

**THE EFFECT OF FOREIGN EXCHANGE RATE FLUCTUATIONS
ON EXPORT EARNINGS: EVIDENCE FROM FLOWER INDUSTRY
IN KENYA**

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DECLARATION

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DEDICATION

I dedicate this work to my family members who have been supportive every stretch of the way during my studies. Their prayer and encouragement to be the best at whatever I set my heart to accomplish in life and guidance has been tremendous. Thank you for the immense support. God bless you all.

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LIST OF ABBREVIATIONS

APT	Arbitrage Pricing Theory
CBK	Central Bank of Kenya
COMESA	Common Market for Eastern and Southern Africa
EAC	East Africa Cooperation
EPC	Export Promotion Council
EPZ	Export Processing Zones
GDP	Gross Domestic Product
HCDA	Horticultural Crops Development Authority
ITC	International Trade Centre
KFC	Kenya Flower Council
KNBS	Kenya National Bureau of Statistics
PPP	Purchasing Power Parity

ABSTRACT

This study evaluated the effect of foreign exchange rate fluctuations on exports earnings with evidence from the flower industry in Kenya. The study used quarterly secondary data which was gathered from HCDA, KNBS, KFC, EPC and CBK for a period of ten years (2005 – 2014). The data collected was processed, analyzed, interpreted and presented in such a manner that is clear, precise and unambiguous. This data was quantified and coded using descriptive statistics. The statistical package for social sciences (SPSS 22.0) was used to describe the collected data, sort and sift through and analyze it. The results from the model show reliability of the model. The study indicated that the variations in export earnings in the flower industry in Kenya are explained by changes in foreign exchange rates, inflation rates and interest rate. The empirical results showed that there was a strong positive relationship between the study variables: the foreign exchange rate, inflation rate and interest rate. The regression results revealed that there is a positive relationship between dependent variable (log of total export earnings of the flower industry) and independent variables (foreign exchange rate, inflation rate, interest rate). From these results, the study recommended that policy makers need to maintain a robust exchange rate regime that will ensure a non-volatile behaviour. Policy measures aimed at mitigating the high exchange rate volatility to promote flower exports from Kenya need to be instituted. In order to cushion exporters from high exchange rate fluctuations, the government could set up a flower export stabilization facility. The fund could be capitalized by charging exporters a tax so that during periods of high flower prices and high export earnings, the country would accumulate the fund which it would draw down during periods of low flower prices. The flower price stabilization fund would be introduced by the government through imposition of a tax on exports. This fund would ensure predictability in flower prices so that fluctuations would not affect flower exporters drastically in future. There is need for policy makers to work towards increasing the volume of exports through diversification of market destinations by targeting local, regional and export markets as opposed to the current practice. This can be realized through regional and export market promotion initiatives as well as consistent compliance with quality standards. Innovative ways of meeting the standards and facilitation of smallholder farmers to meet these standards is required. In addition, Flower export promotion incentives such as input subsidies and tax concessions need to be considered. To reduce the relative price of flower exports from Kenya, there is need for structural reforms that contribute to increased productivity and the enhancement of international competitiveness.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The role of exports in economic growth and development has become a major focus for many countries including Kenya. The export activities stimulate growth which is key to achieving sustainability and stability in the economy. The fresh cut flowers sub-sector contributes significantly to the growth of the Kenyan economy since it generates foreign exchange earnings and creates employment opportunities (Mwangi et al., 2014).

The exchange rate plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign and domestic goods. The exchange rate's level, relative to an equilibrium exchange rate level, and its stability has been shown to importantly influence export earnings, growth, consumption, resource allocation, employment and private investments (Aron et al., 1997). Because of this important role the exchange rate plays in the economy, emerging economies, in particular, are encouraged to conduct their policies so as to get this macroeconomic relative right. The right exchange rate is one that does not stray too far from its equilibrium value (Otieno and Mudaki, 2011). Thus this study analyses the effect of foreign exchange rate fluctuations on fresh flowers export earnings in Kenya.

The major determinants of exports are inflation, foreign direct investment and foreign exchange rate. A country's exchange rate is an important determinant of growth of its cross-border trading and export earnings and it serves as a measure of its international competitiveness (Bah and Musa 2003). This study therefore seeks to understand the effect of foreign exchange rate fluctuations on export earnings of fresh cut-flowers in Kenya. Higher levels of exchange rates lower earnings of exporters whereas lower exchange rates increases exporter's earnings, hence fluctuation negatively and positively affects exporters depending on their levels. The resulting impact on economic growth is negative as risk averse exporters might choose to shun investing in flower farming.

