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DIASPORA REMITTANCES AND DUTCH DISEASE IN KENYA

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DECLARATION

This research proposal is my original work and has not been presented for award of a degree in any University.

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To my beloved wife Caroline, daughters Valerie and Sasha and son Gareth

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OPERATIONAL DEFINITION OF TERMS

Appreciation: A rise in the value of a country's currency in the foreign exchange market, relative to either a particular foreign currency or to a weighted average of other currencies.

Depreciation: It is the changes in the exchange rate when it is allowed to float such that the value of local currency in terms of foreign currency falls. That is the weakening of local currency relative to foreign currency.

Devaluation: It is a deliberate reduction in the value of the local currency relative to the foreign currency in a fixed exchange rate regime.

Exchange rate: It is the value of a foreign country's currency in terms of the home country's currency. It specifies how much one currency is worth in terms of the other.

Market exchange rate: is the exchange rate as determined by the market forces of demand and supply.

Real exchange rate: is obtained when the nominal exchange rate is adjusted with the relative price levels of the foreign country to that of the home country.

ACRONYMS AND ABBREVIATIONS

B-S : Balassa-Samuelson

CBK : Central Bank of Kenya

CPI : Consumer Price Index

ECM : Error Correction Model

FDI : Foreign Direct Investment

GDP : Gross Domestic Product

IFS : International Financial Statistics

NGO : Non Governmental Organization

NER : Nominal Exchange Rate

ODA : Official Development Assistance

REER : Real Effective Exchange Rate

REMIT : Remittances

RER : Real Exchange Rate

USA : United States of America

VAR : Vector Autoregressive mode

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ABSTRACT

Diaspora remittances to Kenya have seen a sharp and sustained rise over years, increasing from under \$383 million in 2004 to over \$890 million in 2011. This has not gone without leaving its macroeconomic impacts. According to Central Bank of Kenya, these remittances have led to higher savings and investments and consumption. Remittances however, can lead to the appreciation of a country's real exchange rate and hurt its competitiveness, a phenomenon known as Dutch disease. The overvalued real exchange rate makes the country's exports relatively expensive, imports cheaper and thus puts pressure on the country's current account.

This study examined the relationship between Diaspora remittances and real effective exchange rate in Kenya and established the impacts of real effective exchange rate changes on net exports in Kenya. The study used secondary time series data that was obtained from Central Bank of Kenya, Kenya Bureau of Statistics, the IFS and the World Bank.

Regression analysis was carried out using vector error correction (VECM) approach to examine the relationship between Diaspora remittances and real effective exchange rate and then applied VAR to find the impact of REER on net exports

The study found that Diaspora remittances causes real exchange rate appreciations however, the changes in real effective exchange rate do not have any impact on net export in Kenya and hence does not cause Dutch disease effect in Kenya. The results showed that the real exchange rate appreciating effects of remittances are absorbed by the productivity- enhancing depreciating impact of foreign direct investment.

CHAPTER ONE:

INTRODUCTION

1.1 Background of the problem

Persistent disparities of wealth and income between countries have caused a significant migration of labour, which in turn has led to an ever increasing level of migrant remittances returning to the countries of origin. Human capital therefore can be seen as a resource which an economy develops. Through external migration because of difference in prospective returns and subsequent remittance to the exporting country; the economy mines from these resources (Corden and Neary, 1982).

One benefit of external migration in Kenya is remittances. These remittances have been steadily rising over time with increased migration especially to developed countries such as US. In the year 2011, the share of recorded remittances in Kenya amount to about 7 percent of GDP (CBK, 2011). The remittances to Kenya surged to \$891.129 million in the year 2011, compared with \$ 641.943million in 2010 (CBK (2011). The government of Kenya recognizes the role Diaspora could play in national development and has therefore highlighted as one of the flagship project under financial sector in the vision 2030 (CBK, 2011).

As with a natural resource windfall, a particular concern is that, since remittances provide abundant resources to labor-exporting countries, they may exert the 'resource curse' which inflicts risks of real exchange rate appreciation and loss of export competiveness in the receiving country (Corden and Neary, 1982).

Remittances may serve as a substitute for labour income and may be used by recipients to reduce their labor supply and labour market participation, obviously having an adverse impact on economic growth and development. There is the argument that there are often serious deleterious impacts on economic development when remittances grow to represent a significant portion of GDP. One problem appears to be that these funds can provide an unfortunate respite from pressures to carry out needed structural reforms. Without the remittances, reforms such as increased fiscal discipline and policies aimed at improving the investment environment or reducing poverty would proceed more expeditiously (World Bank, 2010).

Concerns have emerged that rising levels of remittances, as any other massive capital inflow can appreciate the real exchange rate in recipient economies (Amuendo and Pozo, 2004, Lopez *et al*, 2007), and therefore generate a resource allocation from the tradable to the nontradables sector (Acosta *et al,* 2007). This phenomenon is usually labeled as the Dutch disease. Rodrik (2007) provide evidence that real exchange rate overvaluation undermines the long term economic growth, particularly for developing countries, in that those countries tradable goods production suffers disproportionately from weak institutions and market failures. This underscores the importance of remittances for real exchange rate movements.

Dutch Disease is defined as currency appreciation resulting from increased inflows, which makes the manufacturing sector less competitive, and can even result in job losses. In the core Dutch disease model, resource boom embody a 'spending effect' making the real exchange rate appreciation the principal mechanism for resource allocation. Income from a natural resource can result in private excess demand for both traded and non traded goods. Equilibrium in the non tradable goods markets calls for an increase in their relative price (the real exchange rate), rendering their production more rewarding than the (existing and potential) production of exportable. Under full employment of factors of production, upward pressure on real wages in the tradable sector moves labour from the costly tradable sector to the non tradable sector and thus a tradeoff between both sectors is inevitable. The export firms become less profitable and may grow more slowly, or perhaps contract or even close (Corden and Neary, 1982). In a market economy, this switch in production occurs by a change in relative prices that encourages more non-tradable production and less tradable production (Barder, 2006).

Real exchange rate is defined as the price of tradable goods and services relative to non tradable goods and services (Corden and Neary, 1982). A fall in *RER* implies a real exchange rate appreciation and an increase in the opportunity cost for producing tradables. This is synonymous with a deterioration of the country's competitiveness under the assumption of unchanged relative prices in the economies of the trading partners. Conversely, an increase in *RER* will result in real exchange rate depreciation and an improved international competitiveness. When demand for non-tradables increases, the cost of those goods and services may rise relative to tradables. This is called an appreciation of the real exchange rate (Corden and Neary, 1982).

A country generally experiences an appreciation of its real exchange rate as it industrializes. As productivity, output and incomes increase relative to the rest of the world, the relative price of its tradables rises relative to non- tradables. In the case where this occurs without foreign transfers, the long-run appreciation of the real exchange rate is driven by a rise in productivity, output and incomes. The appreciated real exchange rate is the corollary of higher levels of incomes and consumption that the country enjoys as productivity increases and its citizens becomes richer (Barder, 2006).

The appreciation resulting from remittance is different; the foreign income causes an immediate appreciation of the exchange rate before there has been an increase in productivity and output. The foreign income finance a level of consumption and investment that is higher than the country's economic output would permit. The appreciated real exchange rate is in line with the higher consumption that the country enjoys as a result of the sustained increase in foreign income; but the higher consumption and real exchange rate are both out of line with the nation's underlying productivity and output (Hausmann *et al*, 2004).

The increased demand for non-tradables raise domestic prices if supply cannot easily increase to meet the additional demand – for example, if there is a lack of skilled labor. In this case, the rise in domestic prices of non-tradables is needed to attract sufficient productive resources out of tradables into non-tradables, and this causes the fall in tradables production (Barder, 2006).

Remittances being generally a transfer of foreign currency helps the recipient country by enabling it to import goods and services without having to produce and sell exports to pay for them. It permits higher consumption of non tradable than was possible without the remittances, by switching productive resources into non-tradable from tradable (Giuliano and Ruiz-Arranz's, 2005).

Real exchange rate appreciation associated with remittances can impact negatively on the tradable sector of the economy through loss of international competitiveness especially if it also fuel inflation or if the higher prices result in economy-wide increases in wages. The widening of current account deficit, resulting from an increase in demand for import as a result of real exchange rate appreciation can add to the loss of competiveness of domestic firms. Possible weakening of monetary control, inflation, and sectoral allocation of investment, particularly in real estate can further reduce competitiveness of domestic firms (Barder, 2006).

A cursory look at flow of remittances to Kenya shows that remittances have constantly risen over time.

Figure 1.1 showing Remittances to Kenya from the year 2004 to the year 2011

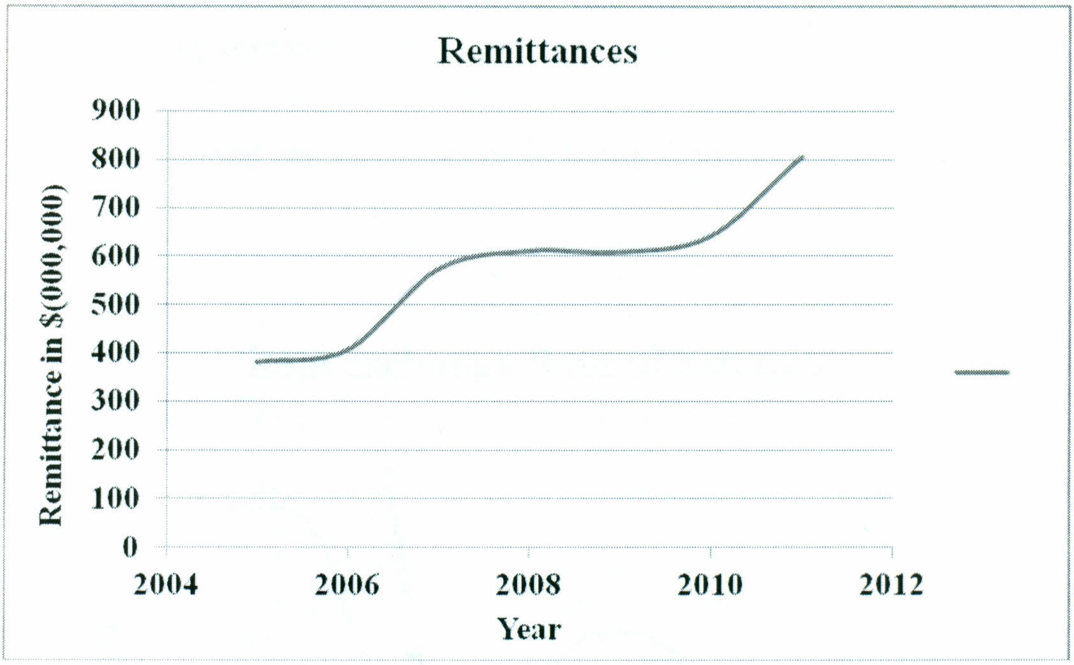

Figure 1:1: Remittances to Kenya from the year 2004 to the year 2011

Source: Central Bank of Kenya Website 2011

The remittances significantly increased in mid 2007 to 2008. Given that it was an elections year, the increased remittances could be explained by the role Diaspora play in funding of elections in the country. The remittances growth significantly reduced between 2008 -2009 due to the political environment which was not stable and post election violence which discouraged investment in the country and consequently cutting back on remittances. The remittances however, steadily increased after 2009 reflecting on stable political environment and improved security.

