



MACROECONOMIC VARIABLES AND VARIATIONS IN DIASPORA REMITTANCES IN KENYA

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ABSTRACT

This paper investigates the effect of macroeconomic variables on variations in diaspora remittances in Kenya. Kenya has experienced a steady growth in the annual volume of diaspora remittances recorded over period. Remittances have become a major source of foreign exchange and a key driver of economic growth as underscored in the Kenya vision 2030. Quarterly trends on remittances show many variations. The analysis using OLS Model revealed that, exchange rates, interest rates, inflation rates and real GDP jointly were responsible for the variation in the value of diaspora remittances at R^2 of 63.36%. There is a direct relationship between exchange rates, interest rates and diaspora remittances, while indirect relationship between inflation rate and diaspora remittances. Real GDP rates have no significant relationship. Policies to limit foreign exchange market intervention would allow capital flows to stabilize by the exchange rate movements from medium to long-term periods, thus eliminating the effects on the interest rate structure.

Keywords: Macroeconomic Variables, Diaspora Remittances, Kenya

JEL Classification: P34, P43, O16

1. INTRODUCTION

Many individuals in developing countries, to cope with poverty and exploit international career opportunities, have adopted international migration. According to Kemegue & Owusu-Sekyere (2010), Kenya like any other sub-Saharan Africa country is prone to challenges such as political instability, economic instability, unemployment, inter-clan conflicts and religious conflicts. These factors singly or cooperatively have led many individuals to migrate to other countries that are considered more politically and economically stable, peaceful and with better living and working conditions. Kinuthia (2013) adds other factors such as a search for business opportunities and the pursuit of further education as influencing migration of Kenyans to other countries. According to Barajas et al (2010), the significant of these factors has been the search for employment opportunities abroad. This has resulted in an increase in international labor flow among countries, whose consequence has been an increase in inflows of worker remittances into the countries of origin of these migrants.

The term 'diaspora' has different uses and commonly to identify different phenomena. The International Organization for Migration (IOM) and Migration Policy Institute (MPI), (2012), define diaspora as emigrants and their descendants, who live outside the country of their birth or ancestry, either on temporary or permanent basis, yet still maintain affective and material ties to their countries of origin. According to IMF (2006), diaspora remittances are the aggregate diaspora remittances as the total sum of migrant workers' remittances, their compensation and transfers. Migrant worker's remittances include current private transfers from migrant workers who have resided in the host country for more than a year. Migrant compensation refers to the income of the migrants who have resided in the host country for less than twelve months whereas migrant transfers include the net worth of migrants anticipated staying in the host country for more than 12 months.

According to the World Bank report (2014), 232 million international migrants represented 3.2% percent of the total world population in the year 2013. Of these figure, 36% constituted migrants from developing nations living in other developing nations, a phenomenon dubbed south-south migration. The World Bank report (2014) also stated that remittances to sub Saharan Africa stood at USD32 billion in the year 2013, and that diaspora remittances were relatively stable, and could behave counter cyclically because migrants often send more when the recipient country is in an economic downturn or experiences a disaster. The sub-Saharan Africa remittances have been more stable than foreign direct investment, private debt, and equity flows. Nevertheless, even small fluctuations in remittance inflows can pose macroeconomic challenges to recipient countries, especially those with large inflows (Mohapatra, *et al*, 2009).

The World Bank Report, (2014), states that Kenya's diaspora remittances grew by an average of 10% in the year 2013 as compared to the year 2012. The reports presented by the central bank of Kenya (CBK) in March 2014 indicate that Kenya's received Diaspora remittances increased from US\$ 103.4 million in March 2013 to US\$ 119.6 million in March 2014. As at the beginning of 2014, remittances from Kenya's Diaspora were the fourth largest contributors of foreign exchange after revenue from tea, horticulture and tourism. The highest contribution came from North America, followed by Europe and the rest was from other areas of the world. According to central bank of Kenya, these remittances have led to higher savings, investments, and consumption. There is a growing trend in diaspora remittances to the Kenyan economy as evidenced by the upward growth in remittances reported over the recent past and the renewed vigor by the government and financial institutions to develop financial products targeted at the diaspora citizens (Kinuthia 2013).

