

Effect of Real Exchange Rate Volatility and Selected Macroeconomic Variables on Trade Exports Performance in Kenya



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ABSTRACT: Kenya's export performance is still constrained by high level of inflation, high-interest rates, low savings, low investments, and fluctuating exchange rates. Generally, Kenya's exports have performed dismally in the recent past. It is not yet clear as to whether this poor export performance can be attributed to exchange rate volatility since, existing empirical evidence show mixed findings. The study sought to establish the impact of exchange rate volatility on Kenya's exports performance for the period 1974 – 2018. Autoregressive Distributed Lag model (ARDL) with bounds test was estimated and it was found that ARCH term t-ratio was significant which indicated that exchange rate is volatile. Exchange rate volatility, terms of trade, inflation money supply and trade openness were significant. Based on these results, it is recommended the government should reconsider exchange rate policies that will prevent high exchange rate fluctuations, suggests that the monetary authorities in the Kenya should come up with monetary policy strategies that will help drive the economy better are necessary for economic expansion, Kenya should maintain its market determined exchange rate and implement a monetary policy aimed at confining inflation to levels that are at par or lower than those of trading partners, the government should review trade policies and take advantage of trade openness to reap from trade liberalization. The study further realized interdependence between exchange rate stability, macroeconomic stability and export performance and hence policy makers need to consider the existing degree and likely effects of exchange rate volatility while designing, developing and implementing trade policies in Kenyan Economy.

BACKGROUND OF THE STUDY

Kenya is mainly dependent on the agricultural sector as a basis for its growth economically, employment creation and generation of the exchange rate. It is also a participant in the international markets through its export trade where it exports horticultural crops, tea, and coffee among others Nyoro (2002). Volatility is described as the extent of change in a variable over time. Kenya has operated in the fixed exchange rate system as well as a floating exchange rate system. Despite Kenya adopting a fixed exchange system between 1966 and 1990 followed by a floating exchange rate system from 1993 Ndung'u (2000), the country has been experiencing sudden movements in foreign currency rates in certain periods, yet export earnings have been gradually increasing Cowan and De Gregorio (2007). The export market provides revenue to the economy and also substantial employment, and it has contributed to the upgrading of agricultural production skills. The country's level of international trade is an important ingredient of economic growth. Exchange rates determine a country's level of international trade. With increasing Globalization, all open economies have become critically dependent. The implementation of financial liberalization has exposed free market economies to international fluctuations which are transmitted across countries. For this purpose, it is therefore critically important to monitor movements in the exchange rate. This is performed in all open economies worldwide. The exchange rate volatility in Kenya has depicted wide fluctuations (Stiglitz & Charlton, 2005). This is very detrimental to the economic stability of the country and costly to the monetary authority. The exchange rate also affects capital flows between economies.

Concerns over exchange rate volatility began in the year 1970s in most of the world and attracted a lot of interest due to its effect on the international flow of capital, goods and also services, that is commodities in general. Even if the firms can protect themselves against short-term foreign exchange risk through hedging, they are exposed to medium and long-term exchange rate volatility. Such exposure to foreign exchange risk could affect the investment decision of the firm and therefore distorts the

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optimal allocation of resources. Knowing the forecast through estimating the movements in exchange rate volatility will have a significant implication on problems underlying exchange rate (Love & Payne, 2008). The exchange rate is just one of the issues of monetary policy carried out by the Central Bank of Kenya, which is very vital in the financial management of public funds by the Government of Kenya. The exchange rate also plays a key role in macroeconomic stability through stabilization and the adjustment policies as a control measure of inflation encourages free trade to increase commodities business through imports and exports in Kenya. The Kenya Government legislated the floating exchange rate regime in the year 1990s, which was expected to lead the country to benefit from the introduction of this regime. These were as follows, the adjustment of the exchange rates which shifted the demand for foreign exchange and the supply of foreign exchange (Njuguna, 2013).