The real exchange rate in Kenya has been appreciating steadily over the same period time as shown in figure 1.2.

Figure 1.2 showing real exchange rate in Kenya from the year 2004 to the year 2011

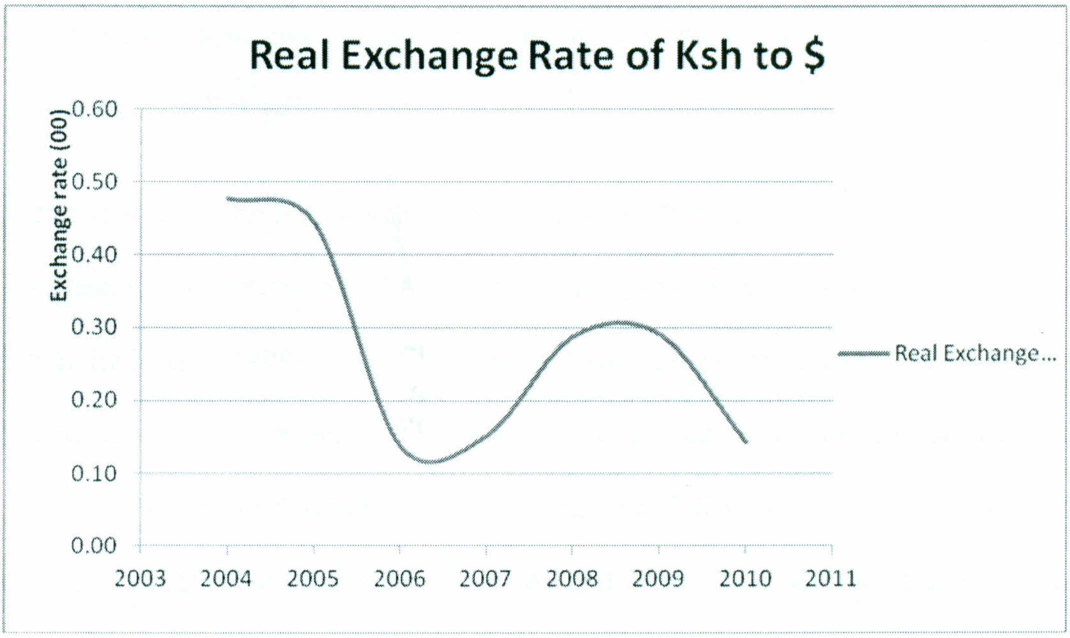

Figure 1:2: Real exchange rate in Kenya from the year 2004 to the year 2011

Source: Economic Survey, 2009 & Central Bank of Kenya Website 2011

The real exchange rate depreciated significantly from mid 2006 to 2009. This period was characterized by fluctuations in oil prices, heated election campaigns and post elections violence as well as global financial crises. All could have contributed to real exchange rate depreciation. From 2009, the real exchange rate started to appreciate steadily once again due to improved political environment and security among other factors.

The appreciating real exchange rate in Kenya occurred at the same period when remittances have been increasing. The two figures (fig1.1 & fig 1.2) show some similar trends and thus raising the question as to whether there is a relationship between remittances and appreciating real exchange rate in Kenya. More importantly, could the increasing remittances explain the real exchange rate appreciation in Kenya?

Some studies in the remittance literature have looked at remittance as one of the macroeconomic determinant (Aggarwal *et al*, 2006, Giuliano and Ruiz-Arranz's, 2005, El-Sakka, 1999). This literature is based on macroeconomic analyses of aggregate data and in general, agrees that remittances have positive impacts on growth, finances, or foreign exchange (Solimano, 2003). However, some studies (Loser *et al*, 2006, Barder, 2006) have warned of possible adverse effects related to productivity of sectors exposed to international competition. The World Bank (2010) considered the impact of remittance on labour force participation and found mixed results. No study has however, looked at the effect of remittances on real effective exchange rate. Mwega (2010) while examining the effects of the global financial crisis; pointed that remittances in Kenya may have adverse macro effects, which include the possibility of Dutch disease arising from an appreciation of the real exchange rate, hence undermining the production of cost-sensitive tradables such as cash crops and manufactures.

This study provides empirical evidence on the relationship between remittances and real effective exchange rate in Kenya and the impact of a change in real effective exchange rate on net exports. The study offered some recommendations on how Kenya and other developing countries' economic growth programs can approach remittances.

1.2 Statement of the problem

Remittances to Kenya have seen a sharp and sustained rise, increasing from 382.153$ million in 2004 to 891.107 million in December 2011(CBK, 2011). These inflows have led to higher saving and more funds for investment, increased consumption and improved human capital of the recipient household and communities (CBK, 2011).

These remittances when invested, act as micro-finance mechanism supporting entrepreneurship and small business formation in receiving countries. The existing literature, however, presents strong case that remittances can cause real exchange rate appreciation and loss of export competitiveness which inflicts slow growth of the export sectors of the economy, a phenomena called Dutch disease.

The Dutch Disease theory suggests that the effects of capital inflows on resource allocation are traced through their effects on the real exchange rate. More precisely, it tells us that large inflows of capital can give rise to an appreciation of the real exchange rate and eventually a deterioration of the competitiveness of the sectors exposed to international competition, thus preventing the development of a dynamic export sector.

With the increasing remittances in Kenya, the question is whether those private transfers inflict cost in the form of loss of competiveness through the Dutch disease phenomenon. From Fig. 1.1 and Fig 1.2, it is clear that there could be negative relationship between real exchange rate and the Diaspora remittance as a percentage of GDP. Thus, there is a possibility that this continued rise in Diaspora remittance causes an appreciation in real exchange rate which in turn brings about the Dutch disease effects by making exports less competitive in the foreign countries. Although extensive literature has been conducted on the Dutch disease effect, no study has looked at Diaspora remittance and the Dutch disease in Kenya. Thus, this study fill this gap by uncovering the empirical relationship between Diaspora remittance and real effective exchange rate in Kenya and the impact of changes in real exchange rate on net exports.

1.3 Research questions

i. What is the relationship between Diaspora remittances and real effective exchange rate in Kenya?

ii. What is the impact of real effective exchange rate appreciation on net exports in Kenya?

1.4 Objectives

The general objective of the study was to investigate the empirical relationship between Diaspora remittances and the Dutch disease in Kenya.

The specific objectives were:

i. To examine the relationship between Diaspora remittances and real effective exchange rate in Kenya.

ii. To establish the impacts of real effective exchange rate changes on net exports in Kenya.

1.5 Significance of the study

This study provided empirical evidence on the relationship between Diaspora remittance and real effective exchange rate and the impact of real exchange rate change on net export. The study uncovered the relationship between Diaspora remittance and Dutch disease in Kenya. The paper offered some recommendations on how Kenya and other developing countries' economic growth programs can approach remittances so as to reduce the potential harmful effect of this large capital inflows..

Secondly this research contributed to international finance literature by providing the relationship between Diaspora remittances and real effective exchange rate in Kenya and its impacts on net export.

1.6 Scope and organization of the paper

Monthly time series data for the period 2004:1 to 2011:12 was used. The rationale for choosing this period is that from 2003 remittances has steady increased to be a significant proportion of foreign exchange in Kenya. The exchange rate also did not experience major fluctuations during this period which could greatly distort the results of the study.

This study is organized into five chapters. Chapter one introduced the study and its objectives. In chapter two relevant theoretical and empirical literatures were reviewed and theoretical framework presented. The research design and methodology was developed in chapter three. The empirical result was presented and discussed in chapter four and finally, summary, conclusions and policy implications is presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical literature

2.1.1 The Dutch Disease

Dutch Disease is defined as currency appreciation resulting from increased inflows, which makes the manufacturing sector less competitive, and can even result in job losses. In the core Dutch disease model, resource boom embody a 'spending effect' making the real exchange rate appreciation the principal mechanism for resource allocation. Assuming fully spent (rather than invested) income from a natural resource can result in private excess demand for traded and non traded goods, Corden and Neary (1982). Equilibrium in the non tradable goods markets calls for an increase in their relative price (the real exchange rate), rendering their production more rewarding than the (existing and potential) production of exportable. Under full employment of factors of production, upward pressure on real wages in the tradable sector moves labour from the costly tradable sector to the non tradable sector and thus a tradeoff between both sectors is inevitable.

Corden and Nearly (1982) present the core model of the Dutch disease economies which assumed that there are three sectors in an economy namely the booming sector (this is the sector which observe high export revenues),the lagging sector (this is the sector which consist of non-booming tradable sector such as agriculture and manufacturing) and the Non-tradable sector. The first two sectors produce tradable goods at a given world prices.

Corden and Nearly (1982) analyzed three static models which characterized different assumptions about the factor mobility between sectors and show that boom impacts economy two effects, namely resource movement effects and spending effect which lead to direct de-industrialization (i.e. the movement of labour from the lagging to the booming sector) and indirect de-industrialization (i.e. movement of labour from the lagging sector to the Non –tradable sector)

Dutch disease has been regarded as a 'resource curse' and in these regard resource abundance seems to be a curse rather than a blessing for such economies. There are four main explanations for the resource curse, but the traditional approach to tackling the resource curse is the Dutch disease concept (Sturm et al, 2009). Dutch disease is the appreciation of a country's real exchange rate which can lead to a decline in export of agricultural and manufactured goods and inflate the cost of non-tradable goods (Corden 1984; Corden and Nearly 1982; Oomes and Kalcheva (2007), by combining these two effects, generate four testable predictions of Dutch Disease as: (a) decline in manufacturing growth, reflecting both direct and indirect de-industrialization; (b) faster growth in the non-tradable sector; (c) surge in overall wage level; and (d) real exchange appreciation, due to an increased relative price of non-tradable.

2.1.2 The Mundell-Fleming Model

The Mundell-Fleming model is an economic model that was developed by Robert Mundell and Marcus Fleming in 1960s. The model is an extension of the IS-LM model. Whereas the traditional IS-LM Model deals with economy under autarky (or a closed economy); the Mundell-Fleming model tries to describe an open economy. By extending the IS-LM model to the case of an open economy, the model provides an understanding of how the exchange rate is determined. The IS-LM model considers three markets: goods, money and assets, and is mainly used to analyse the impacts of monetary policy and fiscal policy. When the goods market is not in full employment equilibrium level, it shows how to use fiscal policy and monetary policy to adjust the economy to full employment equilibrium. Since only two of the three markets are independent, the IS-LM model only establishes a linkage between the money market and goods market. In the Mundell-Fleming model, the balance of international payments is considered as another equilibrium condition in addition to the money market and goods market.