1.1.1 Foreign Exchange Rate Fluctuations

Exchange rate fluctuation refers to the extent to which prices of currencies tend to fluctuate over time (*Cote, 1994*). The measure captures the uncertainty due to unpredictable fluctuations in the exchange rates. Exchange rate fluctuations are therefore a source of risk and uncertainty which tend to impact negatively on risk-averse traders or exporters, thus reducing exports (*Cote, 1994*). A defect of the international quantity theory of money is that it cannot account for fluctuations in the real exchange rate as opposed to simply the nominal exchange rate.

The real exchange rate is defined as the nominal exchange rate deflated by price levels (foreign relative to domestic). It is the real exchange rate that matters most for the real economy. If a currency has a high value in real terms, this means that its products are selling at less competitive prices on world markets, which will tend to discourage exports and encourage imports. If the real exchange rate were constant, then “purchasing power parity” would hold: the exchange rate would be proportionate to relative price levels. Purchasing power parity does not, in fact, hold in the short run, not even approximately, even for goods and services that are traded internationally. But purchasing power parity does tend to hold in the long run.

Exchange rate fluctuation is the change in value of one currency against another currency due to various economic factors. In simple sense, the value of one currency will be appreciated against another if the demand for that particular currency is higher (John Pradeep & Rajeesh Kunnampuram, 2002). While exchange rate fluctuations refer to a situation in which a country’s actual exchange rate deviates from such an unobservable equilibrium with respect to another currency, an exchange rate is said to be undervalued when it depreciates more than its equilibrium, and overvalued when it appreciates more than its equilibrium. The issue is, unless the equilibrium is explicitly specified, the concept of exchange rate fluctuations remains subjective.

A high exchange rate level lowers the receipts that exporters receive thereby decreasing export earnings. On the other hand, a low exchange rate level raises receipts that exporters receive thereby improving export earnings. A fluctuation in the exchange rate impacts directly either positively or negatively on export earnings. Exchange rate fluctuations might impact negatively on exporters and trend economic growth by discouraging firms from undertaking investment, innovation and trade. It may also deter firms from entering the export market. Large fluctuations in foreign exchange rate impose adjustment costs on the economy as resources keep shifting between the tradable and non-tradable sectors. This could permanently shift resources to non-tradable sectors if firms are put off from export markets due to high foreign exchange rate fluctuations (Kiptui, 2007). If exchange rate movements are not fully anticipated, an increase in exchange rate fluctuations may lead risk-averse agents to reduce their international trading activities. The presumption of a negative nexus between exchange rate fluctuations and export earnings is an argument routinely used by proponents of managed or fixed exchange rates.

Businesspeople have long been concerned that a high level of exchange-rate volatility would impose costs on importers, exporters, and those wishing to borrow or lend across national borders. Until recently, economists were skeptical of the importance of this effect. In theory, importers, exporters, and others could hedge the foreign exchange risk on the forward exchange market. And statistically it was difficult to discern that increases in exchange-rate volatility had historically been associated with decreases in trade. More recently, however, this effect has been taken more seriously.

Forward exchange markets do not exist for many smaller currencies and rarely exist beyond a one-year horizon. Such forward markets do not exist in African markets including Kenya. Even when the relevant forward market does exist, there are costs to using it: transactions costs plus, perhaps, a foreign-exchange premium. Statistically, econometricians have now discovered important

effects: when countries eliminate bilateral exchange-rate variability, and especially if they form a currency union, bilateral trade among the member countries rises significantly.

The study will cover a period of ten (10) years starting from January 2005 to December 2014 after Kenya's adoption of the floating exchange rate regime to examine the effects of foreign exchange fluctuations on export earnings from fresh cut flowers in Kenya.

1.1.2 Export Earnings

Export earnings are regarded as one of the key indicators of an economy's performance. Research into export earnings has grown considerably during the past few decades. While numerous studies have been conducted to explain export earnings and its antecedents, there is no generally accepted conceptualization. Export earnings represent the outcome of an economy's activities in export markets (Sousa, Martinez-Lopez, and Coelho, 2008).