KENYAN EXPORT TRADE

Kenya has participated in the export market for a long time for both its domestic and export market. The country has ideal tropical and temperate climatic conditions that make it favorable for the exports such as coffee, tea, and horticulture among other exports. The Kenyan export industry has experienced rapid growth for a long time owing to the active involvement of the private sector in the industry, and the minimal government interference experienced. Europe forms the largest market for Kenya's exports Ndambiri et al. (2012). Kenya generates high revenue in foreign exchange earnings as a result of a reliable and vibrant private sector that has been at the forefront in marketing the nation's products to markets abroad. Total export earnings from Kenya's export trade have historically tended to have an inverse relationship with movements in the exchange rate, although the trend is obscured by changes in volumes from year to year Kiptui (2008). Under the floating exchange rate regime, the fluctuations in world prices of exports strongly affect export earnings. Therefore, a higher demand or a decrease in supply which causes the appreciation of the foreign currency makes export earnings decline Akila (2004).

Agriculture, being the bedrock of Kenya's exports contributes a substantial amount of its export earnings, and this provides the foreign exchange that is needed by the country. From the period ranging 1990 to 2001, the average contribution was 60 with a variation between 50 and 62 percent depending on the performance of the crops. The main contribution to Kenya's export earnings is coffee, tea, horticulture, pyrethrum and limited livestock products. Kenya's export earnings mainly rely on rainfall and world prices of essential commodities the country engages in exporting and also the policies domestically that affect the production and marketing of these commodities Kiptui (2008).

STATEMENT OF THE PROBLEM

The role of export trade towards economic growth and development particularly for developing countries like Kenya cannot be refuted. Apart from enough foreign exchange reserves, the export sector promotes creation of more employment opportunities, improvement on the balance of payment, facilitates technology transfers among others. Since the mid-1990s emerging economies have been committed to flexible exchange rates. Kenya, in particular, has maintained a flexible, market-determined exchange rate policy. Exchange controls were abolished following the repeal of Exchange rate Control Act in 1994 (GoK, 2004). The aim of this policy was to limit volatility of exchange and provide a conducive macroeconomic environment. However, Kenya has over the years been experiencing fluctuations in its exchange rate against foreign currencies, a condition which could have exposed its economy to uncertainties. A fluctuation within exchange rate affects the capital flows and is tied to monetary policy. Despite notable prudence in fiscal and monetary policy formulation and application and improvement in macroeconomic performance IMF and World Bank, (2008), the country is still facing some constraints, high level of inflation, high-interest rates, low savings, low investments and fluctuating exchange rates.

Generally, Kenya's exports have performed dismally in the recent past. It is not yet clear as to whether this poor performance can be attributed to exchange rate volatility because, existing empirical evidence show mixed findings. For instance, while some studies have established for a positive relationship between exchange rate movements and export trade (Fabiosa, 2002; Arize, et al., 2008; Kennedy, 2013; Evans & Lyons, 2002; Samanta, 1998; Alam & Ahmed, 2010), other studies have argued that these two variables are negatively correlated (Kemal & Qadir, 2005; Baron, 1976; Caporale, et al., 2013; Cheng, et al., 2013; Akpolodje & Omjimate, 2009; Ćorić & Arize, 2008). The same inconsistencies have been recorded with regard to studies conducted in the Kenyan perspective. While, Kiptui and Kipyegon (2008) and Mwangi, et al. (2014), show negative relationship, Fabiosa (2002) and Otieno and Mudaki (2011) on the other have, observed that exchange rate volatility and exports are positively correlated.

OBJECTIVES OF THE STUDY

To investigate the effect of exchange rate volatility on traditional and nontraditional trade exports performance in Kenya.