The first equilibrium is the goods market equilibrium, which is given by the IS equation

$Y = C + I + G + (X - M)$ .... (2.6)

where Y denotes domestic national income; C = C(Y) denotes consumption, which is a function of income; I = I (i) denotes investment, which is a decreasing function of nominal interest rate i; G denotes government spending; X = X(Y*,q) denotes exports, which is an increasing function of foreign national income and real exchange rate. M = M(Y, q) denotes imports, which is an increasing function of domestic income and decreasing function of the real exchange rate.

The real exchange rate (q) is defined by

$$q = \frac{SP^*}{P}, \quad \text{...(2.7)}$$

where S is the nominal exchange rate; P, P* denote domestic and foreign prices, respectively.

The second equilibrium is the money market equilibrium, which is defined by the LM equation. Let Md/P = L(Y,i) represent real money demand, which is an increasing function of domestic income and decreasing function of the interest rate, and Ms represent money supply. The money market equilibrium condition can be expressed as

$$\frac{M^s}{P} = L(Y,i), \quad \text{...(2.8)}$$

The final market equilibrium is the external equilibrium denoted by the BP equation

$$BP = CA + KA = 0 \quad \text{...(2.9)}$$

where current account $CA = PX - SP^{*}M$ and capital account $KA = K(i - i^{*} - \Delta s^{e})$

The three are determined simultaneously. One of the most important issues addressed by the model is the so-called trilemma, which states that perfect capital mobility, monetary policy independence and a fixed exchange rate regime cannot be achieved simultaneously. Specifically, it argues that a country cannot sustain monetary policy independence in a fixed exchange rate regime with perfect capital mobility. However, this argument is made in a small country setting, and it is not necessarily true in a bigger economy. The model also predicts a perfect correlation between the level of exchange rate and the level of money supply in the long run. Another important implication is that devaluation may lead to further devaluation if fiscal discipline, inflation and balance of payments are not well managed, or if the assets market produces a self-fulfilling bubble. Finally, the impact of devaluation on the improvement of the current account may be weakened if an economy is heavily reliant on the re-export processing industry.

2.1.3 The Balassa-Samuelson Model

Since, price levels are determined by the interaction between supply and demand, which in turn are associated with producer and consumer's behaviour, a starting point for studying the determinants of the real exchange rate is to investigate producer's behaviour and consumer's behaviour, which are associated with the microeconomic foundations of exchange rate theory. In this subsection, from the angle of producer behaviour, the Balassa- Samuelson (B-S) model due to Balassa and Samuelson (1964) is presented. It shows clearly the role of productivity in the real exchange rate determination.

The standard version of the B-S model is presented using a single-factor aggregate production function. The model assumes that the production functions of traded goods (T) and non-traded goods take the following form:

$$Y_T = A_T L_T$$
$$Y_N = A_N L_N$$
$$Y_T^* = A_T^* L_T^*$$
$$Y_N^* = A_N^* L_N^*$$

where Y is production, A is a constant describing technology, and L is labour force. Foreign economy employs the same kind of technology as the domestic economy, but the value of the technological parameter (A) may differ. The subscript T denotes the traded goods sector and the subscript N the non-traded goods sector. This model also assumes that the law of one price holds for traded commodities and that the world price of traded commodities is equal to one without a loss of generality. In addition, labour is perfectly mobile between sectors within an economy, but immobile between economies. The mobility of labour ensures that the wage rates w are equal in all sectors of an economy. Price index is the weighted geometric average of prices of traded and non-traded goods:

$$P = (p_T)^{\gamma}(p_N)^{1-\gamma} = (p_N)^{1-\gamma} = \left(\frac{A_T}{A_N}\right)^{1-\gamma} \quad \text{...} (2.10)$$

where γ is the share of traded goods in total outputs. If this share is the same at home and abroad, then the relative price vis-à-vis the outside world is

$$\frac{P}{P^*} = \left(\frac{A_T / A_N}{A_T^* / A_N^*} \right)^{1-\gamma} \quad \text{(2.11)}$$

Let $A_T = GDP_{nom}$, where GDP_{nom} the nominal GDP per employee is. Therefore, equation (2.11) can be re-written as

$$\frac{P}{P^*} = \left(\frac{GDP_{nom}}{GDP_{nom}^*} \right)^{1-\gamma} \left(\frac{A_N^*}{A_N} \right)^{1-\gamma} \quad \text{(2.12)}$$

Equation (2.15) states that the relative price is determined by relative GDP and the relative technological level or productivity in non-traded goods sector of the two economies. Other things remaining the same, a higher nominal GDP growth in the home country than abroad, leads to an appreciation of the real exchange rate. On the other side, given the economic growth rates, higher productivity of non-traded goods in the home country than the foreign country will lead to depreciation of the real exchange rate.

The B-S model is one of the cornerstones of the traditional theory of the real equilibrium exchange rate. The key empirical observation underlying the model is that countries with higher productivity in traded goods compared with non-traded goods tends to have high price levels. The B-S model hypothesis states that productivity gains in the traded goods sector allow real wages to increase commensurately, and since wages are assumed to link the traded to the non-traded goods sector, wages and prices also increase in the non-traded goods sector. This leads to an increase in the overall price level in the economy, which in turn results in an appreciation of the real exchange rate.

The shortcomings of this model are clear. First, it assumes that the traded goods price at home is the same as that abroad. This is clearly unrealistic. Secondly, since it says nothing about the demand side, it is criticized by the Keynesian school, which regards price to be rigid or sticky. Thirdly, without considering the behaviour of consumers, or the demand side, it is difficult to interpret how market prices are formed. Last, this model does not deal with the role of money; it can at best explain partly how the real exchange rate is determined. This model captures effect of differences in sectoral productivity in exchange rate.

2.1.4 Dornbush Overshooting Model

The Salter-Swan Corden-Dornbush paradigm serves as the theoretical underpinning for empirical models used to analyze the impact of capital inflows on the real exchange rate in developing economies. The model showcases the transmission mechanism by which an increase in capital inflows (remittances in this case) could cause a real exchange rate appreciation

The evidence that the choice of exchange rate regime can have important effects on real variables motivated a sticky price extension of the flexible exchange rate monetary model. This yielded the elegant Dornbusch Overshooting model, which was presented in the influential masterpiece "Expectations and Exchange Rate Dynamics" by Rudiger Dornbusch in 1976. Under the Dornbusch (1976) model, uncovered interest rate parity and the money market equilibrium of the flexible monetary model are included. However, the assumption of flexible prices is replaced by sticky prices. Thus, the first condition in Dornbusch model is the monetary equilibrium:

$$\mathrm{w}\, m_t - p_t = -\eta i_t + \phi y_t \qquad (2.13)$$

Where m is the money supply, p is the domestic price level, and y is domestic output, all in logarithms; η and φ are positive parameters. Equation (2.13) implies that higher interest rates raise the opportunity cost of holding money and thereby lower the demand for money; on the other hand, a higher interest rate also means high costs of speculation, which lowers the demand of money as well. Conversely, an increase in output raises the transaction demand for money. Finally, the demand for money is positively related to the level of prices. The second condition is uncovered interest rate parity, which can be rewritten as

$$i_t = i_t^* + \left(E_t(s_{t+1}) - s_t\right) \qquad (2.14)$$

where s is the logarithm of the exchange rate (home currency price of foreign currency), and E_t denotes market expectations based on information at time t.

$i_{t+1} = \log(1+i_{t+1})$ and $i^* = \log(1+i^*)$ are approximately correct. The foreign interest rate i^* is taken as a given exogenous variable. In accordance with uncovered interest rate parity, the home interest rate must be equal to the foreign interest rate i^* plus the expected depreciation rate of the home currency $E_t\left(s_{t+1} - s_t\right)$.

Unlike under the perfectly flexible price model, the prices of goods are sticky and cannot adjust immediately to clear the market in the Dornbusch model. With sticky prices, an adjustment mechanism is needed for an economy to converge to its equilibrium path in which full employment is realized. Given the magnitude of the departure of the real exchange rate from its long-term equilibrium, the force to pull it back to equilibrium will increase. Dornbush assumes that if the real exchange rate rises over its long-term equilibrium level, or if the foreign currency is overvalued or the domestic currency is undervalued, the demand for domestic goods will increase. On the other hand, if the real exchange rate falls below its long-term equilibrium level, or the foreign currency is undervalued or domestic currency is overvalued, then the demand of domestic goods will fall. In this connection, the third condition is an adjustment mechanism of the demand for domestic goods, which can be expressed as

$$y_t^d = \bar{y} + \delta\left(s_t + p^* - p_t - \bar{q}\right) = \bar{y} + \delta\left(q_t - \bar{q}\right), \quad \text{...} (2.15)$$

Where p and p^* are the logarithms of the domestic price level P in domestic currency and foreign price levels, respectively, with p^* in foreign currency, δ is a constant greater than zero, $q_t = \log\left(S_t P^* / P\right) = s_t + p^* - p_t$ is the real exchange rate at time t, $\bar{q} = \log\left(SP^* / P\right) = s + p^* - p$, and y denote real exchange rate at which full employment is realized and the exogenous long-term equilibrium output, respectively.

The fourth condition is the price adjustment equation. Keynes assumed that the domestic price level p does not move instantaneously in response to unanticipated monetary disturbances, but adjusts only slowly over time. However, under Dornbusch's model the feature of sticky prices is different from that in the Mundell-Flemming model where the domestic price level is basically assumed to be fixed.

Using the price adjustment mechanism proposed by Mussa (1982), which is better suited than Dornbusch's original formulation to dealing with more complex exogenous shocks, the sticky-price adjustment process can be described as

$$p_{t+1} = p_t + \psi\left(y_t^d - \bar{y}\right) + \left(s_{t+1} - s_t\right) \quad (2.16)$$

The Dornbusch model is well known for its overshooting phenomenon, which states that one permanent change in the money supply must lead to a proportionate change in the price level and the exchange rate in the long run. But in the short run, the price level is fixed and the nominal exchange rate must overshoot its long-run equilibrium. That is, any initial disturbance of money supply will cause a larger rise in exchange rate in the short-run than in the long-run. Another significant conclusion of the Dornbusch model is that the impact on the exchange rate of a monetary shock is greater when prices are sticky than when they are flexible. The third conclusion is that the exchange rate converges to its flexible-price equilibrium value following an initial overshooting after a shock and that the nominal exchange rate is more volatile than the real exchange rate when $\psi\delta < 1$.

A central conclusion of the model is that with sticky prices and flexible exchange rates, monetary shocks will impact on the real economy, leading to large changes in prices and output and prolonged adjustment. If the exchange rate is fixed, the real effects of money demand shocks can be eliminated by setting money supply to money demand. The model also states that the exchange rate policy is to some extent inconsistent with the independence of monetary policy. When a real shock occurs, say a long-run rise in the real exchange rate, the model forecasts that a new full employment equilibrium adjustment will occur immediately under a floating exchange rate regime, and need not change the price level. If the exchange rate were fixed, in order to recover the real economy to equilibrium, the entire burden would have to be borne by the prices of goods. But because these prices are sticky, it is a time-consuming process for the economy to reach equilibrium.