There are strong indications in literature which link a country's export earnings to fluctuations in foreign exchange rates. For instance, De Rosa et al (1991) suggest that in order to boost export earnings, exchange rates should be allowed to adjust to more realistic values. This will lead to significant increases in production and export of such export items as high value horticultural products. Export performance is sensitive to foreign exchange rate fluctuations with the effect of the foreign exchange rate fluctuations dominating the financial performance of the export oriented products and crops. Total export earnings from horticultural crops in Kenya historically tend to have an inverse relationship with movements in the exchange rate, although the trend is obscured by changes in volumes from year to year (Kiptui, 2008). Under the floating exchange rate regime, fluctuations in world prices of horticultural produce strongly affect export earnings. Therefore, a higher demand or a decrease in supply which causes appreciation of foreign currency makes export earnings decline (Akila, 2004).

Like most sub-Saharan African countries, Kenya's export structure is predominantly composed of primary commodities mainly tea, coffee and horticulture. This makes export earnings from this sector more vulnerable to fluctuations in world prices. While certain non-traditional exports such as horticultural products have experienced rapid growth in the last few decades, manufactured goods make only a small proportion of total exports (Wagacha, 2000). The role of export earnings in economic development is widely acknowledged. Ideally, export earnings stimulate growth in a number of ways including production and demand linkages, economies of scale due to larger international markets, increased efficiency, adoption of superior technology embodied in foreign produced capital goods, learning effects and improvement of human resources together with increased productivity through specialisation (Basu et al., 2000). Kenya has ideal tropical and temperate climatic conditions that make it favourable for production and development of horticulture and agricultural products which are the backbone of the export industry in Kenya (EPZ, 2007). A decline in the price of foreign goods in terms of domestic goods has two primary effects on the export earnings. First, on the production side, fewer resources will be allocated towards producing goods that can be exported, since these goods will be expensive to foreigners. At the same time, production of substitutes for foreign goods will also decline. Secondly, on the consumption side, a fall in the price of foreign goods relative to domestic goods will stimulate domestic spending on foreign goods. The net effect is making exports less competitive in foreign markets, while stimulating imports, hence a current account deficit. Consequently, domestic manufacturer's incentives and profits will be lowered leading to declining investment and export volumes (Otieno and Mudaki, 2011).

The key commodities contributing to Kenya's export earnings are coffee, tea, horticulture, pyrethrum and a few livestock products such as hides and skins. The level of Kenya's export earnings is mainly dependent on rainfall and the world prices of key commodities that the country

exports as well as the domestic policies affecting production and marketing of these commodities (Kiptui, 2008).

1.1.3 Effect of Foreign Exchange Rate Fluctuations on Export Earnings

Early theoretical models of analyzing the effect of foreign exchange rate fluctuations on export earnings suggest a negative effect of foreign exchange rate fluctuations on export earnings especially in situations where hedging is not possible or is costly (Clark, 1973). This theoretical proposition can be applied in the case of Kenya, being a developing country where developed financial markets are up coming. The positive relationship between depreciation of the exchange rate and export earnings in Kenya in the period 2002-2004 perhaps could explain why there has been concern over appreciation of the shilling with exporters warning of job losses in Kenya's main export sectors (Kiptui, 2008). More recently however, the country has experienced depreciation in value of its currency against major foreign currencies, mainly the US dollar.

Empirical evidence in support of the hypothesis of a negative link between exchange rate fluctuations and export earnings is mixed. The pertinent survey of McKenzie (1999) concludes that exchange rate fluctuations may impact differently on different markets and calls for further tests using export market specific data. A number of earlier studies employ only cross sectional or time series data and therefore the results from these studies is mixed. For example in the study by Hooper and Kohlhagen (1978), they used time-series data to examine the impact of exchange rate volatility on exports of industrialised countries and found essentially no evidence of any negative relationship.

De Grauwe (1988), states that an increase in foreign exchange risk has both a substitution and an income effect. The substitution effect per se decreases export activities as an increase in exchange rate risk induces agents to shift from risky export activities to less risky ones. The income effect, on the other hand, induces a shift of resources into the export sector when expected utility of

export revenues declines as a result of the increase in exchange rate risk. If the income effect dominates the substitution effect, exchange rate fluctuation will have a positive impact on export activity and vice versa. In addition, an increase in foreign exchange fluctuations can create profit opportunities for exports if firms in this sector can protect themselves against negative effects of foreign exchange rate fluctuations by hedging or if they have the ability to adjust trade volumes to movements in the exchange rate.