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- Measure the effect of terms of trade on trade exports performance in Kenya
- To investigate the effect of inflation on trade exports performance in Kenya
- To determine the influence of money supply on trade exports performance in Kenya
- To investigate the effect of foreign interest rate on trade exports performance in Kenya
- To find out the effect of trade openness on trade exports performance in Kenya
- To determine the effect of current account balance on trade exports performance in Kenya

RESEARCH HYPOTHESES

- H_{01} : Exchange rate volatility has no significant effect on trade exports performance in Kenya.
- H_{02} : Terms of trade does not have significant effect on trade exports performance in Kenya
- H_{03} : Inflation does not have a significant effect on trade exports performance in Kenya
- H_{04} : Money supply does not have significant influence on traditional and nontraditional trade exports performance in Kenya
- H_{04} : There is no significant effect of foreign interest rate on trade export performance in Kenya
- H_{05} : There is no significant effect of trade openness on trade export performance in Kenya
- H_{06} : Current account balance does not have significant effect on trade export performance

RESEARCH METHODOLOGY

Research Design and Study Area: This study employed longitudinal time series research design method for the period 1966-2020. Using the data set for macroeconomic variables for Kenya for the period 1966 to 2020. Kenya is in the continent of Africa and is in Eastern Africa in particular.

Sources of Data: The study used annual secondary time series data; observation for the period 1966 – 2020 in Kenya. Data expressed at the 2000 constant dollar prices, were sourced from World Development Indicators (WDI), World Integrated Trade Solution (WITS), Kenya National Bureau of Statistics (KNBS) and Central Bank of Kenya (CBK).

Model Specification: Autoregressive Distributed lag (ARDL) bound test (hereafter referred to as ARDL) used extensively by Pesaran *et al.*, (2001) was employed. The ARDL approach was an appropriate choice of this study because it has several advantages over the conventional cointegration tests such as the two-step residual-based test for cointegration proposed by Johansen (1988) and Johansen and Juselius (1990). Thus, because the ARDL approach does not depend on pre-testing the order of the variables, it eliminates the uncertainty associated with pre-testing the order of integration. Pre-testing is particularly problematic in the unit-root-cointegration where the power of unit root test are typically low (Narayan & Smyth, 2005). Second, Banerjee *et al.*, (1993, 1998) pointed out that unlike the Engle-Granger cointegration test, the bounds testing approach to cointegration with an ARDL framework does not push the short run dynamics into the residuals terms. Thus, it has better statistical properties in testing for the presence of cointegration. Third, on the basis of Monte Carlo experiment, Pesaran and Shin (1999) found that the ARDL approach is more efficient in small samples.

The regressors in an ARDL model include the lagged values of the dependent variable and the current and lagged values of the explanatory variables. Its estimating equation with p lagged values of the dependent variable and $q_j, j = 1, 2, \dots, n$, values of the n explanatory variables is designated as an ARDL (p, q_1, \dots, q_n) (Handa, 2000) and as the form:

$$\beta(L, p)y_t = \beta_0 x_0 + \sum_{j=1}^n \beta_j(L, q)x_{jt} + \mu_t \dots\dots\dots 1$$

Where L is the lag operator such that $L^i y_i = y_{t-i}$, x_0 is a constant and (L, p) and (L, q) are the lag polynomials?

$$\alpha(L, p) = 1 - \alpha_1 L^1 - \alpha_2 L^2 - \dots - \alpha_p L^p \dots\dots\dots 2$$

$$\beta(L, q) = 1 - \beta_1 L^1 - \beta_2 L^2 - \dots - \beta_q L^q \dots\dots\dots 3$$

In the long run, $y_t = y_{t-1} = \dots = y_{t-p}$ and $x_{jt} = x_{jt-1} = \dots = x_{jt-q}$, so that $L = 1$, $\alpha(1, p) = (1 - \alpha_1 - \alpha_2 - \dots - \alpha_p)$ and $\beta(1, q) = (1 - \beta_1 - \beta_2 - \dots - \beta_q)$ and the long-run relationship becomes:

$$y_t = \beta'_0 + \sum_{j=1}^n \beta'_j x'_{jt} + v_t \dots\dots\dots 4$$

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Where $\alpha'_0 = \alpha_0 / (\alpha(1, p))$, $\beta_j = \beta'_j (1, q) / (\alpha(1, p))$, $v_j = \mu_j / (\alpha(1, p))$. The error-correction equation of this ARDL model is:

$$\Delta y_t = \Delta \beta'_0 - \sum_{i=2}^p \alpha'_i \Delta y_{t-i} + \sum_{j=1}^n \beta'_{j0} \Delta x_{it} - \sum_{j=1}^n \sum_{i=2}^q \beta'_{i,t-j} \Delta x_{j,t-i} - \alpha(1, p) ECM_{t-1} + \eta_t \dots\dots\dots 5$$