The deficiencies in this model include the inability to deal adequately with the current account and fiscal policy dynamics, or more fundamentally, with welfare issues, because it lacks a micro foundation. In addition, it is premised on the assumption that capital is perfectly mobile and the market is clear. In cases where capital mobility is imperfect, or where capital control is stringent, as in developing countries, there is a lot of room for the model to be improved. Finally, a fixed exchange rate regime may not be a viable option in the long run, given the limited ability of an economy to endure pervasive speculative attacks on a fixed exchange rate. Finally, the model in its original formulation was intended to represent equilibrium at a point in time.

2.2 Empirical literature review

Emmanuel K K et al (2008) considered remittances, exchange regimes and the Dutch disease using panel data analysis. They used unbalanced data set comprising of 109 developing and transitional countries for period 1993-2003 that were selected based on availability of data, with at least three consecutive years of information on remittance flow. They found that rising levels of remittances in emerging economies can have an important spending effect that culminates in an increase in the relative price of nontradables and real exchange rate appreciation. The results also indicate that a resource movement effect that favors the nontradables sector at the expense of tradable goods follows an increase in remittances. In particular, the evidence shows that the share of services in total output rises while the share of manufacturing declines, these being characteristics of the phenomenon known as the Dutch-Disease. They found that the results still hold after dealing with endogeneity issues and controlling for economic growth, terms of trade, trade openness, monetary aggregates and fiscal policy. The authors left crucial questions that arises as to whether such macroeconomic adjustments following an inflow of remittances are detrimental to the economies in terms of economic growth and welfare and what policy mixes are worth pursuing to address them.

Makhlouf F et al (2011) analysed remittances and Dutch disease in Pakistan economy using Bayesian approach and found that the Pakistani economy exhibits symptoms of the Dutch disease as a result of the remittance inflows. They found remittances on the country's competitiveness appear to be detrimental, even though many households benefit directly from them. The results lend credence to the argument that remittances have, over the years, caused a shift in resource allocation through consumption of non-tradable goods and services. They found that the net effect is that the country's exports have become relatively less competitive in the foreign markets and the imports have become more attractive. They also found that the real exchange rate appreciating effect of remittances is more significant than the one caused by other financial flows because unlike foreign capital inflows, remittances are the outcome of a gradually developing social process (that of migration), and are not prone to sudden stops or reversals.

Fayad G (2010) investigated the potential Dutch disease threat of remittance inflows in a panel of net labor exporters in the Middle East and North Africa (MENA) region. Fayad (2010) found that the real exchange rate effect of remittances significantly changes whether they are included separately or interacted with FDI. The results show that in the MENA region, remittance transfers induce a real exchange rate appreciation, suggesting that they are more likely spent than invested. However, Fayad (2010) found a threshold level of FDI beyond which the appreciative real exchange rate effect of remittances turns depreciative, strongly suggesting that the standalone appreciative effect of remittances, usually found in the literature, is increasingly absorbed by the productivity- enhancing depreciative effect of simultaneous FDI.

Acosta, Lartey and Federico (2009) looked at remittances and Dutch disease in El Salvador using Bayesian approach. Their results generally suggest that remittance inflows lead to the Dutch disease phenomenon under each of the cases considered. They found that whether altruistically motivated or otherwise, an increase in remittances ultimately culminates in a rise in household income and, consequently, an increase in consumption that is biased toward non-tradables.

In addition, remittances result in a decrease in labor supply, leading to an increase in production costs of the non-tradable sector, which is relatively labor intensive. This scenario, in turn, results in rising nontradable prices, consistent with real exchange rate appreciation. Consequently, it creates an expansion of the non-tradable sector at the expense of the tradable sector. They showed that remittances cause Dutch disease even in a scenario where remittances are channeled to investment rather than to household consumption.

2.3 Overview of Literature Review

The Dutch Disease theory suggests that the effects of capital inflows on resource allocation are traced through their effects on the real exchange rate. More precisely, it tells us that large inflows of capital can give rise to an appreciation of the real exchange rate and eventually a deterioration of the competitiveness of the sectors exposed to international competition, thus preventing the development of a dynamic export sector. Theoretical literature shows the exchange rate between two countries' currencies as a function of macroeconomic fundamentals such as the interest rates, prices, output, money, trade balance, government debt, official development assistance consumption, investment and terms of trade, mostly expressed as differential.

Some of theoretical literature has argued that it is unlikely that a long sustained and predictable increase in remittance would, through the impact on the real exchange rate, do more harm than good because of various reasons. First, they found the adverse effect on export from Dutch disease and any impact on economic growth may be small. Secondly remittance spent in part on improving the supply side that is investments in infrastructure, education government institution and health; the result in productivity benefits the whole economy which can offset any loss of competiveness from Dutch disease effect. Third the welfare of the nation's citizen depends on their consumption and investment not just on output. The additional consumption and investment which the remittances finances is larger than any likely adverse impact on output. However other theoretical literature found that remittance can cause substantial harm to the economy through loss of competiveness as a result of exchange rate appreciation. The argument is that appreciations of the real exchange rate slow the growth of a country's export and that remittances increases might thereby harm a country's long-term growth prospects. While some studies done such as Loser *et al* (2006) found the countercyclical trend of remittances produced mixed macroeconomic results which on balance do not cause severe distortions in the economy.

The impact of the remittances on tradable production therefore depends in part on the extent to which there are unemployed resources in the economy. If there are spare resources, the increased demand for non-tradables can be met with no fall in tradable production and no appreciation of the real exchange rate. But if some factors of production are scarce, their price rises, the real exchange rate appreciates, and tradable production contracts to free up those resources for non-tradables. The size of the initial fall in tradable output depends on a number of characteristics of the economy, including: the share of tradable goods in the additional consumption; the capacity to substitute between domestically-produced and imported goods; the elasticity of supply, and the amount of spare capacity in the economy.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section looks at the econometric analysis of the role of remittances on the real exchange rate in Kenya. The study defined the concept real exchange rate and discussed the factors believed to determine the level of and changes in the real exchange rate. The study then performed an econometric test to examine the role of emigrants' remittances on the real exchange rate in Kenya.

3.2 Research Design

This is an attempt to give a clearer picture on whether Diaspora remittances cause Dutch disease effects in Kenya. This study used secondary time series monthly data, spanning the period January 2004 to December 2011 for monthly analysis. The study carried out regression analysis to examine the relations between Diaspora remittance and real effective exchange rate. Vector Autoregressive estimation technique was then be carried out to determine the impact of change in real effective exchange rate on net exports.

3.3 Theoretical Framework

This study used the 'Dutch disease' theory, to analyze the impact of remittances on real effective exchange rate and the impact of real effective exchange rate on net export.

The Dutch disease model predicts that an export boom of one sector in the economy results in a decline of other sectors producing internationally tradable goods due to an appreciation of the real exchange rates. The overall effect is a declining competiveness in the international tradable goods sector.

The Dutch disease model is represented by a simple open economy producing two kinds of goods: internationally tradable goods t and non-tradable goods n. Tradable goods (X_t) are traded internationally without restrictions and their price is determined by the international demand and supply, which is exogenous to the sending country. Non-tradable goods (X_n) are only traded within the model economy due to either trade restrictions or because international trade is not possible e.g. government services or perishable goods. The price of non-tradable goods is determined by the domestic demand and supply.

The demand for both goods is less than completely elastic and they are produced by two factors of production: Labour and capital. Labour is assumed to be homogenous and completely mobile between the sectors while capital, which is always fully employed is only mobile in the long run. The Marginal productivity of labour may diminish; therefore, unemployment of labour is possible. Before the start of migration at a wage rate of W_0; L_n workers are employed in the non-tradable sector and L_t are employed in the tradable sector leaving U_0 workers unemployed (Knerr ,1996)..

Wages will remain unchanged as long as there is unemployment and the total demand of the economy will remain at the same level as deficient consumption of emigrant is compensated by higher consumption of those remaining (Knerr, 1996).

Out- migration under restrictions or quotas would lead to $M_1 < U_0$ migrant leaving the country, thus reducing unemployment from U_0 to U_1. Migration might continue to take place until full employment is achieved. Beyond this point, the limited supply of labour will lead to an increase in wages. Here out-migration of M_2 workers has reduced the labour force in both sectors to L_{2n} and L_{2t} respectively and wages increased to:

$$W_1 = W_j \phi - Cm$$

where W_j is the wage rate in the receiving country and Cm the cost of migration and ϕ the factor representing the preference to remain in the sending country.

The impact of remittance income depend on their share of remittances in GNP, the income of the group receiving additional income, the propensities to spend income on investment or consumption, consumer preferences e.g. for purchasing imported rather than domestic goods, the elasticity of supply and on foreign trade restrictions. The demand for both tradable and non-tradable depends on consumers' preferences. Since capital is immobile in the short –term, supply remains unchanged. An increased demand would lead to higher prices for non-traded goods while the prices of tradable goods remains unchanged since it is determined by international markets. The additional demand will be covered by imports which will increase from I_0 to I_1.

If unemployment prevails, the additional demand can be satisfied without increasing wages and the wages remain constant wages at W_0. If the economy is at full employment, both tradable and non tradable sectors of production will start competing for the available labour and as a result wages increase above W_0, which leads to an increase of the cost of production and the real exchange rate (p_t/p_n) declines.

Since capital is assumed to be immobile in the short-term, additional demand through remittances does not induce real output growth. The increasing remittances will pull labour out of the tradable to non-tradable sector; the tradable sector will thus contract.

In the long run, capital is shifted to the sector where its marginal productivity is highest, namely, the non-traded-sector. The traded-sector loses competiveness due to higher cost and unfavourable exchange rates. The external value of the currency appreciates due an increase of foreign reserves caused by the inflow of remittances. In addition to the shifting of existing capital, capital accumulated from foreign income could also be invested in the non-traded-sector of the domestic economy. So in essence, the Dutch Disease leads to declining international competitiveness through a higher cost of labour and the appreciation of external value of the currency. A shift of labour and capital from internationally tradable goods sector towards the non tradable goods sector takes place.

The level of welfare under Dutch disease systems may not be affected as longs as the inflow of remittances remains unchanged. However, a reduction in the remittances would result in an adaption crisis, which always accompanies significant changes.

