THE IMPACT OF EXCHANGE RATE VOLATILITY ON TRADE BALANCE: EMPIRICAL EVIDENCE FROM UGANDA: 1990-2015

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Abstract - The study seeks to analyze the extent to which exchange rate volatility has impacted the trade balance in Uganda, a regression model and a granger causality test were applied on annual data for the period 1990 to 2015, extensive literature was reviewed in line with the topic under study. The results revealed that exchange rate volatility negatively impacts Uganda's trade balance, however this impact was not statistically significant. At the same time, Trade Balance was found to be positively correlated with exchange rate volatility. Additionally, exchange rate did not granger cause trade balance going by the Granger causality test. This is consistent with the fact that even though the country has experienced preponderant currency depreciation year in year out, it has not resulted into an improvement in the country's trade balance.The results may be linked to inadequate infrastructure, poor policy framework and implementation, in the midst of which exchange rate depreciation has been constrained in achieving the set goals. The study therefore recommends that measures geared towards improving the real sector will help enhance exports whilst cutting down non-productive and unprocessed imports. Exchange rate stability should therefore be stimulated through attracting foreign private investments as well as implementing well-coordinated macroeconomic policies that impact inflation positively.

Index Terms - Currency Depreciation, Exchange Rate, Trade Balance, Volatility

I. INTRODUCTION

The evolution of the exchange rate policy in Uganda can be traced back to the 1970s, when the official exchange rate with the US dollar was held close to the original rate at which the East African shilling had been fixed, which the Uganda shilling inherited in 1966 after the dissolution of the East African Currency Board. (Opolot and Anguyo, 2007).

Economic mismanagement of the 1970s and 1980s led to the emergence of a parallel foreign exchange market. By 1981, the price of foreign currency in the parallel market was over 10 times higher than the official exchange rate (Atingi-Ego and Sebudde 2003). This led to an adjustment program to correct the prevailing exchange rate distortion hence a massive devaluation of the shilling in July 1982.

The policy objective was to eliminate the overvaluation of the Uganda Shilling and to establish a unified market based rate that would provide a uniform price, which would promote efficiency in allocation of resources, growth and development. (Kihangire, 1994).

In October 1989, a crawling peg was introduced. As a result, the nominal exchange rate was adjusted on a monthly basis. Legalization of the parallel market by licensing foreign exchange bureaux was implemented in 1990 where bureaux were permitted to conduct spot transactions at freely determined exchange rates and to satisfy most private sector demand for foreign exchange to finance visible and invisible payments. This was in a bid to address popular concern about capital flight hence creation of a market based foreign exchange system which aimed at increasing the efficiency of the foreign exchange allocation processes and at the encouragement of foreign capital flows through an open and competitive exchange rate payments system. Whereas exchange rates were market determined, the foreign exchange market remained segmented. In order to eliminate the segmented nature of the foreign exchange market and to bring about convergence of the exchange rates, an inter-bank foreign exchange market system was introduced in November 1993. (Opolot & Anguyo, 2007).

On April 1994, the government accepted the obligations of Article VIII, Sections 2, 3 and 4 of the International Monetary Fund's Articles of Agreement, expressing its commitment to a free and open exchange rate system. The floating exchange rate system has, nonetheless, presented certain difficulties for the country. First, it has heightened the risk of exchange rate volatility, which is synonymous with the flexible exchange rate system. The adoption of a flexible exchange rate system meant the loss of the exchange rate as a nominal anchor for domestic prices which has exposed the economy to external shocks arising from exchange rate volatility.

This has negatively impacted on international trade flows, foreign investors have perceived exchange rate volatility as risky to their investments and hence flee from assets which they perceive as risky and invest in "safer" assets like US treasury bonds or gold.

As a result, least developing countries like Uganda tend to draw very low amounts of short term portfolio capital from abroad as a result of capital flight which puts further pressure on the exchange rate to

depreciate thereby creating uncertainty to macroeconomic policy, international trade flows and investment decisions.