From a political economy point of view, Brada and Mendez (1988), note that exchange rate movements facilitate the adjustment of balance of payments in an event of external shocks, and thus, reduce the use of trade restrictions and capital controls to achieve equilibrium, and this in turn encourages international trade. Economic theory suggests that when markets are free of distortions, an exchange rate misalignment has no long run effects on export earnings as it does not change relative prices. But long run effects are predicted in models that assume market distortions such as information problems or product market failures. In the short run when some prices in the economy can be sticky, movements in nominal exchange rates can alter relative prices and affect international trade flows (Marc and Michelle, 2011).

Coric and Pugh (2010), state that on average, foreign exchange rate fluctuations exert negative effects on international trade. Exporting firms may be more sensitive to foreign exchange rate fluctuations than domestic firms but this sensitivity is likely to be reduced by factors such as the existence of hedging instruments, the presence of imported inputs, the presence of firms on the global market where upward and downward movements of various exchange rates cancel out, the possibility of invoicing in the local currency and the capacity to absorb losses due to exchange rate changes and other factors in profit margins.

Kenya, like other developing countries has experienced a combination of exogenous shocks such as worsening terms of trade mainly on account of fluctuations in international commodity prices,

oil price shocks and volatility in capital flows, which have created macroeconomic management policy challenges. External shocks require appropriate fiscal and monetary policies and the adoption of a flexible exchange rate regime to prevent the emergence of unsustainable current account deficits, growing foreign debt burdens and steady losses of international competitiveness. Kenya's vulnerability to external shocks is amplified by its concentration in agricultural product exports such as tea, coffee and horticulture, thus exposing the country's export earnings to direct impacts of fluctuations in exchange rates (Otieno and Mudaki, 2011). More recent studies using panel data tend to find evidence of a negative effect of exchange rate fluctuations on export earnings. The effect of foreign exchange rate fluctuations on export earnings is a delicate but critical issue that needs to be understood since there are varied findings by studies done elsewhere regarding the effects of foreign exchange rate fluctuations on export earnings.

1.1.4 Flower industry in Kenya

Kenya is the fourth largest exporter of cut flowers in the world, after Netherlands, Colombia and Ecuador (*ITC database 2015*). The fresh cut-flowers form key part of horticultural crops and contribute more than half of the total horticultural produce exports. Kenya's primary market for exports of the horticultural produce is the European Union, which take more than half of total horticulture exports. It is estimated that over 500,000 people (including over 90,000 flower farm employees) depend on the floriculture industry.

According to Kenya National Bureau of Statistics in 2015, Horticulture is the top foreign exchange earner accounting for 18% and generating approximately US\$ 1.1 billion in 2014, having displaced the tea from the top position. The floriculture industry has recorded growth in volume and value of cut flowers exported every year (10,946 tons in 1988 compared to 86,480 tons in 2006, 117,713 tons in 2009, 120,220 tons in 2010, 121, 891 tons in 2011, 123,511 tons in 2012, 120,767 tons in 2013, and to 132,302 tons in 2014 (KNBS). The floriculture industry exported 132,302 tons valued at Kshs 48.7 billion in 2014 (*Kenya Flower Council, 2015*).

Kenya is the lead exporter of rose cut flowers to the European Union (EU) with a market share of about 38%. Approximately 65% of exported flowers are sold through the Dutch Auctions, although direct sales are growing. In the United Kingdom, supermarkets are the main retail outlets. Other growing destinations include Japan, Russia and USA. Over 25% of exported flowers are delivered directly to these multiples, providing an opportunity for value addition at source through sleeving, labelling and bouquet production (*Kenya Flower Council, 2015*).

The main production areas are around Lake Naivasha, Mt. Kenya, Nairobi, Thika, Kiambu, Athi River, Kitale, Nakuru, Kericho, Nyandarua, Trans Nzoia, Uasin Gichu, Kajiado, Meru, Laikipia and Machakos, Kirinyaga and Embu. The main cut flowers grown in Kenya are roses, carnations, Alstromeria, Gypsophilla, Lilies, eryngiums, arabicum, hypericum, Statice, and a range of summer flowers (*Kenya Flower Council, 2015*).