Where:

$$ECM_{t-1} = y_{t-1} - \hat{\beta} - \sum_{j=1}^n \beta_j x_{jt-1} \dots\dots\dots 6$$

According to Pesaran et al. (2001), to implement the ARDL bounds test approach, the familiar Wald-coefficient test/F-statistic should be used to test the significance of the lagged levels of the variables in the conditional UECM. Considering the limited time series data, there should be a delicate balance between choosing lags sufficiently large to mitigate the residual serial correlation problem, while at the same time, sufficiently small to prevent the conditional UECM from becoming unduly over-parameterised (Pesaran et al., 2001). To choose the optimal lag length for each variable, the ARDL method estimates the number of regressions, where the maximum is the number of the lags and is the number of variables in the equation. The model can be selected by the Schwartz-Bayesian Criteria (SBC) and the Akaike Information Criteria (AIC). The SBC is known as a parsimonious model, selecting the smallest possible lag length, while the AIC is known for selecting the maximum relevant lag length, Jalil, A., & Feridun, M. (2011).

To execute, the ARDL bounds test approach requires three steps Hoque and Yusop, (2010). The first step is to determine the existence of a long run cointegration relationship among the variables in the equation. The long-run level relationship among the variables was determined using the Wald-coefficient or F-test. Here a joint significance test is performed to test the null hypothesis of no cointegration by setting the coefficients of all the one lagged level variables equal to zero against the alternative hypothesis that the co-integrating relation setting the coefficients of all the one lagged level variables is not equal to zero Tang, (2003). In the present study, the Wald-coefficient test/F-statistic is employed by setting the null hypothesis for equation (3.42) and (3.43) as H_0 . This indicates the existence of a long run relationship against the alternative hypothesis. These are the coefficients of the one lagged level variables included in the model excluding the dummy variable. Then the estimated F-statistic was checked for the null hypothesis whether all the long run coefficients were jointly equal to zero.

DISCUSSIONS OF THE FINDINGS

The cointegration test results indicated that the variables are cointegrated and that the variables are integrated of order $I(0)$ and $I(1)$ and therefore it was appropriate to estimate ARDL with bound test model to determine the factors that affect exports in Kenya. Table 1 reports the results of the ARDL model. The output also indicates that the R-squared is 0.9274 while the adjusted R – squared is 0.8250. R-Square shows the explanatory power of independent variables (money supply, exchange rate, inflation, trade openness, terms of trade and foreign interest rates). It implies that 92.74 percent of the variation is explained by the independent variables while the remaining 7.26 percent of the variation is attributed to the error term, or the variables not captured in the estimated model.

The second part of table indicates the error correction model. The error correction model allows estimation with both long run and short run (Otieno & Mudaki, 2011). The significance ECT confirms the presence of long-term relationship between exports, money supply, inflation, exchange rate, trade openness, terms of trade and foreign interest rate (Banerjee *et al.*, 1993). ECT showed a negative and significant of -1.0279 (p-value = 0.002 < 0.05). The error correction term shows the speed of adjustment of the dependent variable (exports trade performance) to return to equilibrium with changes in the independent variables implies a long run convergence.

Table1: Auto Regressive Distributed Lag Model in the Long run

Sample 1974 – 2018		Number of observations = 45			
Log likelihood = 89.3515		R-squared=0.9274			
		Adj R-squared = 0.8250			
		Root MSE= 0.0453			
	D.exp	Coefficient	Std. Err	t	p > t
ADJ	EXP				
ECT	L1	-1.0279	0.2815	-3.65	0.002
LR	MNS	0.6021	0.1412	4.26	0.001