Additionally, the country's exports have increased at a slower pace hence off-setting the imports expenditure bill. The widening unfavorable trade balance has been majorly on account of continued exportation of unprocessed agricultural products which form the bulk of Uganda's exports. The deteriorating trade balance in Uganda has affected economic growth, employment and price stability hence justifying the case for considering trade balance equilibrium an important objective of economic policy.

Despite the growth in literature tackling the topic of the relationship between exchange rate volatility and trade balance, the empirical evidence has remained ambiguous. Some scholars argue that, exchange rate volatility leads to a decrease in trade flow because most transactions are effected in the international currencies, hence discrepancy in the exchange rate unfavorably affecting competitiveness of exports and profitability of the exporters.

Conversely, Verena and Nawsheer (2011) stipulate that exchange rate volatility has a positive and significant short run effect on exports. These conflicting empirical evidence therefore renders the debate on the impact of exchange rate volatility on trade balance inconclusive. This research paper therefore sought to construct such understanding through an extensive review of the literature and an empirical analysis of the result.

II. LITERATURE REVIEW

Despite advances in econometric methodology for estimation, the impact of exchange rate volatility on trade balance has remained ambiguous. Whereas some studies have found a contractionary effect of depreciation of exchange rate on domestic output which consequently impacts the trade balance position, others find expansionary effects of exchange rate depreciation on output.

In the context of Sub-Saharan African countries, Adubi and Okunmadewa (1999); Atingi-Ego and Sebudde (2004); Kihangire (2004) and Musonda, (2008) provide empirical evidence of the impact of exchange rate volatility and over valuation of exchange rate on export performance. These studies provide evidence of a negative relationship between exchange rate volatility and export flows.

Arize, Osang and Slottie (2000) used a Johansen's multivariate procedure for long-run and error correction model to analyze the short-run dynamics to investigate real exchange rate volatility on the exports of 13 less developed countries with quarterly data series for the period 1973-1996.Their study reveals a significant negative impact of volatility on trade flows.

Calderon (2004) investigates the issue of trade openness in a sample containing 79 countries for the period 1974-2003 and conclude that volatility of real exchange rates has less impact, if a country follows more open trade policies. In addition, studies that examine the impacts in different sectors find that trade in some products responds positively to exchange rate variation and others negatively, so the net effect is highly determined by the composition of exported and imported products, (Doroodian, 1994).

The Monetary Approach championed by the contributions of Harry Johnson and Jacob Frenkel in the early 1970s, suggests that devaluation improves the trade balance by increasing domestic prices and thereby reducing the real money supply. Furthermore, basing on the monetary approach, Pentti (1976) investigates the relationship between exchange rate and trade in the short- and long run. His findings show a significant departure from the traditional analysis by establishing a link between monetary policy and the inflow or outflow of capital through the effect of interest rate and exchange rate on aggregate demand and output and thereby on the current account, which determines the capital account balance

Basing on the J curve Phenomenon, Carter and Pick (1989) examine the US trade in agricultural goods. They pioneered research on the pass-through effect of exchange rate changes on agricultural exports and imports, and the net impact on the agricultural trade balance. They find evidence of the price effect of the J-curve; a depreciation leading to a decline in the agricultural trade balance. The quantity effect however is only partly explained by the J-curve effect. Doroodian (1994) find a J-curve effect only for agricultural goods, but not for manufacturing, using US data for 1977 to 1991. This could explain why some studies using aggregate data fail to support the J-curve hypothesis – perhaps the J-curve effect does not apply overall.

Hsing (2008) examined US trade with seven South American trading partners over the last 20 or 30 years according to the studied countries and showed that a J-curve exists for Chili, Ecuador and Uruguay while a lack of support is found for Argentina, Brazil, Colombia and Peru. These findings therefore suggest that the conventional wisdom of pursuing real exchange depreciation in order to improve the trade balance may not apply in some countries

The further theoretical model developed by Nagy and Stahl (1967) deals with more detail examination of the reasons for demand for export and import. The main idea of the Nagy and Stahl (1967) study is to define the irritation between optimal volume of the foreign trade and the marginal exchange rate whilst minimizing domestic expenditures. According to the research the devaluation of the exchange rate improves the trade balance and decreases the domestic expenditure. This study therefore builds on this literature by specifically evaluating the impact of exchange rate volatility on

trade balance in Uganda for the period 1990-2015.