2. LITERATURE REVIEW

There are many studies carried out to determine the various factors that affect diaspora remittances to their countries of origin. According to Ricketts (2011), these studies have mainly categorized them into microeconomic and macroeconomic factors. Studies carried out by Gupta & hedge (2009), Dustmann & Mestres (2010) and Agarwal & Horowitz (2002) investigated the microeconomic determinants of diaspora remittances. Higgins *et al* (2004), Buch & Kuckulenz (2004) and Ratha (2003) are among the many that have investigated the macroeconomic determinants of diaspora remittances. Bollard *et al* (2009) in their study of 11 major diaspora remittance destination countries, report that there is a positive effect of migrant education levels and the amount remitted, the higher income earned by highly educated migrants explains their higher remittance levels back home. They however report that there is a mixed relationship between education levels and the likelihood of remitting. Niimi *et al* (2008) reports that highly educated migrants remit less to their home countries. This is collaborated by Adams Jr (2008), who reports that the skill composition of a country's migrants influences diaspora remittances to that country. Countries with a larger share of educated migrants receive less per capita remittances as compared to countries with a larger share of less educated migrants. This is because high skilled migrants make lower remittances as they are less likely to return to their home countries, and most often bring along their family members to their resident countries. On the other hand, migrants with low education levels are likely to return home and do not bring along their family members hence the need to remit money to cater for their upkeep (Adams Jr, 2008).

Sing *et al* (2009), notes that migrants usually make decisions on how much to remit back home based on their own income and the income of their family at home. Where their income is higher than the income of the family members back at home, there is more remittance to cushion against economic hardships facing their family members. Higgins *et al* (2004) state that, the receiving country's income levels are reflective of the poverty levels and have negative relationship with remittance inflows. Chami *et al* (2003) note that income differentials between the home country and remitting country influences diaspora remittances.

McKinnon & Ohno (1997), explain that foreign exchange rates influence diaspora remittances across borders. They state that exchange rates affect Diaspora's investment in financial investment portfolio and other foreign investment facilities. Exchange rate fluctuations result in capital gains or losses (Ndungu 2000, Were *et al* 2013). Faini (1994) presents findings in favor of the fact that real exchange rate depreciation of the home country's currency had a significant effect on remittances. They report that in the end, Diaspora remittances increase when the exchange rate depreciates or devalues. Alleyne (2008) explains that this can be as a result of migrants desire to capitalize on the opportunity to acquire assets or to counter the negative effect of rising

domestic prices synonymous with a depreciating currency. This is also pointing to the prevalence of the 'wealth' effect as put forward by Bougha-Hagbe (2006).

According to Singh *et al* (2009), remittances may reflect a portfolio choice about investment opportunities in the receiving country. Consequently, the interest rate differential between the host and home country of the migrant would influence the likelihood of diaspora remittances. The higher the interest rates in the financial markets in the home country, the more likely it is that migrants will remit funds for investment to earn greater returns. According to Vargas-Silva & Huang (2005), the remitting country's macroeconomic conditions significantly influenced remittance levels and frequency than those in the receiving country. Their study reveals that migrants consider the prevailing economic conditions in the host country relative to those in their home country in determining whether to remit and when. Those of Ricketts (2011) reports that unemployment levels in the US influenced remittance inflows to Jamaica corroborate the study findings. Gupta (2005) also reports that diaspora remittances were greater when the economic conditions in the host countries were robust, noting that remittances were higher when employment levels in the US were higher. Lin (2011) states that diaspora remittances to the Tonga republic increased with decreasing unemployment levels in the migrant's host countries.

Ojapinwa (2012) reports that, factors that affect diaspora remittances among other factors are inflation rates in the host countries. According to El-Sakka & McNabb (1999), inflation affects remittances both directly and indirectly. They explain that high rates of inflation in the home country could cause increased migration because real income would be unstable in the home country. The high migration has the effect of increasing remittances as migrants send back money because of the altruism motive. They also explain that inflation may erode the domestic currency's purchasing power thus reducing the incentive to remit money to their home countries.

Alleyne, *et al* (2008) in their study of remittance inflows to the Caribbean, reveal that among other factors, real GDP is a significant determinant of the decision of the migrants to remit money back to their home country. Bougha-Hagbe (2006) also reports that real GDP in morocco inversely affect the amount of diaspora remittances to the country. Lueth & Ruiz-Arranz (2007) who found that diaspora remittances to Sri-lanka were positively related and pro-cyclical further corroborate the results. Lin (2011) also reports that, the real GDP in the remitting countries influenced remittances to the Tongan republic. A study by Elbadawi & Rocha (1992) reported that there is no significant relationship between the home country's GDP and remittance inflows to the country.

