

Factors Determine Exchange Rate Volatility of Somalia

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Abstract

The exchange rate is a very important macro variable that has influence on the whole economy and has, therefore, been the topic of many discussions amongst policymakers, academics and other economic agents. The issue of whether to have a fixed, pegged or floating exchange rate regime was highly debated during the 1970s. The purpose of this paper is to investigate what factors determine the exchange rate in Somalia. Quantitative research methodology has been employed to develop regression model using time series data for the period of 12 years. The regression model has been developed based on Quantity theory of money, purchasing power parity and uncovered interest rate parity theory. Somalia is on the countries where the highest exchange rate volatility exists; for example in 2012, the rate jumped 29% percent and two week later dropped 21%, when Turkish humanitarian aid agencies injected the market a lot of U.S dollar. Based on my study using regression model for time series data of 12 years, the four factors are mainly attributable for the exchange rate volatility of Somalia; these factors include the balance of payment, inflation rate, money supply (mostly come from remittance and NGOs) and Bank profits.

Keywords: Exchange Rate Volatility, Purchasing Power Parity, Somalia.

1. Introduction

The exchange rate is a very important macro variable that has influence on the whole economy and has therefore been the topic of many discussions amongst policymakers, academics and other economic agents. The issue of whether to have a fixed, pegged or floating exchange rate regime was highly debated during the 1970s. The discussion is still very important since countries today again stand before the choice of which exchange rate regime to adopt.

Somalia was officially adopted fixed exchange rate in 1976, where the Somali shilling is pegged with Italian lira, because Somalia was colonized by Italy; at that time 1 Lira was pegged to 8 Somali shilling. The central bank of Somalia had the ability to intervene the market and also settle the policies of financial markets. But 1991 brigade militia took the control of the country from the hands of the government after long fighting, after that time, Somalia didn't get strong government who can mandate the market and the fixed exchange rate shifted to flexible exchange rate automatically (Leeson, 2007).

In Somalia hundreds of vendors deal in currency transactions, setting daily the exchange rate on the basis of localized contingent factors, but the exchange rate is extremely volatile, for example last year 2013 the average fluctuation of the exchange rate per day was estimated by 12% decrease or increase. Remittances have constituted the major source of foreign exchange earnings for the last ten years. The flow of remittances to and from abroad therefore significantly affects the exchange rate in Somalia. (Farah, 2009).

The value of the Somali shilling before the collapse of Somali central government in 1991 seemed stronger because of the administration that being interfered the exchange market. Fixed exchange rate was adapted during that period, and the government has the power to balance the market using physical policy (Leeson, 2007). This paper examines what factors determine the fluctuation of the exchange rate of Somalia, more specifically we will focus on factors that is very specific to Somalia and exchange rate between US dollar and Somalia shilling, because approximately 80% of foreign exchange market of Somalia is traded by US dollar.

Objectives

- To examine what factors determine exchange rate volatility of Somalia
- To explain the magnitude effect of these factors on the exchange rate
- To suggest the possible remedies of Somalia exchange rate problems

Importance of the paper

The determination of exchange rate volatility is an important issue for both policymakers and economic agents involved in the financial market. Foreign investors and multinational firms use volatility models in their estimation of risks associated with exchange rate as well as the inputs when they evaluate prices. The policymakers on the other hand use the information about how the factors impact the exchange rate volatility so that the most appropriate policy can be conducted.

2. Literature Review

The exchange rate is simply the price of one country's currency expressed in another country's currency. In other words, the rate at which one currency can be exchanged for another. For example, the exchange rate between the U.S. dollar and Somali Shilling is $US\$1 = 18,000 \text{ SoSh}$.

2.1. Factors determine exchange rate volatility a literature survey

There are many factors contributing to real exchange rate misalignment. Among these main factors are; the level of output, inflation, the openness of an economy, interest rates, domestic and foreign money supply, the exchange rate regime and central bank independence. Although the degree of the impact of each of these factors varies and depends on a particular country's economic condition. Thus, the countries that are in the transitions process (such as Somalia) are more vulnerable to being affected by these factors, (Somalia doesn't use interest rate it's religiously prohibited) which in its turn will affect the monetary policy decisions (Reis & Paz, 2005).

2.2. The effect of the exchange rate volatility on the trade

A broad and comprehensive review of the literature on the relationship between real exchange rate volatility and trade shows that there are theoretical models that postulate both positive and negative effects of the exchange rate volatility on trade. (Bah & Amusi, 2003), (Azaikpono, 2005) and (Todani & Munyama, 2005) examined the effect of real exchange rate variability exerts a significant and negative impact on the trade both in the long and short-run. The similar study by (Azaikpono, 2005) extends the work of (Bah and Amusa, 2003) over the period by employing autoregressive conditional heterokedasticity method proposed by Nelson 1991 as a measure of variability of exchange rate; the result of the latter boil down to those reached by the former.