3.4 Model Specification

Remittances being financial inflow are, intrinsically associated with the country's monetary aggregates and hence influenced or may in turn be influence by the country's monetary policy. To examine the existence of Dutch disease; the study looked at the drivers of real effective exchange rate (REER) in Kenya. The real effective exchange rate (REER) is considered a major matrix determinant of a country's external competiveness. It is the relative price of domestic to foreign goods. An appreciation of the REER reduces the productivity and profitability of the export oriented sectors of the economy by raising their relative costs and by making the non- tradables cheaper. Following Edwards (1988, 1989), Montiel (1999) and Makhlouf F *et al* (2011), we will take real effective exchange rate index as our indicator of choice. The real effective exchange rate (REER) can be consider as the ratio between the relative prices of the tradables and non-tradables, which is determined by various macroeconomic fundamentals driving the internal and external equilibrium.

The study analyzed the impact of our selected variable on Kenya real effective exchange rate using modified Makhlouf F and Mughal (2011) model. Our model can be written as `

$$REER \uparrow \rightarrow FDI \uparrow \rightarrow ODA \uparrow \rightarrow REM \uparrow \rightarrow REER_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

$$NetExport \uparrow \rightarrow REER \uparrow \rightarrow Net\ Export_{t-1} \uparrow \rightarrow REM \uparrow \rightarrow FDI \uparrow \rightarrow ODA \uparrow \ldots. \quad (3.2)$$

REER : Real effective exchange rate index (2005 = 100)

REM : Workers' remittances and compensation of employees, received (% of GDP)

ODA : Net official development assistance received (% of GDP)

FDI : Foreign direct investment, net inflows (% of GDP)

The study took logs for all variables to reduce the possibility of having multicollinearity in the model.

Regression analysis was done using vector error correction model (VECM) to determine the relations between Diaspora remittances and real effective exchange rate. A VAR model was used to estimate the impact of real effective exchange rate changes on net exports. A VAR model was applicable since the study was analyzing the interrelationship between cointergrated variables.

3.5 Definition and measurement of variables

The variables used in this study are defined:

Foreign direct investment is a direct investment into production or business in a country by a company in another country, either by buying a company in the target country or by expanding operations of an existing business in that country.

Inflation rate is the change in the log of the consumer price indices. Consumer price indices **(CPI)** a measure of the price level in the economy were taken for both Kenya and US.

Nominal effective exchange rate index represents the ratio of an index of a currency's period-average exchange rate to a weighted geometric average of exchange rates for the currencies of selected countries, weighted by each country's trade in both manufactured goods and primary products with its partner countries

Official development assistance (ODA) are flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). ODA flows comprise contributions of donor government agencies, at all levels, to developing countries (bilateral

ODA) and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions.

Real effective exchange rate (REER) index represents a nominal effective exchange rate index adjusted for relative changes in consumer price indices, a proxy of cost indicators of the home country. Since it is defined as the relative price of domestic to foreign goods, a fall in REER imply a real exchange rate appreciation.

$$REER = No\min al \quad exchangerate \times \frac{CPI_{foreign \ coutries}}{CPI_{Kenya}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

3.6 Source of data

This study used data for remittance, GDP, FDI, ODA, net exports for the period from 2004:1 to 2011:12. Data for estimation of the model was obtained from the Central Bank of Kenya, Kenya Bureau of Statistics, The IFS (*International Financial Statistics*) and from the World Bank (*World Bank Africa Database*).

3.6.1 Stationary of the Data

Augmented Dickey-Fuller (ADF) tests for stationary are performed on the different time series to address sample bias; the study used the conventional 5 per cent level.

3.6.2 Co-integration Analysis

Johansen's Cointegration tests were performed in order to check for the long-term statistical relationship between the real effective exchange rate and the explanatory variables. Johansen's Cointegration test was used to determine details of how the movements in the co-integrating systems occur.

3.7 Estimation Technique

VAR is an *n*-equation, *n*-variable model in which each variable is in turn explained by its own lagged values, plus (current) and past values of the remaining n-1 variables. A VAR can be thought of as the reduced form of a dynamic economic system involving a vector of variables z_t. That is, starting from the so-called structural form:

$$Az_t = B_1z_{t-1} + B_2z_{t-2} + \dots + B_pz_{t-p} + u_t \dots\dots (3.6)$$

$$Euu' = \sum{}_u = \begin{bmatrix} \delta_{u1}^2 & 0 & & 0 \\ 0 & \delta_{u2}^2 & & 0 \\ 0 & 0 & \dots & 0 \\ 0 & 0 & & \delta_{un}^2 \end{bmatrix}$$

We assume that each of the variables in z_t is demeaned prior to estimation, so we can neglect constant terms in each of the equations.

$$Z_t = A^{-1}B_1Z_{t-1} + A^{-1}B_2Z_{t-2} + \dots + A^{-1}B_pZ_{t-p} + A^{-1}u_t \dots\dots 3.7$$

Where $E(u_t)=0, E(u_t\ u_t')=\sum_u$ for $t = \tau$ and 0 otherwise. Thus a vector autoregression is a system of in which each variable is expressed as a function of its own lag as well as lags of each other variables.

Where Z_t is a vector of endogenous variables at time t, A_i (i = 1, ..., p) are coefficient vectors, p is the number of lags included in the system, and $\boldsymbol{u_t}$ is a vector of residuals. This system of equations can be thought of as encompassing a number of structural models in an unrestricted way; the restrictions that distinguish the structural models from each other are not imposed. The residuals, $u_{t,}$ represent the unexplained movements in the variables, reflecting the influence of exogenous shocks (i.e. shocks that arise outside the assumed model e.g. variables not consider by the model). The residuals represent a composite of the various exogenous shocks affecting the endogenous variables in the underlying structural model. It is not possible, therefore, to derive any economic interpretation from the residuals without transforming equation **(1)**.

In VAR, the interest is in obtaining the impulse response functions. Impulse responses trace out the response of current and future values of each variable to a one unit increase in the current value o f one of the VAR errors, assuming that this error returned to zero in subsequent periods and that all errors.

The study analyzed variance decomposition which separates the variation in an endogenous variable into component shocks to the VAR. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR.

VAR model has three types: the reduced form VAR, the recursive VAR and the Structural VAR. The latter was used with no identifying restrictions. The search for p was based on Akaike Information Criteria (AIC) and Schwarz Information Criteria (SIC). The criterion was to choose p so as to maximize AIC. In an attempt to reduce the size of the model, zero coefficients was imposed on variables and lags with low t-statistics. A reduction in SIC in this case implies an improvement in the model. Therefore a model with a lower SIC was preferred. Before choosing the lag order, the residual was analyzed for serial correlation problem.

The use of VAR requires that all the variables used be of same order of integration. Where variables are stationary at level, then VAR can be used at level. Variables can be integrated of order zero; I(0) and it can also be integrated of order d; I(d), where $d > 0$. If variables are I(1), then it is important to determine whether it is co-integrated or not. If it is I(1) and co-integrated, then the error correction term has to be included in the VAR. The model then becomes a vector error correction model (VECM), which is a restricted VAR. On the other hand, if the variables are I (1) and co-integrated, then a VAR can be used at first difference. That is, estimation will be done at first difference where the variables are stationary.

3.7.1 Stability Test

Stability test for a VAR (p) process involves checking that the eigenvalues of the following matrix are less than one. If they are then the VAR is stable.

$$\beta = \begin{pmatrix} \beta_1 & \beta_2 & \cdots & \beta_{p-1} & \beta_p \\ I & 0 & \cdots & 0 & 0 \\ 0 & I & \cdots & 0 & 0 \\ \vdots & \vdots & \cdots & \vdots & \vdots \\ 0 & 0 & \cdots & I & 0 \end{pmatrix}$$

VAR is stable where the eigenvalues for the stability matrix above lies inside the unit circle.

3.8 Data Analysis and Techniques

This study tackled two objectives. The first was to examine the relationship *between Diaspora remittances and real effective exchange rate in Kenya. This was* accomplished through regression of the model using vector error correction model (VECM). The study first tested for unit roots and then test for Cointegration of the variables. The estimation was done using Diaspora remittance, foreign direct investment, official development assistance and lagged values of real exchange rate as independent variables. Real effective exchange rate appreciation would be inferred if the co-efficient of remittances is negative and significant

The second objective was to establish the impacts of real effective exchange rate changes on net exports in Kenya. This was accomplished through VAR estimation. The impulse responses and variance decomposition that was generated was used to analyze the impacts of real effective exchange rate changes on net exports. The time series data for the following variables: remittances, real effective exchange rate, Diaspora remittances, foreign direct investment, and official development assistance was first tested for stationary and for Cointegration. If the variables are non-stationary, then the estimation is done using first (or higher) differences. The number of lags to be included was chosen using the Akaike information criterion or the Schwarz information criterion. Any particular lagged value of one of the variables was retained if it was significant according to a t-test, and if the other lagged values of the variable jointly add explanatory power to the model according to an F-test.

CHAPTER FOUR

EMPIRICAL RESULTS

4.1 Introduction

This chapter presents empirical findings of this study. First an overview of the properties of the data is presented. Secondly, the relationship between Diaspora remittances and real effective exchange rate in Kenya is presented and explained. Finally, the impacts of real effective exchange rate changes on net exports is analyzed and explained

4.2 Unit Root, Cointegration and Structural Break Test Results

4.2.1 Unit root tests

The null hypothesis that the series I(1) against the alternative that the series are I(0) was tested using ADF unit root tests. Variables were taken to be stationery where unit roots where P values were less than 0.05.

Table 4.1 showing the unit root test results of the variables

Variables	**Levels**		**First difference**		**Level of integration at 5% level of significance**
	ADF(no trend)		**ADF(no trend)**		
	Z-values	**P-values**	**Z-values**	**P-values**	
Diaspora remittances	-2.896	0.0043	-2.896	0.000	I(0)
Real effective exchange rate	-2.896	0.3066	-2.896	0.0000	I(1)
Foreign direct investment	-2.896	0.2748	-2.896	0.000	I(1)
Official development assistance	-2.896	0.8585	-2.896	0.027	I(1)
Consumer price index	-2.896	0.9970	-2.896	0.0000	I(1)
Net export	-2.896	0.2725	-2.896	0.0000	I(1)

Table 4.1: Unit roots results.

Source: Derived from data.

The tests were carried out with an intercept and no trend whose critical values were as follows:

1) 1% critical value -3.524
2) 5% critical value -2.897
3) 10% critical value 2.584

As shown in the table 4.1, Diaspora remittances was stationery at level while real exchange rate, Foreign direct investment, Official development assistance and net export were integrated of order one. They become stationery when difference once.

4.2.2 Cointegration Test

Cointegration test was done using Johansen test for Cointegration and results were as per table 4.2.

Table 4.2 showing results for Johansen test of Cointegration

Trend: constant			Number of objects = 94		
Sample: 2004:1 – 2011:12			Lags = 2		
Maximum rank	Parms	LL	Eigenvalue	Trace statistic	Critical value
0	20	537.8222	.	57.2273	47.21
1	27	554.3219	0.29606	24.2278*	29.68
2	32	562.5395	0.16041	7.7927	15.41
3	35	566.2714	0.07633	0.3289	3.76
4	36	566.4359	0.00349		

Table 4.2: Results for Johansen test of Cointegration

Source: Derived from data.