1.2 Research Problem

Exchange rate fluctuation is a crucial element that needs to be considered for small countries that depend extensively on trade. An understanding of the effects of exchange rate volatility on export earnings is of interest to researchers, farmers, exporters and policy makers. Indeed, producers and exporters of goods and services are not only concerned with the magnitude of the price they receive but also about how stable these prices are as it affects their earnings of a consistent income. A number of studies revealed that an increase in exchange rate fluctuations leads to uncertainty which might have a negative impact on export earnings. According to Anderton and Skudelny (2001), the economic logic underpinning the negative link between exchange rate fluctuations and export earnings leads to the aversion of export firms from engaging in trade and this leads to loss of export earnings. Most agricultural products have been vulnerable to exchange rate volatility thus impacting negatively on export earnings. An increase in export earnings leads to a decrease in exchange rate fluctuations, and a decrease leads to an increase in exchange rate fluctuations.

Analysis of Kenyan exports reveals that horticulture is leading with about 18% (2014) of the total exports. The elasticity of demand and price of horticultural exports needs to be disaggregated into individual crops. This study therefore seeks deeper understanding on the effects of foreign currency fluctuations on export earnings of fresh cut-flowers in Kenya. The question here is; to what extent does foreign exchange volatility affect the export volume and earnings of cut-flowers? Understanding this question will address myriad problems surrounding not only Fresh cut-flower exports industry but also horticultural exports at large.

Most of the previous studies have focused on the effects of volatility on aggregate trade flows, ignoring potentially different effects that may be observed at a more disaggregated level of analysis. Bini-Smaghi (1991) suggests that there may be different export demands and price elasticities across sectors and this may be reason why aggregate studies have found little evidence of the effects of exchange rate volatility on trade. The disaggregated focus is appealing because exchange rate volatility may affect export commodities differently, so that aggregate effects may cloud the effects on individual products, or perhaps cancel out different effects across sectors which would otherwise provide information as to how individual products are affected by exchange rate volatility. Thus the volatility of the exchange rate may be more sensitive when disaggregated data is used and have a different impact across commodities (Bini-Smaghi, 1991).

Available literature shows mixed results on the effects of exchange rate volatility on exports including paucity of such studies in developing countries. The available studies in Africa include Vergil (2002) for Turkey, and Bah and Amusa (2003) and Takaendesa et al., (2005) for South Africa. The review of literature finds weakness in the previous studies carried out in developing countries by use of aggregated data instead of disaggregated data which gives better results (Bini-Smaghi, 1991).

Despite the critical importance that flowers play in Kenya's economic development and concerns raised by exporters and policy makers, the relationship between exchange rate volatility and flowers export growth in Kenya remains unclear. There have been limited studies in Kenya on the effects of exchange rate volatility on aggregate horticultural exports done by Were et al., (2002), Minot and Ngigi (2004), Kiptui (2008), Gertz (2008), and Maana et al., (2010). However, these studies gave conflicting evidence on the effect of exchange rate volatility on exports as Were et al., (2002) and Kiptui (2008) show negative effects while Minot and Ngigi (2004), Gertz (2008) and Maana et al., (2010) indicate positive or no effects.

Additionally, these studies used aggregated horticultural data and did not evaluate the effects of exchange rate volatility on flowers exports in Kenya. Thus there is a gap in literature on the lack of empirical evidence on the effects of exchange rate volatility on flowers exports in Kenya. The purpose of this paper is therefore to evaluate the impact of exchange rate volatility on Kenya's flowers exports to its major trading partners in the European Union market.

1.3 Research Objective

The objective of this study was to examine the effects of foreign exchange rate fluctuations on export earnings of the flower sub sector in Kenya.

1.4 Value of the Study

The findings of this study will assist policy makers in Kenya and other developing countries to design appropriate exchange rate and trade policies to boost their exports. These results can be utilized by other stakeholders in this and other industries to develop coping mechanisms for similar effects experienced by them. This will also inform the government and related agencies especially in the floriculture sector, in coming up with policies to boost the flower industry in Kenya.