From the above review, there are different factors that influence diaspora remittance inflows to receiving countries. Despite the fact that diaspora remittances were the fourth largest contributors of foreign exchange after revenue from tea, horticulture and tourism (CBK report 2014), there is also expected upward growth in remittances due to the renewed vigor by the government and financial institutions to develop financial products targeted at the diaspora citizens of Kenya. There are seasonal variations in the diaspora remittances received in Kenya and there is need to explore the reason behind such variations. This study therefore looks at the determinants of diaspora remittance variations by evaluating the effects of macroeconomic variables, exchange rates, domestic interest rates, real GDP growth rates and inflation rates on diaspora remittances in Kenya.

3. DATA AND METHODOLOGY

The study used the explanatory research design with aim to evaluate the behavior of dependent variable in response to changes in the behavior of the independent variables. The study used secondary, quarterly averages data from the Central Bank of Kenya and the Kenya National Bureau of Statistics, about inflation rates, domestic interest rates, nominal USD/KES exchange rates, and real GDP and diaspora remittances for 45 quarters for the period starting January 2004 to March 2015. Figures on diaspora remittances were for the first time published as from January 2004, hence the starting study period. Ordinary Least Squares (OLS), a time series linear regression model to analyze the effects of the independent variables on the observed values of diaspora remittances.

3.1. Model Specification

The predictive study model;

$$DR_t = \beta_0 + \beta_1 EXR_t + \beta_2 INTR_t + \beta_3 INFR_t + \beta_4 RGDP_t + \epsilon \tag{1}$$

Where;

DR= Diaspora Remittances

β_0 = Constant Coefficient

$\beta_1, \beta_2, \beta_3, \beta_4$ = coefficient of independent variables

EXR = exchange rate

INTR= domestic interest rate (91-day Treasury bill)

RGDP = real GDP growth rate

INFR = inflation level.

ϵ = error term

t= time

The magnitude of the impact traced by log linear regression model;

$$\ln(DR_t) = \beta_0 + \beta_1 \ln(EXR_t) + \beta_2 \ln(INTR_t) + \beta_3 \ln(INFR_t) + \beta_4 \ln(RGDP_t) + \epsilon \tag{II}$$

LN = Log is the natural logarithm

4. FINDINGS AND DISCUSSIONS

4.1. Descriptive Statistics and Diagnostic Tests

The DR graph in Figure 1 shows that the Diaspora Remittances has been rising steadily over the study period. This may be because of the increase in number of Kenyan citizen in other foreign countries. The other variables depend on level of economic performance and management, which had many fluctuations during the study period.