(*) denotes rejection of the hypothesis at 5% significance level

These result shows that there is Cointegration between variables and therefore regression was done at levels. The selection of lags was done using AIC as shown as per table 4.1:3

Table 4.3 showing lags selections using AIC

Sample 2004:5 – 2012:12			Number of objects = 92	
lag	df	AIC	HQIC	SBIC
0		-2.45505	-2.4108	-2.34541
1	16	-10.8033	-10.582	-10.255*
2	16	-11.2278*	-10.8295*	-10.241
3	16	-11.012	-10.4368	-9.58668
4	16	-11.0622	-10.3099	-9.19823

Table 4.3: Lags selections using AIC

Source: Derived from data.

(*) denotes the lags selected as per the AIC selection criteria

A test for heteroskedasticity on the variables was done using Breusch-Pagan / Cook-Weisberg test for heteroskedasticity. The null hypothesis was: Ho: Constant variance. We could not reject the null hypothesis that there were constant variances. The study also did a test for omitted variables was done using Ramsey RESET test using powers of the fitted values of logs of real exchange rate. The null hypothesis: Ho: model has no omitted variables was accepted since

Prob > F = 0.0000 (which is less than 0.05).

The test for autocorrelation was also done using Variance Inflation Factor (VIF) and because we cannot reject the null hypothesis of no autocorrelations in the residuals, this test does not indicate

4.3 Relationship between Diaspora Remittances and Real exchange rate

The first objective of the study was to examine the relationship between Diaspora remittances and real effective exchange rate in Kenya. This was achieved through regression analysis. The regression analysis was done using vector error correction model. Net export was omitted from the equation because of multicollinearity effects.

Table 4.4 showing results of regression analysis

Sample:2004:3- 2011:12			No of Objects = 94		
Log likelihood = 554.3219			AIC = -11.21962		
			HQIC = -10.92454		
Det (sigma-ml)= 8.87e-11			SCIC = - 10.48909		
Equation ()	Parms	RMSE	R-sq	chi2	P>chi2
log of REER.D	6	0.022703	0.3024	38.15581	0
Log of Remittances.D	6	0.118492	0.2298	26.24871	0.0002
Log of FDI.D	6	0.37224	0.0637	5.991757	0.4241
Log of ODA.D	6	0.011918	0.5432	104.6556	0

	Coefficient	Standard Error.	z	P>|z|	95% confidence interval	
D log of REER (lagged once)	-0.1738777	0.0374499	-4.64	0	-0.3477553	
log of REER LD.	0.3797571	0.0975534	3.89	0	.1885558	.5709583
Log of Remittances LD.	0.029913	0.0200427	1.49	0.136	-.0093699	.069196
Log of FDI LD.	-0.0076113	0.0068907	-1.1	0.269	-.0211169	.0058943
Log of ODA LD.	-0.1800172	0.1617482	-1.11	0.266	-.4970379	.1370036
constant	-0.0022738	0.0027193	-0.84	0.403	-.0076035	.0030559

Table 4.4: Regression analysis results

Source: Derived from data.

The null hypothesis that the coefficient of Diaspora remittances equals zero is not rejected since Prob>F=0.136 (Prob>F is greater than 0.05). Therefore the coefficients are not significant. This implies an increase in Diaspora remittances do not decrease the real exchange rate in short run – that is it does not cause real exchange rate appreciation in short run. Foreign direct investment and official development assistance do not decrease the real exchange rate in short run since the null hypothesis that their coefficient equal zero could not be rejected. This implies that foreign direct investment and official development assistance do not cause real exchange rate appreciation in short run. From the result real effective exchange rate is explained only by its lags in short run since the null hypothesis that its coefficient equal zero is rejected. The coefficient of lag of REER is negative and significant implying that a positive change in previous lag of REER decrease real exchange in short runs i.e. it causes real effective exchange rate appreciation.

Table 4.5 showing results of Johansen normalization restriction imposed

beta	Coefficient.	Std. Err.	z	P>z	[95% Conf. Interval]	
					Upper	Lower
Log of REER	1	.	.	.	.	.
Log of remittances	0.455026	0.098514	4.62	0	.2619421	6481101
Logs of FDI	-0.07107	-0.01831	3.88	0	-0.14214	-.035185
Log of ODA	0.632648	.062891	0.06	0	.5093839	.7559122
Constant	-2.43174	.	.	.	. .	

Source: Derived from data.

Table 4.6 showing the results of Impact parameters

Equation	Parms	chi2	P>chi2
D log of REER	1	21.5569	0
D log of remittances	1	11.8179	0.0006
D log of FDI	1	0.0913	0.7625
D log of ODA	1	1.12429	0.289

Pi	Coefficient	Standard Error	z	P>|z|	95% Confidence Interval	
					upper	lower
DLog of REER (lagged once)	-0.1738777	0.0374499	-4.64	0	-0.2472782	-0.1004771
Dlog of Remittances (lagged once)	-0.0791189	0.0170407	-4.64	0	-0.112518	-0.0457197
DLog of FDI (lagged once).	0.0123577	0.0026616	4.64	0	0.007141	0.0175744
Dlog of ODA (lagged once).	-0.1100034	0.0236926	-4.64	0	-0.1564401	-0.0635667

Table 4.6: Results of Impact parameters

Source: Derived from data.

The null hypothesis that the coefficient of Diaspora remittances equals zero is rejected since Prob > F = 0.0 (Prob>F is less than 0.05). Therefore the coefficient is significant and negative as shown by impact parameters above. This implies an increase in remittances decreases the real exchange rate in the long run – that is causes real exchange rate appreciation in the long run. This is also true for official development assistance and lags of real effective exchange rate which are negative and significant in the loan run implying that they cause real effective exchange rate appreciations in the long run However, foreign direct investment have a positive and significant impact on real effective exchange rate. A positive change in foreign direct investment decrease real effective exchange rate that is cause real effective exchange rate to depreciate.

4.4 Impacts of real effective exchange rate changes on net exports in Kenya

The second objective of this study was to establish the impacts of real effective exchange rate changes on net exports in Kenya. This objective was achieved by using VAR estimation where the impulse functions and variance decomposition generated are analyzed.

4.4.1 Impulse functions

An impulse response function traces the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. A shock to the j^{th} variable directly affects the j^{th} variable and is transmitted to all the endogenous variables through dynamic structure of VAR.

The following graphs show the effect of one standard deviation positive shock to each of the macro-economic fundamentals on net export over 94 months. The variables are ordered as follows: real exchange rate, remittances, net exports, foreign direct investment and Official development assistant.

In each graph, the solid line represents the estimated response while the shades represent two standard errors bands. Each relationship is considered significant where zero lies outside the confidence band for at least two months. .

Figure 4.1 showing the impact of RER on net export

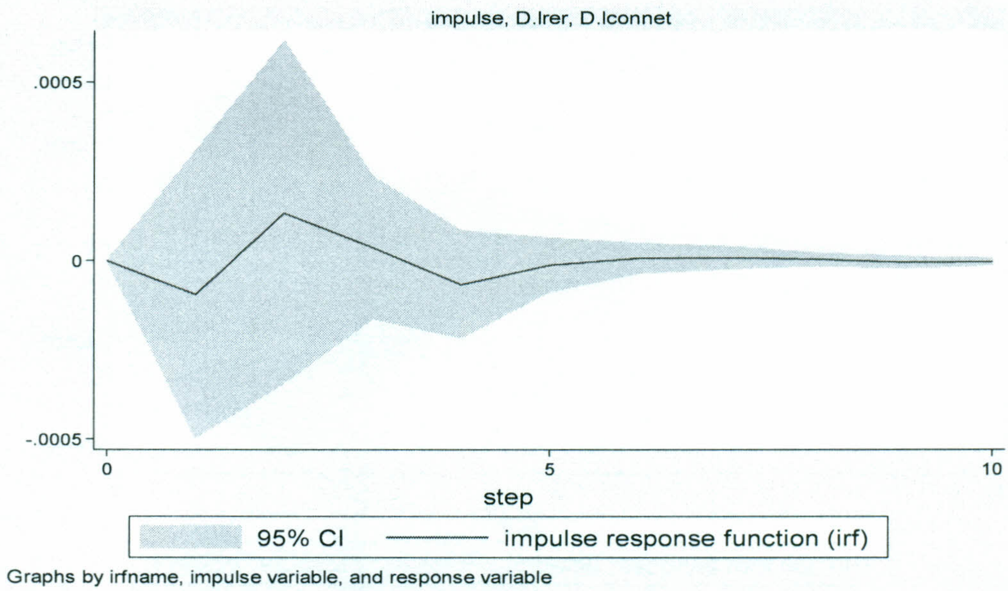

Figure 4. 1: Presents the impact of real exchange rate on net export

Source: derived from data

The response to one standard deviation of innovations to real exchange rate changes resulted in a stable time path, which declined to zero with respect to net export as shown in figure 4.3.1. The reaction of net export to changes in real exchange rate though not significant was initially negative then turn positive after two months before dying out after five months. The confidence interval which is larger on the negative side for at least two months indicates that one standard deviations positive shock to real exchange rate change cause a decrease in net export. This however, may or may not occur since the confidence interval includes zero.

Figure 4.2 showing the impact of changes in remittances on net export.

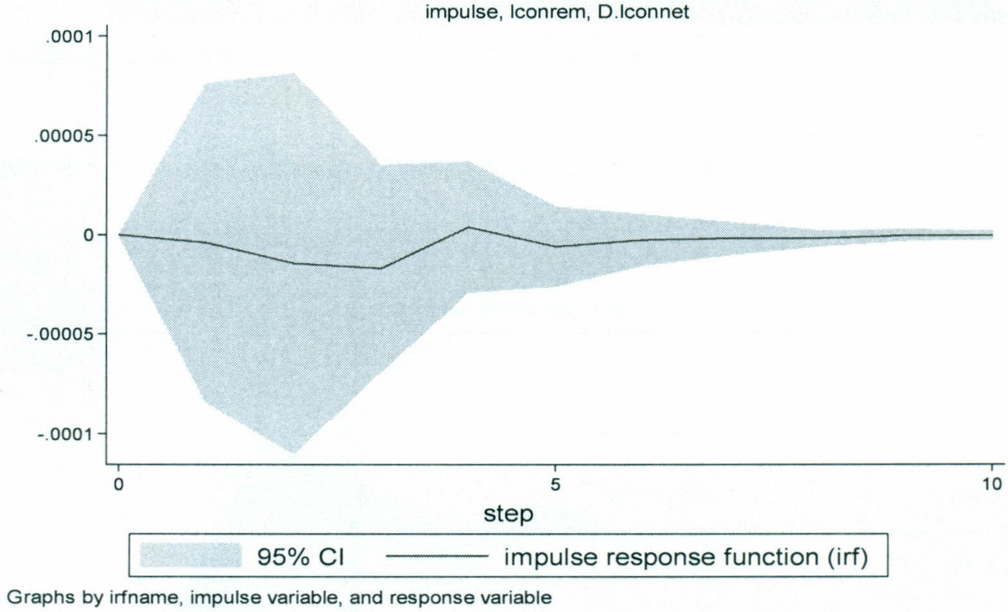

Figure 4.2: The impact of Diaspora remittances on net export

Source: derived from data

The response to one standard deviation innovation to remittances resulted in a stable time path at zero with respect to net export as shown in figure 4.2. The impact of one standard deviation shock to remittances on net export is negative but is insignificant. This implies that the impact of remittances on net export is negative but mild. The large confidence interval which includes zero indicates that after one standard deviation positive shock to remittances, a change in net export may or may not occur.