III. METHODOLOGY

The variables used in the study are trade balance (TB), exchange rate (EXCR), gross domestic product (GDP) inflation (INF), interest Rate (INTR), government expenditure (GE) and money supply (MS). Annual data for the period 1990 to 2015 was used in the study. Data on exchange rates, trade balance, money supply and inflation was obtained from the Bank of Uganda annual reports, data on interest rate, Gross Domestic Product and government expenditure was obtained from the Ministry of Finance, Planning and Economic Development.

Data was analyzed using E-Views 7, stationarity tests were carried out to test for stationarity using the Augmented Dickey-Fully tests and the Philips Peron, the Johansen Co- integration procedure was used for testing co- integration on variables, multicollinearity tests were carried out to test for correlation among variables.

The granger causality test was also carried out to determine whether exchange rate volatility is useful in forecasting and an estimation equation was developed from the regression model using the OLS method. The parameters were determined with the help of the model enumerated under;

$$TB = \alpha + \alpha 1(EXCR) + \alpha 2(GDP) + \alpha 3(INF) + \alpha 4(INTR) + \alpha 5(GE) + \alpha 6(MS) + \varepsilon 1$$

Where TB is the dependent variable, α is the intercept: $\alpha 1, \alpha 2, \alpha 3, \alpha 4, \alpha 5$ and $\alpha 6$ are coefficients of the independent variables and $\varepsilon 1$ represents the error term.

The study analyzed the time series data and in order to find a relationship between variables, simple OLS (Ordinary Least Square Method) to run regression with Iterative process was used for empirical results to solve the lagged problems in variables and among stochastic error terms.

IV. EMPIRICAL RESULTS

The Augmented Dicker Fuller and Philips Peron tests were used to test for stationarity of time series data to establish whether the data used has a constant mean and a constant variance so as to reduce chances of getting spurious results in the estimate equation. The results in Table (I) indicate that all the variables become stationary after taking a first difference using both the ADF and the PP.

Table I: Unit Root Tests Using Augmented Dicker Fuller and Phillips Perron.

	Augmented Dickey fuller(ADF)		Phillips-Perron(PP)	
Level				
Variable	Constant without trend	Constant with trend	Constant without trend	Constant with trend
TB	-0.323(1)	-2.423(1)	-0.396(1)	-1.941(1)
GDP	1.299(1)	-1.490(1)	2.553(1)	-1.313(1)
GE	1.468(1)	-1.059(1)	2.138(1)	0.888(1)
INF	-2.169(1)	-2.591(1)	-2.780(0)	-0.888(1)
INTR	-2.206(1)	-2.120(1)	-1.923(1)	-1.863(1)
EXCR	-2.893(0)	-2.848(1)	-2.161(1)	-1.869(1)
M2	2.847(0)	-0.769(1)	3.396(0)	-0.437(1)
First Difference				
TB	-2.593*(1)	-2.518*(1)	-3.551**(1)	-3.469*(1)
GDP	-1.384(1)	-1.632(1)	-1.966(1)	-3.274*(1)
GE	-1.180(1)	-1.947(1)	-2.275(1)	-3.525**(1)
INF	-4.362***(1)	-5.079***(1)	-6.310***(1)	-7.200***(1)
INTR	-1.800(1)	-1.660(1)	-3.340*(1)	-3.177*(1)
EXCR	-2.548*(1)	-2.954(1)	-2.807*(1)	-3.153*(1)
M2	-0.810(1)	-2.0968(1)	-2.531(1)	-5.064***(1)

(0) non stationary ;(1) stationary: * Order of integration at 10%: ** Order of integration at 5%;*** Order of integration at 1%.

Source: Author's computation using E-views

Table (II) indicates the results of the johansen Cointegration test which reveal that there is a long-run relationship between trade balance and exchange rate volatility. The results of the granger causality test in Table (III) show that exchange rate can be used to forecast Trade balance after we reject the Null hypothesis at 5% confidence interval.