Figure 1: Graphical Trend Movement in Variables

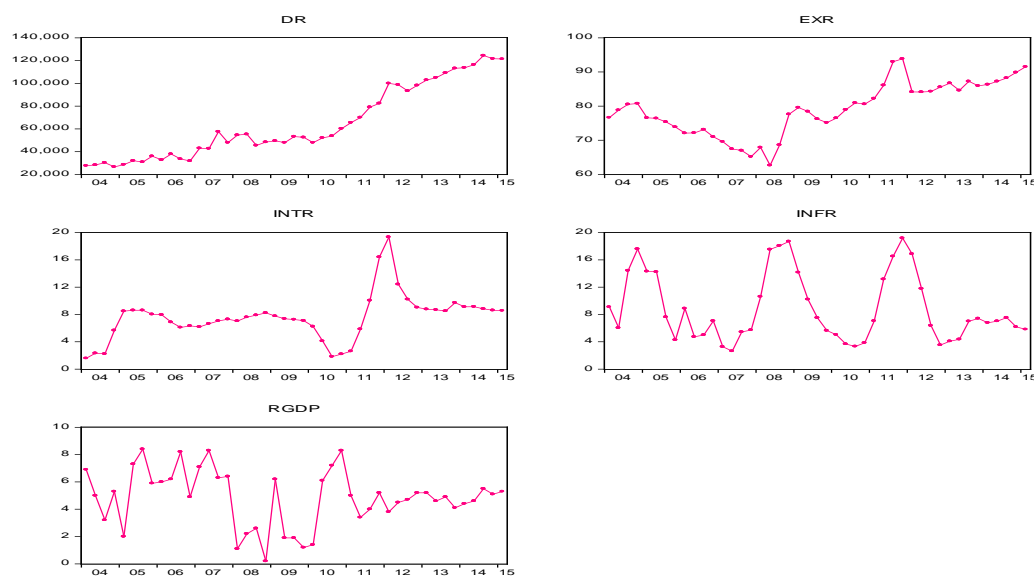


Table 1: Descriptive Statistics Diagnostic Test Results

Measures	LNDR	LNEXR	LNINTR	LNINFR	LNRGDP
Mean	10.95641	4.366279	1.910486	2.032731	1.419604
Median	10.88223	4.368659	2.050699	1.953028	1.609438
Maximum	11.73160	4.541907	2.962865	2.954216	2.128232
Minimum	10.18899	4.137500	0.457425	0.965716	-1.609438
Std. Dev.	0.492946	0.099364	0.530412	0.556117	0.689527
Skewness	0.127846	-0.315572	-1.193910	0.130149	-2.272046
Kurtosis	1.734735	2.379069	4.329244	1.955763	9.635156
Jarque-Bera	3.124266	1.469810	14.00357	2.171599	121.2639
Probability	0.209688	0.479551	0.000910	0.337632	0.000000
Sum	493.0386	196.4826	85.97185	91.47291	63.88218
Sum Sq. Dev.	10.69183	0.434423	12.37883	13.60769	20.91966
Observations	45	45	45	45	45

The descriptive statistics for each of the variables studied are represented in log linear showing various indicators of the kind of data collected as mean, median, standard deviation, maximum and minimum levels, skewness, a Jarque-Bera and kurtosis. The skewness coefficients for each log linear variable were less than zero or closer to zero indicating that the distributions of each variable are normal. The negative skewness coefficients indicate that the distribution of the returns is slightly left skewed, implying that appreciation in the exchange rate occur slightly more often than depreciation whereas interest rates and real GDP slightly rises than it falls. The kurtosis for model variables, LN (INTR) and LN (RGDP) are greater than the three (3) for a normal distribution indicating that the underlying distributions of the variables are leptokurtic, whereas the kurtosis of the variables LN (INFRD), LN (DR) and LN (EXR) are slightly less than three (3) Mesokurtic. The Jarque-Bera test for normality indicates that the distribution of the variables have a normal distribution, hence model fit.

Table 2: Correlation Matrix Table

	LNDR	LNEXR	LNINTR	LNINFR	LNRGDP
LNDR	1.000000				
LNEXR	0.646570	1.000000			
LNINTR	0.465680	0.184361	1.000000		
LNINFR	-0.110434	0.097593	0.280376	1.000000	
LNRGDP	0.005782	0.096642	-0.161076	-0.419672	1.000000

All variables have a coefficient of less than 0.8 hence there exists no multicollinearity between them.

Table 3. Final Output for Heteroscedasticity Test

Heteroscedasticity Test	F-Statistic	Prob. F (a.k.a P value)	Prob. Chi	R ²	Adjusted R ²
White Test	2.585358	0.0142	0.0387 (0.2691)	0.546794	0.335297
Breusch-Pagan-Godfrey Test	4.895869	0.0026	0.0052 (0.0392)	0.328673	0.261540
Arch Test	3.657435	0.0627	0.0605 (0.0047)	0.080106	0.058204

All the values from the white test and Breusch-pagan-Godfrey gives values that are less than 5% and greater than the 5% critical values for the arch test, meaning that the problem of Heteroscedasticity was corrected by transforming the data into log form. The observation for white test shows p value of 0.0142 less than 0.05. Breusch-Godfrey serial correlation lm test shows p value of 0.0026 less than 0.05 implying that in both cases, the null hypothesis is rejected meaning there is homoscedasticity when OLS is used in white test and Breusch-Godfrey serial correlation lm test as seen in the result. The adjusted r-square in both cases is positive meaning the relationship between the tested variables is positive. The Arch test shows p value of 0.0627 more than 0.05 implying the residual is not Heteroscedastic and the model is desirable.

Table 4. Unit Root Tests Summary for Log Variable

Variable	Test critical values (level)	ADF Test Statistic	Prob*	Coefficient of the variable (-1)	Lag length	INFERENCE
DR	-4.180911* -3.515523** -3.188259***	-3.292389	0.0808	-0.415813	0	I(0) Constant and trend
EXR	-4.180911* -3.515523** -3.188259***	-1.979435	0.5961	-0.158055	0	I(0) Constant and trend
INTR	-2.622585* -1.949097** -1.611824***	-0.256757	0.5875	-0.004266	3	I(0) None
INFR	-2.624057* -1.949319** -1.611711***	-0.842373	0.3448	-0.021137	4	I(0) None
RGDP	-2.619851* -1.948686** -1.612036***	-1.026659	0.2694	-0.074803	1	I(0) None

Note: critical values

* denotes 1% significant level

**denotes 5% level

***denotes 10% level

The Augmented Dickey Fuller (ADF) test for unit root test used to test for stationarity for all the study variables. Further tests at level with intercept and trend shows that the variables are not stationary. In all the above cases, the computed ADF tau statistics are less negative than the MacKinnon critical tau statistics values at 0.05, which is a generalized significance level, therefore the null hypothesis of non-stationary in the time series data are acceptable. The ADF test for the variables in this study has a unit root when exogenous variable is at level with intercept meaning that it does have intercept and trend. The test has a Prob* value for linear model which is greater than 0.05. The ADF critical values compared have a more than test statistic absolute value considered. Therefore, in this case accept the null hypothesis at 5% significant level.