This finding was consistent with those of Loser *et al* (2006) who found the countercyclical trend of remittances produced mixed macroeconomic results which on balance do not cause severe distortions in the economy. The finding was also consistent with those of the World (2010) who considered the impact of remittance on labour force participation and found mixed results.

Figure 4.3 showing the impact of changes in net export on itself

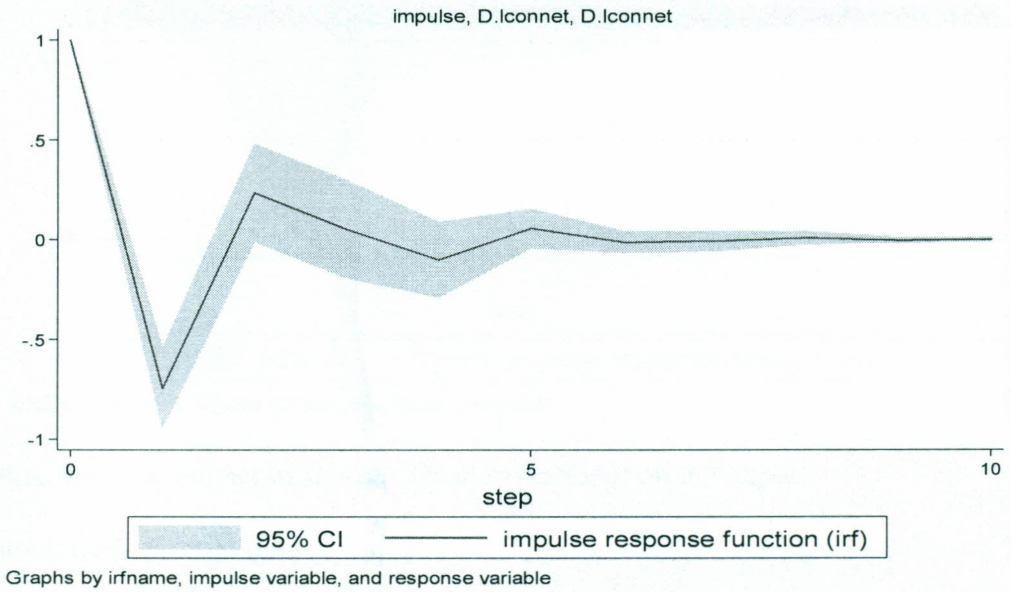

Figure 4.3: The impact of net export on itself

Source: derived from data

A one standard deviation own shock to net export resulted in a stable time path, which is negative and significant. This suggests that a shock on net export have a positive impact on itself which fizzle out after over five months. The confidence interval lies on one side of zero for at least two months which indicates that one standard deviations positive shock to real exchange rate cause an increase in net export.

Figure 4.4 showing the impact of changes in foreign direct investment on net export

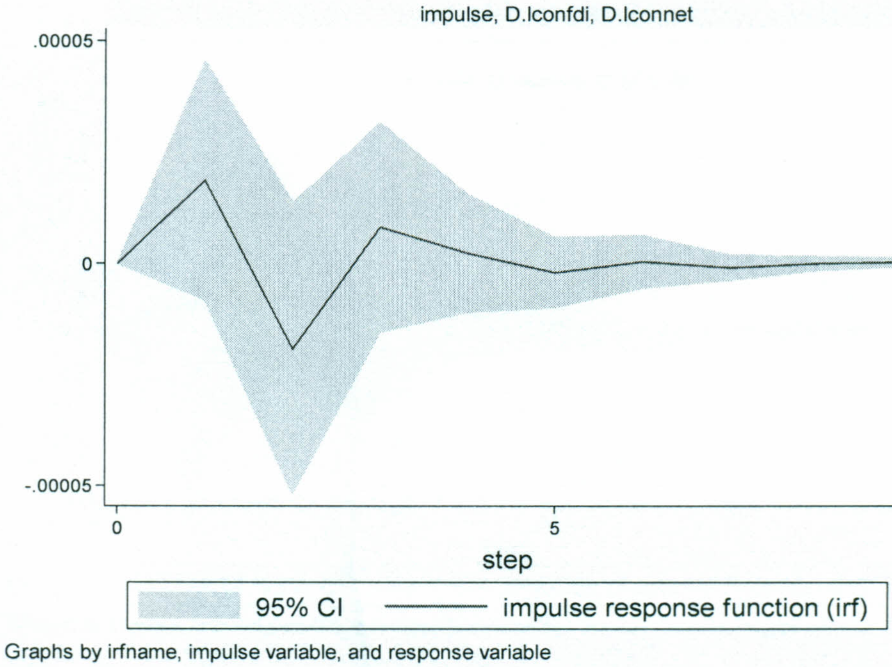

Figure 4.4: The impact of foreign direct investment on net export

Source: derived from data

The response to one standard deviation innovations to foreign direct investment resulted in a stable time path, which is positive but insignificant. The impact is initially positive but turns negative after 2 months before dying out after five months. The large confidence interval on the positive side of zero indicates that after a one standard deviation positive shock to foreign direct investment, an increase in net export may or may not occur.

The finding of this study was in line with those of Fayad (2010) who found that FDI had a depreciating effect on real exchange rate which enhances productivity.

Figure 4.5 showing the impact of changes in official development assistance on net export

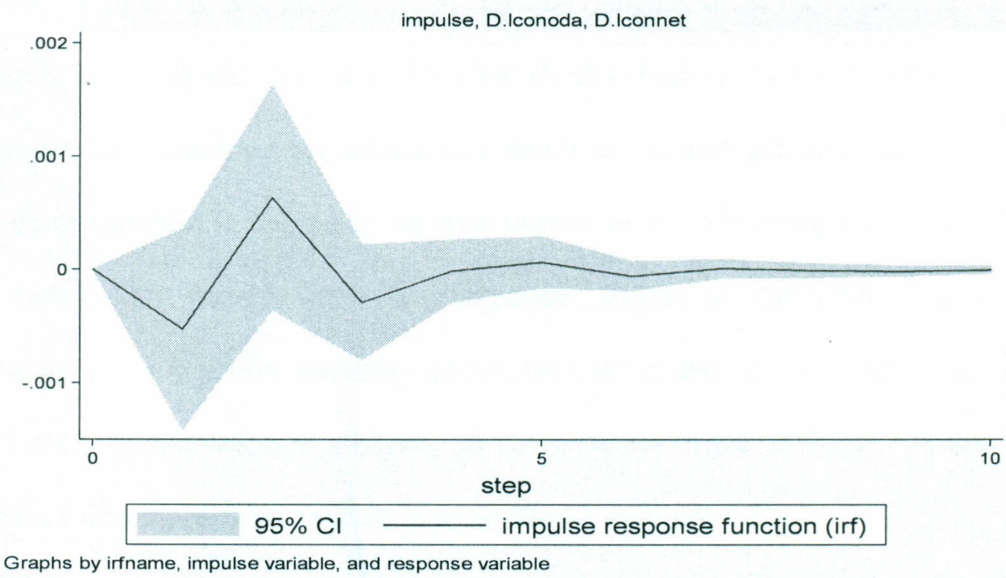

Figure 4.5: The impact of official development assistance on net export

Source: derived from data

The response to one standard deviation innovation to ODA resulted in a stable time path at zero with respect to net export as shown in figure 4.3.1. The impact of one standard deviation shock on ODA on net export is negative but insignificant. The large confidence interval on the negative side for at least two months indicates that after one standard deviation positive shock to ODA causes a negative change in net export. This however, may or may not occur since the confidence interval include zero.

4.4.2 Variance decompositions

The forecast error variance decomposition provides complementary information for a better understanding of the restrictions between the variables of a VAR model. It tells us the proportion of the movements in a sequence due to a variable's own shock, and other identified shocks (Enders, 2004). While impulse response functions trace the effects of a shock to one endogenous variable on to the other variables in the VAR, variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR. Therefore variance decomposition provides information about the relative importance of each random innovation in affecting all the variables in the VAR. The results of variance decompositions analysis is show shown in figure 4.7

Table 4.7 showing results of variance decomposition

	Real exchange rate			**Diaspora Remittances**		
step	Forecast error variance decomposition	95% Confident interval		Forecast error Variance decomposition	95% Confident interval	
		Lower	Upper		Lower	Upper
0	0	0	0	0	0	0
1	0.05153	-0.036	0.13904	9.1E-05	-0.0037	0.00387
2	0.07033	-0.0415	0.18221	0.00035	-0.008	0.00866
3	0.07986	-0.0458	0.20552	0.00085	-0.0066	0.00831
4	0.07943	-0.0457	0.20452	0.00196	-0.005	0.00892
5	0.08063	-0.0461	0.20734	0.00198	-0.005	0.00893
6	0.08053	-0.0461	0.20718	0.00208	-0.005	0.00918
7	0.08051	-0.0461	0.20715	0.00211	-0.0051	0.00929
8	0.08051	-0.0461	0.20715	0.00212	-0.0051	0.0093
9	0.08052	-0.0461	0.20716	0.00213	-0.0051	0.00934
10	0.08052	-0.0461	0.20717	0.00213	-0.0051	0.00934

	Net export			Foreign Direct Investment		
step	Forecast error variance decompositio n	95% Confident interval		Forecast error variance decompositions	95% confidence interval	
		Lower	Upper		Lower	Upper
0	0	0	0	0	0	0
1	0.94838	0.8608	1.03597	0	0	0
2	0.91443	0.79829	1.03057	0.00594	-0.0181	0.03003
3	0.88812	0.74759	1.02864	0.01048	-0.0335	0.05444
4	0.88431	0.73987	1.02876	0.01122	-0.0379	0.06031
5	0.88318	0.73716	1.0292	0.01131	-0.037	0.05961
6	0.88307	0.73704	1.02911	0.01133	-0.0372	0.05983
7	0.88297	0.73689	1.02906	0.01133	-0.0371	0.05977
8	0.88294	0.73683	1.02905	0.01135	-0.0372	0.05986
9	0.88293	0.73681	1.02904	0.01135	-0.0372	0.05985
10	0.88291	0.73678	1.02904	0.01135	-0.0372	0.05986

	Official Development Assistance		
step	Forecast error variance decomposition	95% confidence interval	
		Lower	Upper
0	0	0	0
1	0	0	0
2	0.008949	-0.021101	0.038999
3	0.020697	-0.040668	0.082063
4	0.023084	-0.044592	0.090761
5	0.02291	-0.044246	0.090066
6	0.022989	-0.04447	0.090448
7	0.023078	-0.044567	0.090723
8	0.023078	-0.044574	0.090731
9	0.023078	-0.044568	0.090724
10	0.023085	-0.044566	0.090736

Table 4.7: Results of variance decomposition

Source: Derived from data.