2.3. Exchange rate volatility and interest rate

It is conventional in macroeconomics to see the interest rate as the price of money and to consider it in the context of the supply of and demand for money. Here, however, we consider the interest rate alongside the exchange rate. The reason for this is that because capital can move freely into and out of the each country. Ling, Zekai & Wef, (2007) explained the linkage between exchange rate and interest rate; he argued that interest rate has negative relationship with exchange rate. For example if countries want more US bonds. The foreign demand for USD increases and so the nominal exchange rate falls (appreciates) making USD more expensive to buy on forex. This appreciation occurs to offset the increased demand in USD.

2.4. Exchange rate and inflation

The relationship between inflation targeting regime and exchange rate regime has led some analysts to conclude that one of the costs of inflation targeting adoption is the increase in exchange rate volatility. Yet, some studies show that the adoption of a free-floating exchange rate does not necessarily implies more effective of nominal and real exchange rate floating. (Baba, Engle, Kraft, & Kroner, 2009) argued that inflation targeting would lead to higher exchange rate volatility. (Mohd, 2012) find that the lack of credibility of monetary authority may lead to exchange rate volatility problem.

2.5. Exchange rate and money speculation

A strong correlation seems to exist between trading volume and price volatility in major currency markets (Baillie & Bollerslev, 2003). Evidence for such a correlation is also abundant for major equity and bond markets (Osler, 1998). Many observers would argue that the high trading volume reflects high speculative activity which, in turn, induces the high price volatility. In fact, over 90 percent of foreign exchange market participants in Japan, Hong Kong, and Singapore believe that speculation increases volatility (Cheung & Chinn, 2001). Others claimed that rational speculation must reduce exchange rate volatility.

3. Methodology

The purpose of this study was to examine what factors determine exchange rate of Somalia. Regression model was developed using theoretical frame work from the literate in order to predict exchange rate knowing the independent variables. Time series data of 12 years from 2000 up to 2012 was used; references and details of the data were explained in data source section.

Money demand model can be applied to the Keynesian money supply equation taking purchasing power parity (ppp) and uncovered interest rate parity (UIP) that can be expressed as:

$$m_t - p_t = \eta i_{t+1} + \phi y_t$$

Where m is nominal money at time t, p is price index at time t, η is elastic demand adjusted to the expected inflation. i_{t+1} is the nominal interest rate where y_t is real GDP. It assumed that interest disparity between the countries is the result of the currency movement so it specified as:

$$i_{t+1} = i_{t+1}^* + E_t e_{t+1} - e_t$$

Where i_{t+1}^* stands for international interest rate and $E_t e_{t+1}$ is difference between the exchange rates. Purchasing power parity is assumed and calculated by substituting i_{t+1} to $e = \frac{p}{p^*}$

$$(m_t + \phi y_t + \eta i_{t+1} - p_t) - e_t = -\eta(E_t e_{t+1} - e_t)$$

So we solve exchange rate assuming both PPP and UIP

$$e_t = \frac{1}{1 + \eta} (m_t + \phi y_t + \eta i_{t+1} - p_t) + \frac{\eta}{1 + \eta} e_{t+1}$$

So $e_t = \beta m_t + \phi y_t + \eta i_t - p_t + \varepsilon$

Equation stated that exchange rate is positively related to the money supply and negatively related to the GDP based on the economic theory of that Production increase, rises money demand and domestic prices go down to reach real balance hence domestic currency gains value.

Model

Balance of the Payment, Remittance and NGOs, Inflation, and Bank profit rate
Model is specified as follows

$$e_t = \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_\eta \ln \eta + \beta_\pi \ln \pi + \varepsilon$$

Where e_t the expected value of the exchange rate and t is time, BP Balance of the payment and RN is the remittance and NGOs factors, η in the inflation rate, $\ln \pi$ is bank profit rate as proxy of the interest rate. ε is random error.

Assumptions of the model

1. Zero conditional mean.
2. No perfect co linearity.
3. Linear relationship between the dependent variable and independent variables.
4. Variables are normally distributed.

Hypothesis

$$H_0: \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_\eta \ln \eta + \beta_\pi \ln \pi = 0$$

$$H_1: \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_\eta \ln \eta + \beta_\pi \ln \pi \neq 0$$

- A small p-value (typically ≤ 0.05) indicates strong evidence against the null hypothesis, so reject the null hypothesis.
- A large p-value (> 0.05) indicates weak evidence against the null hypothesis, so you fail to reject the null hypothesis.