4.2. Regression Analysis

From the output table 5, there is a positive relationship between currency exchange rate and diaspora remittances as p-value is $0.000 < 0.05$, a unit increase in exchange rate of KSH/USD leads to 3.0446 increase in diaspora remittances. This implies that when the local currency loses strength, a lot of diaspora remittances flow into the economy to help the shilling by raising the amount or supply of dollar and vice versa. There is a positive relationship between interest rates and diaspora remittances as p-value is $0.001 < 0.05$, a unit increase in interest rates leads to 0.398 increase in diaspora remittances. The above results imply that the increase in exchange rates and interest rates widens the investment demand at home causing increase in the supply of dollars into the economy. Higher interest rates attracts diaspora capital inflows causing an increase in the demand for local currency to exchange for foreign currency and hence a decrease in demand for foreign

currency. When there is a decrease in demand for foreign currency, the exchange rates would depreciate against the local currency, which eventually would lead to decrease in interest rates causing a decrease in diaspora remittance. The movement in the two variables may explain the seasonal variations in diaspora remittances in Kenya.

Table 5: Log-Linear Regression Output

Variables	Coefficient	t-value	p- value (0.05)
Constant(C)	-2.345845	-1.122293	0.2684
LN(EXR)	3.044641	6.210878	0.0000
LN(INTR)	0.398101	4.225237	0.0001
LN(INFR)	-0.305488	-3.155678	0.0030
LN(RGDP)	-0.092340	-1.207103	0.2345
R ²		0.633600	
F- Statistics		17.29258	
Prob(F-statistic)		0.000000	

The estimation equation of the log-linear model;

$$\text{LNDR} = C(1) + C(2) * \text{LNEXR} + C(3) * \text{LNINTR} + C(4) * \text{LNINFR} + C(5) * \text{LN RGDP}$$

This forms the long run model

$$\text{LNDR} = -2.346 + 3.045 * \text{LNEXR} + 0.398 * \text{LNINTR} - 0.306 * \text{LNINFR} - 0.0923 * \text{LN RG}$$

There is a negative relationship between inflation rates and diaspora remittances as p-value is $0.003 < 0.05$, a unit increase in inflation rate leads to 0.305 decrease in diaspora remittances indicating a negative causality of inflation rate on diaspora remittances. There is insignificant relationship between the real GDP growth rate and diaspora remittances as p-value is $0.235 > 0.05$, a unit increase in real GDP growth rate leads to 0.092 decrease in diaspora remittances. The inverse relationship between inflation rates, real GDP rates and diaspora remittances implies that, an increase in domestic inflation would cause the purchasing power of people to decrease and thereby more money sent home to cushion relatives for consumption purposes. However, the inflation may also be a sign of a weakening economy, causing the withheld of investment portion of the diaspora remittances. The withheld portion may be a bigger portion when compared to the consumption portion thereby causing the negative overall effect on the diaspora remittances. As real GDP rate of the economy increases, more people locally earn higher incomes thus reducing the demand for monetary support from relatives in the diaspora.

5. CONCLUSION

The R-square describes how much the independent variables in the model can jointly influence the dependent variable. In this case, the R² is 63.36% more than 60%, thus the overall model is a good fit at p-value = $0.000 < 0.05$. The Adjusted R² = 59.7% of the linear model explain the extent to which the used independent macroeconomic variables determine the magnitude of flow of diaspora remittances into Kenya. Therefore, for Kenya to maintain a steady increase in diaspora remittances, then the Kenyan government has to adopt policies that would maintain the macroeconomic variables at reasonably manageable levels by reducing magnitude fluctuations in the exchange rates and domestic interest rates and constant reduction in inflation rates. The optimal possible approach would be to limit foreign exchange market intervention and thus allow capital flows to stabilize by the exchange rate movements from medium to long-term periods, thus eliminating

the effects on the interest rate structure. Further studies may include other variables that capture the political and environmental factors that may affect diaspora remittances in an economy.

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