The variance decomposition tables largely confirm the results obtained in the impulse response analysis. This results shows that unexpected shock on net export has a positive impact on itself. Real exchange rate, Diaspora remittances and official development assistance has a negative but insignificant impact on net export. Finally, foreign direct investment has positive impact on net export which is also insignificant.

CHAPTER FIVE

SUMMARY CONCLUSION AND POLICY IMPLICATIONS

5.1 Introductions.

In this chapter, a brief summary of the important results from the study is given, followed by a conclusion highlighting important finding of the study, then policy recommendations.

5.2 Summary

This study sought to provide empirical relationship between Diaspora remittance and Dutch disease in Kenya. This was achieved through a two step process each representing an objective. The first step was to examine the relationship between Diaspora remittances and real effective exchange rate in Kenya and then in the second step establish the impacts of real effective exchange rate changes on net exports. Monthly data spanning the period 2004:1 to 2011:12 for the following variables: remittances, real exchange rate, foreign direct investment, official development assistance and net export were used to achieve these objectives.

The first objective was to examine the relationship between Diaspora remittances and real effective exchange rate in Kenya. This was accomplished through regression analysis using vector error correction model (VECM) of the selected model. The coefficient of the regression equation and impact parameters were used to analyze and examine the short run and long run relationship between Diaspora remittances and real effective exchange.

As per the results from regressions analysis, Diaspora remittances and official development assistances cause a decrease in real effective exchange rate but their coefficients are only statistically significant in the long run. Diaspora remittances and official development assistance cause real effective exchange rate appreciation in the long run. On the other hand, foreign direct investment causes an increase real exchange rate and its coefficient is only statistically significant in the long run. This implies that foreign direct investment cause real effective exchange rate depreciation in the long run. The real effective exchange rate has a negative effect on itself which is significant both in short run and in the long run implying that a positive change in real effective exchange rate causes real effective exchange rate to appreciate.

The second objective was to establish the impacts of real effective exchange rate changes on net exports in Kenya. This was accomplished through VAR estimation of the model. The impulse responses and variance decomposition generated was used to analyze the impacts of real effective exchange rate changes on net exports

From the results of the impulse response functions net export has impact on itself in Kenya. The previous lags of net export had a positive impact on itself and were statistically significant, since zero lied outside the confidence band for at least four months. The reaction of net export to changes in real exchange rate was negative but the impact was statistically insignificant because zero lies within the confident interval. Similarly, the official development assistance and Diaspora remittances had negative impact on net export which were however, statistically insignificant. Foreign direct investment had a positive impact on net export which was hypothetically satisfactory but was statistically insignificant. The large confidence interval which includes zero indicates that the impact may or may not materialize.

The findings of this study was in line with those of Fayad (2010) who found a threshold level of FDI beyond which the appreciative real exchange rate effect of remittances turns depreciative, strongly suggesting that the standalone appreciative effect of remittances, usually found in the literature, is increasingly absorbed by the productivity- enhancing depreciative effect of simultaneous FDI.

5.3 Conclusion

From a theoretical and empirical perspective, the study has established that there is a negative relationship between Diaspora remittances and real effective exchange rate which is statistically significant only in the long run. An increase in Diaspora remittances causes a decrease in real effective exchange rate in the long run i.e. it cause real effective exchange rate appreciations. Similarly, the study has established that official development assistance causes real effective exchange rate appreciation in the long run while Real exchange rate has a negative impact on itself both in short run and long run. The study has however, established that foreign direct investment has a positive relationship with real effective exchange rate i.e. a positive change in foreign direct investment cause real exchange rate depreciations.

The study established that changes in real effective exchange do not have any impact on net export in Kenya and hence does not cause Dutch disease effect in Kenya. The results shows that the real exchange rate appreciating effects of remittances and official development assistance are absorbed by the productivity-enhancing depreciating impact of foreign direct investment.

The results indicate that the increasing remittances and official development assistance result in improvement in internal competiveness which offset any effect of real effective exchange rate appreciations. This implies that a large proportion of remittances are being channeled towards productive avenues and that much of the remittances are spent on investment opportunities than on conspicuous consumption.

5.4 Policy implications

1. The real exchange rate appreciations though it does not currently affect net export can be remedied through improvement in internal competitiveness. More attention is required for channeling remittances towards productive avenues. In absence of adequate investment opportunities, much of the remittances are spent on conspicuous consumption. The country need to provide investment schemes to overseas Kenyan, and promote small-scale

enterprises where these remittances can be harnessed in a way that can improve the country's productivity. Development of the financial sector to factor in Diaspora banking is also necessary. Higher financial literacy, a culture of a bank deposit and easier and less costly access to banking services can be useful in this regards.

2. The impact of remittance flows on the equilibrium real exchange rate tends to be small in highly open economies with flexible labor markets in which the traded and non-traded goods sectors employ similar factors that can be readily reallocated between the two sectors with minimal frictions. The country should therefore invest in relevant knowledge and skills so as to make labour readily flexible and mobile across sectors of the economy.

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APPENDIX 1

Result of Vector Autoregression

	Coefficient.	Standard error.	z	P>z	95% Confident interval	
					Upper	lower
D_log of REER						
log of REER						
LD.	0.424163	0.099477	4.26	0	0.229192	0.619134
L2D.	-0.39067	0.106053	-3.68	0	-0.59853	-0.18281
log of Remittances						
L1.	-0.02424	0.019775	-1.23	0.22	-0.063	0.014514
L2.	0.006213	0.019602	0.32	0.751	-0.03221	0.044633
log of Net export						
LD.	-20.6856	48.17681	-0.43	0.668	-115.11	73.7392
L2D.	33.91425	47.01648	0.72	0.471	-58.2364	126.0649
log of FDI						
LD.	0.004359	0.006616	0.66	0.51	-0.00861	0.017326
L2D.	0.020294	0.00644	3.15	0.002	0.007672	0.032916
log of ODA						
LD.	-0.38727	0.217876	-1.78	0.075	-0.8143	0.039755
L2D.	0.113063	0.21112	0.54	0.592	-0.30072	0.526849
constant	-0.06444	0.065106	-0.99	0.322	-0.19204	0.06317
log of Remittances						
log of REER						
LD.	-0.36284	0.515018	-0.7	0.481	-1.37225	0.646581
L2D.	0.313668	0.549067	0.57	0.568	-0.76248	1.38982
log of Remittances						
L1.	0.45485	0.10238	4.44	0	0.254189	0.65551
L2.	0.149786	0.101487	1.48	0.14	-0.04913	0.348696
log of Net export						
LD.	22.38177	249.4245	0.09	0.928	-466.481	511.2447
L2D.	-58.5482	243.4171	-0.24	0.81	-535.637	418.5406
log of FDI						
LD.	-0.01828	0.034251	-0.53	0.594	-0.08541	0.048852
L2D.	0.009877	0.033341	0.3	0.767	-0.05547	0.075224

log of ODA						
LD.	1.220974	1.128003	1.08	0.279	-0.98987	3.431819
L2D.	-0.03314	1.093023	-0.03	0.976	-2.17543	2.109143
constant	-1.37453	0.337073	-4.08	0	-2.03518	-0.71388
D_log of Net export						
log of REER						
LD.	-9.5E-05	0.000206	-0.46	0.645	-0.0005	0.000308
L2D.	9.63E-05	0.000219	0.44	0.66	-0.00033	0.000526
log of Remittances						
L1.	-3.99E-06	4.09E-05	-0.1	0.922	-8.4E-05	7.61E-05
L2.	-2.7E-05	4.05E-05	-0.66	0.507	-0.00011	5.25E-05
log of Net export						
LD.	-0.74563	0.099545	-7.49	0	-0.94073	-0.55052
L2D.	-0.32629	0.097147	-3.36	0.001	-0.51669	-0.13588
log of FDI						
LD.	1.86E-05	1.37E-05	1.36	0.173	-8.17E-06	4.54E-05
L2D.	-1.88E-06	1.33E-05	-0.14	0.888	-2.8E-05	2.42E-05
log of ODA						
LD.	-0.00053	0.00045	-1.17	0.243	-0.00141	0.000357
L2D.	0.000534	0.000436	1.22	0.221	-0.00032	0.001389
constant	-0.0001	0.000135	-0.77	0.444	-0.00037	0.000161
D_log of FDI						
log of REER						
LD.	-0.11105	1.648652	-0.07	0.946	-3.34235	3.120246
L2D.	-0.4826	1.757647	-0.27	0.784	-3.92752	2.962327
log of Remittances						
L1.	0.433633	0.327733	1.32	0.186	-0.20871	1.075977
L2.	-0.79805	0.324875	-2.46	0.014	-1.4348	-0.16131
log of Net export						
LD.	405.6662	798.4454	0.51	0.611	-1159.26	1970.59
L2D.	290.772	779.215	0.37	0.709	-1236.46	1818.005
log of FDI						
LD.	0.044197	0.109644	0.4	0.687	-0.1707	0.259095
L2D.	0.02491	0.106729		0.815	-0.18428	0.234096
log of ODA						
LD.	-3.39856	3.610909	-0.94	0.347	-10.4758	3.678693

L2D.	0.60651	3.498932	0.17	0.862	-6.25127	7.46429
D Log of ODA						
constant	-1.22803	1.07902	-1.14	0.255	-3.34287	0.88681
LD.	-0.01696	0.052132	-0.33	0.745	-0.11913	0.085222
L2D.	-0.09637	0.055579	-1.73	0.083	-0.2053	0.012561
log of Remittances						
L1.	-0.00163	0.010363	-0.16	0.875	-0.02194	0.018686
L2.	0.001618	0.010273	0.16	0.875	-0.01852	0.021752
log of Net export						
LD.	8.339434	25.24775	0.33	0.741	-41.1453	57.82412
L2D.	24.79938	24.63966	1.01	0.314	-23.4935	73.09223
log of FDI						
LD.	0.007325	0.003467	2.11	0.035	0.00053	0.01412
L2D.	0.00149	0.003375	0.44	0.659	-0.00512	0.008105
log of ODA						
LD.	0.494037	0.114181	4.33	0	0.270246	0.717828
L2D.	0.145099	0.11064	1.31	0.19	-0.07175	0.36195
constant	0.002473	0.03412	0.07	0.942	-0.0644	0.069347

(L1) denotes 1st lag

(L2) denotes 2nd lag

(D) denotes integration