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SR	ERV	-0.5158	0.2098	-2.46	0.025
	INF	-0.0670	0.0257	-2.60	0.019
	TRO	1.3655	0.4623	2.95	0.009
	TOT	0.7599	0.2182	3.48	0.003
	FIR	-0.0031	0.298	-1.07	0.298
	EXP				
	LD	0.4602	0.2279	2.02	0.060
	L2D	0.0569	0.1793	0.32	0.755
	MNS				
	D1	-0.4266	0.1872	-2.28	0.036
	LD	-0.4343	0.1531	-2.84	0.011
	L2D	-0.3384	0.1612	-2.10	0.051
	ERV				
	D1	0.0051	0.2013	0.03	0.980
	LD	-0.0659	0.1834	-0.36	0.724
	INF				
	D1	-0.0477	0.0270	-1.77	0.095
	LD	-0.0171	0.0213	-0.81	0.431
	L2D	-0.0065	0.0135	-0.48	0.638
	TRO				
D1	0.5704	0.6237	0.91	0.373	
LD	-1.1777	0.6761	-1.74	0.100	
L2D	-0.3378	0.4687	-0.72	0.481	
TOT					
D1	-0.1115	0.2285	-0.49	0.632	
LD	-0.3114	0.1853	-1.68	0.111	
FIR					
D1	0.0112	0.0053	2.09	0.052	
LD	0.0089	0.0046	1.94	0.070	
Cons	8.2233	3.6031	2.28	0.036	

Notes: ADJ implies adjusted, LR-long run and SR is the short run

Source: Research Analysis, 2022

The existence of negative and significant error correction term is evidence of a long-term adjustment towards its long-term adjustment path or to the point of convergence as a result of temporary shocks. *ECT* of -1.0279 percent shows that divergence from long run equilibrium is corrected in the short run, which is dependent on speed of adjustment. This suggests that a 102 percent of disequilibria is corrected to equilibrium in one year. Further, it implies that the system adjusts itself quickly and takes short time for the system to get back to long term equilibrium after short run shocks.

From the long term ARDL output, money supply (MNS) showed a positive and significant coefficient of 0.6021 (p -value = 0.0010 < 0.0500) which indicates that a unit increase in money supply leads to 0.6021 unit increase in Kenya's exports. This positive relationship between exports and money supply is explained by the fact that through money supply both private and public sector are able to carry out businesses implying that increased money supply in an economy makes private and public sector to obtain credit and engage in export and import of goods and services. Money supply can also influence exports positively by unexpected increase in money stock (Jawaid, Qadri & Ali, 2011) while Keynesians argue that money supply has a limited influence on exports. Money supply is a monetary tool policy that is used by the Central Banks or Federal reserves to influence the flow of economic activities within an economy such as exports and imports through price. The results resonate with the findings of Omodero (2019) who found a positive relationship between money supply and exports.

The results indicated that exchange rate volatility (ERV) is negatively related with exports in Kenya. This is in consistent with economic theory that asserts that there exists a negative relationship between exchange rate and trade exports performance. It has a significant coefficient of -0.5158 (p - value 0.0250 < 0.0500) which implies that a one percent increase in exchange

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rate volatility causes a 0.5158 percent decrease in trade exports performance in Kenya. Economic theory asserts that exporters are risk averse in nature. An increase in the rate of exchange rate depresses export volume as this causes increase in costs like irreversible to adjust for future higher uncertainties (Ahmed, (Qassim & Chani, 2017). The negative relationship between exchange and trade exports performance can be due to reallocation of resources by the market participants (Arize, Malindretos & Kasibhatla 2003) while Fountas & Aristoteles (2005) found inconclusive results on the effect of exchange rate on exports from European monetary systems. This result agrees with the findings of previous studies by (Musyoki *et al.*, (2012) & Otieno, 2014), Nsofor (2017), (Bala & Asemota, 2013); (Arize, Osang & Slottje, 2000)). However, studies by Li & Rowe (2008) and Nyeadi, Atiga and Atogenzoya, (2014) argued that there is a positive relationship between exchange rate and exports which is can be explained by supply side impacts of aid inflows into a country and this may induce a rapid supply response which is by more than the level that is necessary to offset the demand responses.