Table II: Results of the Johansen Co-Integration Test

Maximum Rank	Parms	LL	eigenvalue	trace statistic	5% critical value
0	12	-928.12477		55.9227	29.68
1	17	-910.77521	0.77879	21.2236	15.41
2	20	-901.37064	0.55859	2.4145*	3.76
3	21	-900.1634	0.09966		

*Rejection of the null hypothesis at a 5% level of significance

Source: Author's computation using E-views

The tests for Multicollinearity in Table (IV) reveals that Trade Balance is negatively and weakly correlated with, GDP, INF, and MS but positively correlated with EXCR, GE and INTR.

Table III: Results Of the Granger Causality Test.

Pair wise Granger Causality Tests			
Sample: 1990 2015			
Lags: 2			
Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
EXCR does not Granger Cause TB	23	0.14231	0.8683
TB does not Granger Cause EXCR		3.15353	0.0670

Source: Author's computation using E-views

Table IV: Correlation Matrix

	DTB	DEXCR	DGDP	DGE	DINF	DINTR	DM2
DTB	1.000000						
DEXCR	0.066609	1.000000					
DGDP	-0.352696	0.043157	1.000000				
DGE	0.014949	0.607339	-0.104135	1.000000			
DINF	-0.111801	0.194633	0.859672	-0.031702	1.000000		
DINTR	0.067487	-0.344197	0.005057	-0.416717	-0.144745	1.000000	
DM2	-0.478232	-0.149851	-0.238452	-0.052358	-0.417043	-0.274527	1.000000

Source: Author's computation using E-views

A linear regression model has been run to estimate a relationship between variables and this was done by fitting a linear equation to observed data as shown in Table (V).

Table V: Results of the Regression Model

Dependent Variable: LTB				
Method: Least Squares				
Sample (adjusted): 1990 2015				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LEXCR	-0.393066	0.425038	0.924779	0.3697
LGDP	-0.653604	0.349412	-1.870579	0.0810
LGE	-2.099567	3.092973	-0.678818	0.5076
LINF	-0.060208	0.624289	-0.096443	0.9244
LINTR	0.127027	0.187840	0.676252	0.5092
LM2	0.737868	0.501624	1.470959	0.1620
C	10.60818	13.68783	0.775008	0.4504
Prob(F-statistic)	0.000101			

Source: Author's computation using E-views

According to the regression model, the result of the relationship between exchange rate and trade balance indicates that it is negative. This is because depreciation in exchange rate will improve the trade balance due to the increase in net export balance. The result suggests that trade balance is likely to be improved using exchange rate devaluation.

Gross Domestic Product in Uganda was found to be negatively related with the country's trade balance. This result is hardly surprising, given that real output in the Ugandan economy has had little if any positive impact on the price levels because the Inflation has been anything but reduced despite the growth in output experienced in Uganda over the years.

This contravenes with economic theory as an increase in GDP improves a country's trade balance. The explanation is that with increase in real output, prices generally fall, a situation that stimulates higher demand for domestic products in both the internal as well as the international markets. Inflation is negatively related with the trade balance. This is because an upward movement in the price of raw materials raises the cost of production in those sectors where the raw material is used and causes prices of finished products to move up hence reducing the amount of exports demanded of that commodity resulting into trade balance deficits.

The results indicate a positive relationship between money supply and trade balance this is because an increase in money supply raises the level of income, and reduces both the Central Bank Rate (CBR) and the Prime Lending Rate (PLR). This engenders an improvement in the level of investment and thus local employment and production which can consequently improve a country's net export and thus improve the country's trade balance position. According to the regression model, trade balance is negatively related with Government Expenditure. This is not at all surprising in the context of Uganda because huge government expenditures have been channeled towards recurrent expenditures other than productive expenditure.

CONCLUSION

The main conclusions drawn from the study include; the Uganda shilling is highly volatile and has been depreciating preeminently; exchange rate volatility has a statistically significant negative impact on the country's trade balance; there is a bidirectional causality between Trade balance and exchange rate volatility; the proposed macroeconomic policy mix of the depreciation of the exchange rate has not been found to consistently result in improvement of the Trade balance. Since a volatile exchange rate creates economic uncertainty it is recommended that an efficient stabilization policy should be implemented especially when the exchange rate is abnormally volatile.

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