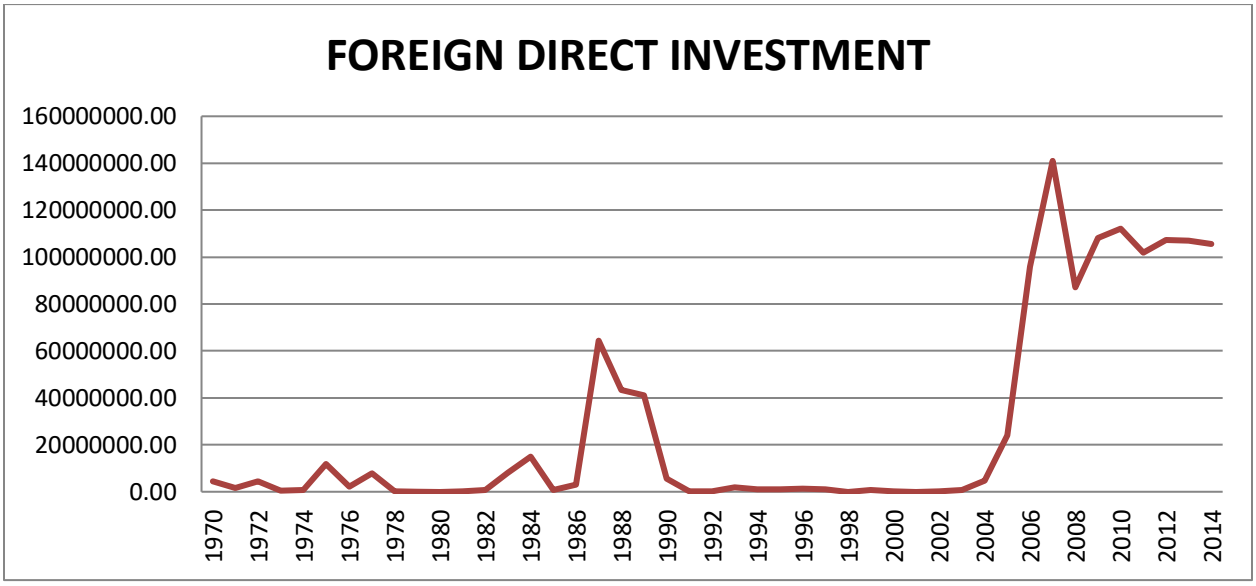


Figure 4.4: Balance of Trade

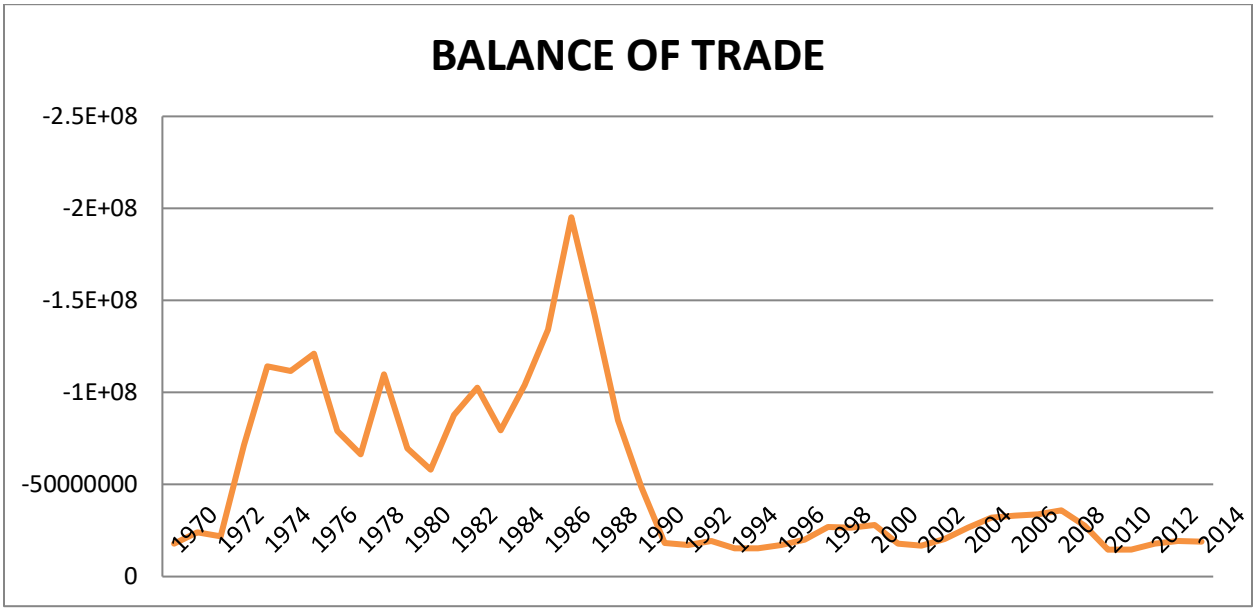
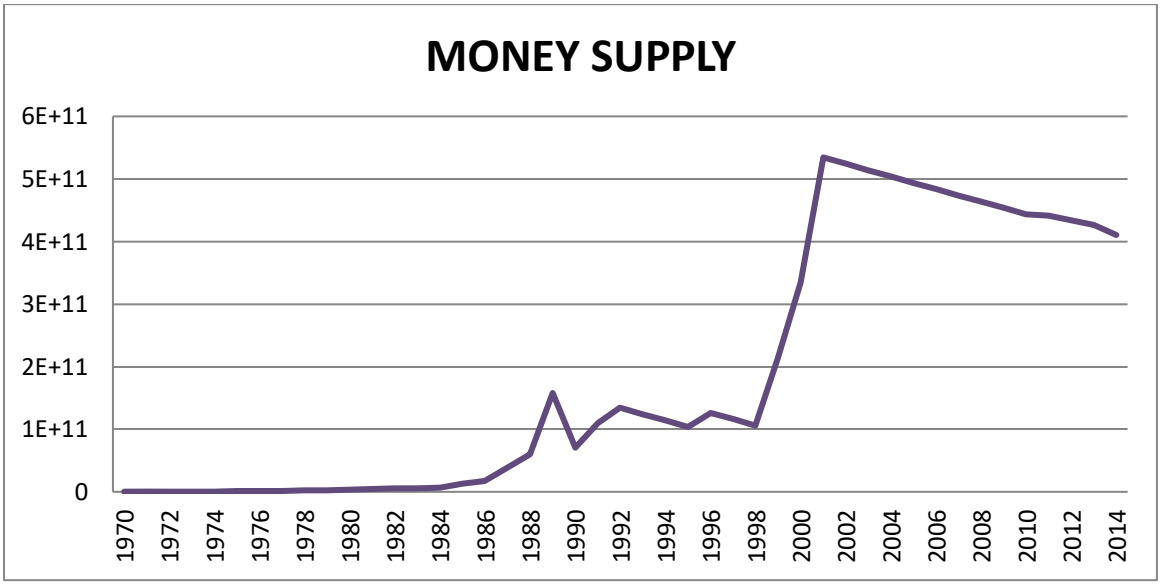


Figure 4.5: Money Supply



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