Inflation rate was found to negatively affect Kenya's exports. It registered a negative and significant coefficient of 0.0670 ($p - value$ 0.0190 < 0.05) which indicates that a one percent increase in the level of inflation causes a 6.7 percent decrease in the level of trade exports performance in Kenya. A rise in the level of inflation leads to an increase in money supply in circulation and an increase in money supply causes an increase in interest rates. An increase in interest will increase the cost of obtaining credit which is highly needed by exporters to invest. The findings agree with previous study by Ahad (2017) who found a negative and significant relationship between inflation and exports. However, the findings disagreed with previous studies by (Kiganda, Obange & Adhiambo, 2017) who showed that there exists a positive relationship between exports and inflation in Kenya. The differences could be attributed to difference to the extent of inflation at a particular period since these were carried at different time periods.

In the long run, the responsiveness of exports (EXP) to a one unit increase in terms of trade (TOT) is 0.7599 units. This is indicated by a positive and statistically significant coefficient of 0.7599 ($p - value$ 0.003 < 0.05). The findings are in line with the economic predicted theory. This means that high price stability of Kenyan exports coupled with favorable terms of trade leads to an expansion of export earnings. However, research by Morrison *et al.*, (2016) found that exports in Eastern and Southern Africa which are dominated by primary agricultural exports suffer from declining terms of trade especially tea, coffee and horticultural exports and high volatility of prices in the international market.

A study by Subramanian *et al.*, (2007) also concluded that lack of favorable terms of trade and the subsequent presence of trade barriers is a major hindrance to international trade. However, the findings contradict with previous study of Otieno & Mudaki (2011) who found out that terms of trade has a negative effect on trade exports performance. The existence of conflicting relationship between trade exports performance and terms of trade will not be far-fetched from the use of different proxies of terms of trade, methodologies, samples periods. The differences in the findings could be possibly due to differences in countries where there is possibility of variation in terms of trade

Trade openness recorded the largest, positive and significant coefficient of 1.3655 ($p - value$ 0.003 < 0.0500). This shows that a one percent increase in trade openness causes a 1.365 percent increase in export performance in Kenya. Increasing trade openness is positively related with exports as a result of beneficial effects of technologically innovative countries. If countries set policies that increases tariffs in country this reduces the ability of a country to participate in trade while increased trade openness makes countries to participate in international trade of imports and exports of goods and services. Countries that have trade openness are likely to receive loans from institutional organizations such as World Bank and other foreign aid from international donors and this is likely to trigger growth in sectors such as transportation, communication and technology and this is likely to trigger increase in exports as a result of improvement in the aforementioned sectors in the economy. Increased trade openness encourages reduction in business taxes that makes it less desirable for companies to operate in other foreign countries and this positively influences exports of goods and services.

Trade openness brings in imports which may serves as inputs for further production which in turn catalyze exports. Trade openness attracts new technologies from their trading partners which increases efficiency in other export sectors. The findings resonate with the previous findings by Hoekman & Shepherd (2015); Chaudhary & Amin (2012) and (Borchert *et al.*, 2012) and Karuraa (2008) who found a positive and significant relationship between manufactured exports and terms of trade openness. Similarly, (Chaudhary & Amin, 2012) concluded that there is a positive and significant relationship between exports and trade openness in Pakistan. However, the findings contradict the previous findings of (Adhikary, 2012). It argues that such negative relationship is due to high export demand in developing countries.

The effect of foreign interest (FIR) rate on trade exports performance in Kenya was inconclusive. It had an insignificant coefficient of -0.0031 ($p - value$ = 0.298 > 0.05). This was inconclusive and inconsistent with economic theory. This disagrees with earlier studies by Bostan & Firtescu (2018) who argued that higher foreign interest rates increase the cost of

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borrowing, reduce disposable income, and therefore limit the growth in consumer spending that will in turn decrease exports. A rise in foreign interest rates affect both consumers and firms that are engaged in exports; therefore, a rise in FIR discourages investment in export activities and makes firms and consumers less willing to invest in risky investment and purchase; therefore, the economy is likely to experience falls in consumption and investment.

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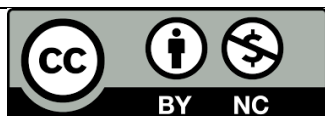
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