4. Conclusion

The regression output from EViews data analysis program is shown table 4.1, the estimated regression model was; $e_t = \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_{\eta} \ln \eta + \beta_{\pi} \ln \pi + \varepsilon$. This can be written as: $e_t = 0.08 - 0.792(bp) + 0.69(RN) + 0.371(\eta) + 0.677(\pi)$. Where BP is balance of payment, RN is remittance and NGOs money supply, η is bank profit, and π is inflation rate.

Table 1: Regression Model Results

Variables	Coefficient	Std. error	Pro.	R square	P-value
C	8.02	269907	0.019		
Log (BP)	-79.28	5637	0.028		
Log (P)	37.13	19847	0.041		
Log (Inf)	67.72	4732	0.018		
Log (RN)	69.01	14513	0.013		
				0.8161	0.027

The coefficients of each independent variable represent an estimate of the average change in the dependent variable for one unit change in the independent variable, holding all other independent variables constant. The correlation coefficient between the exchange rate and the balance of payment is -79%. This means that all other things being constant, 79% change of exchange rate is explained or caused by balance of payment; this correlation coefficient explains that exchange rate and balance of payment have significant negative relationship as I explained in chapter two; Somalia has been deficit balance for the all 12 years data for this study.

Bank profits here is the proxy of interest rate because Somalia doesn't use interest rate it is religious prohibited and they are 100% Muslim society. Instead they use bank profit that works as interest rate in the market system to influence the determination of money supply and demand; in Somalia bank profit has a positive relationship to the exchange rate; 1 level increase of bank profits will cause exchange rate to increase 0.37 keeping all other things constant.

On the other hand inflation rate and exchange rate have significant positive relationship that is 67%. Holding other things constant; 1 level change of inflation will cause 0.67 change of exchange rate. Let us look how consumer price index has been changed during a period of 5 years.

Table 2: good predictor of exchange rate

Item	2006 (So.Sh/1kg)	2011 (So.Sh/1kg)	Variance (%)
Sugar	10,000	55,000	450%
Flour	6,000	31,000	417%
Rice	8,000	42,000	425%
Spaghetti	9,000	34,000	278%
Cooking oil	3,000	47,000	1579%
Maize	5,000	11,000	120%
Sorghum	4,000	9,000	125%

The other factor that the model has been included as a good predictor of exchange rate is the remittances and non-governmental organizations money supplies, as discussed below remittance companies supply millions of dollars to

Somalia; this money comes from Somalia Diaspora all over the world. It has been estimated that remittance company supply \$400 million each year to Somalia; they don't give the customers Somali shilling instead they give U.S dollar that means they increase the supply of U.S dollar, the Somalia shilling is appreciated at that time and the exchange rate decreases.

Likewise non-governmental organization supply large amount of US dollar each year in order to facilitate or conduct humanitarian aid inside Somalia. Remittances and NGOs represent crucial part of Somalia money supply and they positively correlated to the exchange rate that is 69%. According to the report of united nation of development programs (NDP) report of 2013 non-governmental organization inject Somalia approximately \$140 million each year.

Coefficient of determination

$R^2 = \frac{\text{sum squares of regression}}{\text{total sum of squares}} = \frac{SSR}{SST}$ The actual calculations are done by using EVIEWS software. As shown in Table 4.1 R^2 is 0.8161 that means, more than 81% of the variation of the exchange rate can be explained by linear relationship of the four independent variables. All independent variable are equally important to the model's ability to explain this variation.

Modal significant

The model was constructed based on sample data and might subject to we need to test the statistical significance of the overall regression model. We have developed our hypothesis as follows:

$$H_0: \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_{\eta} \ln \eta + \beta_{\pi} \ln \pi = 0$$

$$H_1: \beta_0 + \beta_{bp} \ln BP + \beta_{RN} \ln RN + \beta_{\eta} \ln \eta + \beta_{\pi} \ln \pi \neq 0$$

If the null hypothesis is true and all the slope coefficients are simultaneously equal to zero, the overall regression model is not useful for predictive or descriptive purpose. P-value is used to test the significant of the model, if the p-value is greater than the significant level (α) of 0.05 the null hypothesis will not reject, that means all slope coefficient is zero. Table 4.1 is shown that p-value is 0.02731 this p-value is less than the significant value of 0.05, therefore the null hypothesis is reject and alternative hypothesis is accepted. It is concluded that the relationship between exchange rate and the independent variables are statistically significant.

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