The study will also benefit researchers and students as they will be in a position to get information that will help them to carry out research work in related fields to advance their research papers and projects respectively. The findings will also increase the knowledge base concerning the effects of foreign exchange rate fluctuations on fresh cut flowers earnings in Kenya. Of more importance, the study will help exporters and importers alike, investors and monetary authorities to know the behavior of the exchange rate as it directly or indirectly affects them. The behavior of the exchange rate is therefore, a useful indicator of economic export performance that needs to be understood.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant literature on foreign exchange rate fluctuation. It cites review material relating to foreign exchange rate fluctuation and how it affects world trade both in international and in the local context. The purpose of this literature review is to try and establish the extent to which researchers have studied foreign exchange rate fluctuation.

This will enable this study to review and use some useful information arising from their research findings. It will also enable this study to improve on some aspects of their research findings and also concentrate this study on areas which hitherto has not been researched on. The reviewed source materials will include books, journals, periodicals, magazines and the internet (Brodkin, 2007). The theoretical framework of this study has its basis on currency theory, interest rate parity theory, purchasing power parity theory and arbitrage theory.

2.2 Theoretical Review

Three theories are used in explaining fluctuations in foreign exchange rates between countries. These are the Currency Theory, Arbitrage Theory and Purchasing Power Parity as explained below.

2.2.1 Currency theory

Currency is the acceptable means of purchasing through trade. It comprises money supply of a given nation, that is, coins and notes. It is variably referred to as legal tender. Many countries in the world have their own currencies. Ezeala-Harrison (2009) defines hard currency as currency in which investors have confidence. Today, currency generally refers to printed or minted money. In order for any currency to be considered hard, the country needs to have a stable government, sound fiscal and monetary policies, and low inflation (Ezeala- Harrison 2009). Currency involves the

exchange of goods and services for cash. The hard currencies are international currencies in the sense that they are acceptable internationally. They are used for transactions in many foreign countries, including transactions between locals.

The currency market is the foreign currency market. This is where trading in currencies take place. Trading on the Foreign Exchange Market establishes rates of exchange for currency. Exchange rates are constantly fluctuating on the foreign exchange market. As demand rises or falls for particular currencies, their exchange rates adjust accordingly. Instantaneous rate quotes are available from a service provided by Reuters. A rate of exchange for currencies is the ratio at which one currency is exchanged for another (Cross, 1998).

2.2.2 Arbitrage Theory

Arbitrage Pricing Theory (APT), in finance is a general theory of asset pricing that has become influential in the pricing of stocks. It is the process of earning riskless profits by taking advantage of differential pricing for the same physical asset or security (Sharpe 2004). It entails the sale of a security at a relatively high price and simultaneous purchase of the same security (or its functional equivalent) at a relatively low price (Taylor, 1989).

In the APT context, arbitrage consists of trading in two assets with at least one being mispriced. The arbitrageur sells the asset which is relatively too expensive and uses the proceeds to buy one which is relatively too cheap (Frenkel, 1975).

2.2.3 Purchasing Power Parity

Purchasing power parity (PPP) is a theory of long term equilibrium exchange rates based on relative price levels of two countries. The PPP exchange-rate calculation is controversial because of the difficulties of finding comparable baskets of goods to compare purchasing power across countries. We apply PPP theory to the analysis of long-run equilibrium in the foreign exchange

market. The concept is founded on the law of one price which states that in the absence of transaction costs, identical goods will have the same price in different markets. People in different countries typically consume different baskets of goods (Wei, 1995). In its "absolute" version, the purchasing power of different currencies is equalized for a given basket of goods. In the "relative" version, the difference in the rate of change in prices at home and abroad (the difference in the inflation rates) is equal to the percentage depreciation or appreciation of the exchange rate. PPP exchange rate fluctuations are mostly due to different rates of inflation between the two economies (Rogoff, 1996).

Engel (1996) in his analysis of the behavior of the exchange rate in three EMU countries in the period 1960-1999 found out that there was non-stationarity of the real exchange rate, which is a symptom of the longrun persistence of disequilibria in the foreign exchange market. He also found out that some real exchange rate series were trend stationary and this lead him to believe that there is a mean reversion phenomenon around a trend. In a situation in which PPP does not hold, agents believe, on account of some "natural reason", that as time goes by, the dominant currency in the EMS (the German Mark) will appreciate. However, he concluded to the contrary that the weaker currencies – especially the Portuguese Escudo – were the ones that with passing of time appreciated in real terms (Engel, 1996).

It is necessary to compare the cost of baskets of goods and services using a price index. This is a difficult task because purchasing patterns and even the goods available to purchase differ across countries. Thus, it is necessary to make adjustments for differences in the quality of goods and services (Kim, 1990). Additional statistical difficulties arise with multilateral comparisons when (as is usually the case) more than two countries are to be compared. When PPP comparisons are to be made over some interval of time, proper account needs to be made of inflationary effects (Engel, 1996).

2.3 Determinants of Flowers Export Earnings

The determinants of foreign exchange fluctuations include inflation rate, interest rate, exchange rate, transport infrastructure and macroeconomic environment.

2.3.1 Inflation Rate

Tucker (2007) refers to inflation as an increase in the general price level of goods and services in the economy. Inflation is an increase in the overall average level of prices and not an increase in any specific product. Sloman and Kevin (2007), explain that inflation may be either demand pull inflation or cost push inflation. Demand pull inflation is caused by persistent rises in aggregate demand thus the firms responding by raising prices and partly by increasing output. Cost push inflation is associated by persistent increase in the costs experienced by firms. Firms respond by raising prices and passing the costs on to the consumer and partly cutting back on production. Hendry (2006) agrees that inflation is the resultant of many excess demands and supplies in the economy.

Tucker (2007) observed that there are many measures of inflation, because there are many different price indices relating to different sectors of the economy. Two widely known indices for which inflation rates are reported in many countries are the CPI, which measures prices that affect typical consumers, and the GDP deflator, which measures prices of locally-produced goods and services.

2.3.2 Foreign Exchange Rate Fluctuations

Exchange rate is the price at which one country's currency exchanges for another country's currency. The exchange rate plays a pivotal role in determining the price of a nation's product in the rest of the world and domestic price of goods imported from abroad. Today world trade is conducted in a floating exchange rate system, where exchange rate changes continuously

throughout the day (Thomas, 2006). Samuelson and Nordhaus (2010) define exchange rate as prices of one currency expressed in terms of another, they can be expressed in two ways, direct and indirect quotation.

The role of exchange rate in an open economy frame work is important in the monetary transmission mechanism. Real exchange rates affect aggregate demand channel of the monetary transmission of monetary policy. It affects the relative prices between domestic and foreign goods and foreign demand for domestic goods (Ncube and Ndou, 2011).

2.3.3 Interest Rate

According to Thomas (2006) interest rate is the cost of borrowing expressed as a percentage per year. It is a key economic variable that plays an important role in consumer's decision to purchase. The real interest rate, the interest adjusted for expected inflation is particularly significant. The real interest rate influences consumption and investment expenditures and the way in which wealth is redistributed between borrowers and lenders. If real interest rates are unusually high lenders benefit at the expense of borrowers. If real interest rates are abnormally low, borrowers benefit at the expense of the lenders (Thomas, 2006). Interest rates rank among the most crucial variables in macroeconomics and in the practical world of finance. Interest rate changes influence many economic phenomena, including the level of consumer expenditures on durable goods, investment expenditures on plants, equipment and technology and the way wealth is redistributed between borrowers and lenders. Interest rates influence the prices of key financial assets such as stocks, bonds, and foreign currencies (Thomas, 2006).

2.4 Empirical Review

A number of studies have been undertaken on the effects of foreign exchange fluctuations on export earnings. Some have concluded that the relationship between exchange rate fluctuations and

export earnings is negative while others have concluded that the relationship is positive. Some of the empirical studies conducted both locally and abroad are highlighted here below.

Qian and Varangis (1992) applied ARCH-in-mean model to six countries in estimating bilateral and aggregate exports. They find foreign exchange rate to have a negative, statistically significant impact in two cases: Canadian and Japanese exports to the United States. In terms of aggregate exports, the relationship is negative but statistically insignificant for Japan and Australia while positive and statistically significant for Sweden and to some extent UK, but statistically insignificant for the Netherlands. The magnitude of the impact of foreign exchange rate varies greatly – from a reduction in exports of 7.4% for Canada to an increase of 5% for Sweden, following a 10% increase in volatility.

Arize, Osang and Slottje (2004) investigated the impact of real exchange rate volatility on export flows of eight Latin American countries. The results show that increases in fluctuations of the exchange rate exert a significant negative effect on export demand in both the short and long-run thereby decreasing export earnings. In Ghana, Bhattarai and Armah (2005) confirm a stable long run relationship between both exports and imports and the exchange rate. They also found that when the domestic currency weakens, that is devaluation; the effect on both imports and exports is contractionary. Examining the impact of exchange rate fluctuations on South African export flows, Todani and Munyama (2005), came to more or less the same conclusion with respect to the differential impact of foreign exchange rate fluctuations on export earnings of agricultural and non-agricultural exports.

Cameron et al., (2005) investigated the effects of exchange rate variability on Uganda's tropical freshwater fish exports. The empirical evidence suggests that Uganda's export earnings of fish were negatively and significantly correlated with foreign exchange rate fluctuations.

Chit et al. (2010) examined the real exports of five emerging East Asian economies among themselves, as well as to thirteen industrialized countries. The paper provides strong evidence that exchange rate fluctuations have had a statistically significant negative impact on the export earnings of those emerging East Asian economies. They also tested the impact of foreign exchange rate fluctuations on third world countries to establish whether a rise in exchange rate fluctuations between the importing country and other exporting countries encouraged bilateral exports between two trading partners. Their findings tend to confirm that not only absolute fluctuations but also relative fluctuations are important for bilateral export flows and earnings of emerging East Asian economies. They conclude that exchange rate fluctuations in East Asian economies have a significant negative impact on export flows and earnings to the world market.

In Kenya, a study conducted by Kimani (2007) found out that forward exchange rates are biased predictors of the future spot rates. He notes that under presence of efficiency in the foreign exchange market, the forward exchange rates should be unbiased predictor for the future spot rate. He found out that there was presence of unexploited profit opportunities for those who participate in exchange rate transactions in the Kenyan foreign exchange market and therefore concluded the rational expectation approach is inefficient in foreign exchange market in Kenya. He notes that there is presence of a risk premium and therefore participants in the FOREX market in Kenya conduct their transactions on the basis of speculation rather than on prediction of future market behavior based on the past or current performance of respective currency. Other local studies carried out on efficiency of foreign exchange markets in Kenya by Ndunda (2002) and Kurgat (1998) looked at efficiency from the basis of simple trading rules. Kiptui (2007) in his presentation paper notes that real exchange rate has positive effects in the short-run but that these effects were found to be statistically insignificant.

Mwanza (2007) carried out a study on the effect of the strong Kenya shilling on horticultural exports in the period around year 2003. He notes that the country had been experiencing sudden

movements in the foreign currency rates in certain period's yet horticultural export earnings had been gradually increasing. He gives an example in 2003 when Kenya experienced adverse effects of a strong shilling on export earnings which wiped out millions of earnings resulting in losses. He concludes in his study that a strong shilling portends mixed fortunes.

Kiptui (2008) conducted a research study on whether exchange rate volatility harms Kenyan exports. He examined the role of the real exchange rate in influencing the demand for Kenya's exports in an export demand framework which also includes economic activity for specific export categories: tea, coffee, horticulture and manufactured goods. Bounds testing and ARDL approaches to the analysis of long-run relationships and error correction modeling are applied and he concluded that foreign exchange rate fluctuations have significant negative short and long run effects on Kenya's real exports of tea and horticulture.

Otieno and Mudaki (2011), in their study, factors influencing real exchange rate and export sector performance in Kenya argue that the real exchange rate has positive effects in the short-run but these effects are found to be statistically insignificant. Nevertheless, the short run elasticities are high and positive as in the case of coffee and manufactured goods which are close to unity. Therefore the effects of the real exchange rate are more likely to be long term in nature rather than short term. Concerns over short run effects of real exchange rate appreciation are therefore unwarranted. From their findings, they also conclude that exchange rate fluctuations have not been to levels that harm export growth and thereby earnings, that is, there could exist a threshold level at which exchange rate fluctuations harm exports. The positive relationship between export performance and depreciation of the shilling in real terms in Kenya has raised questions over underlying determinants of demand for the country's exports. While it has been argued by some that the exchange rate is a factor, others point to favourable economic growth prospects in export destination countries.

Mwangi et al. (2014), examined the effects of exchange rate volatility on French beans exports in Kenya. In this study, the values of exchange rate volatility of the Kenya shilling against the US dollar were computed using a generalized autoregressive conditional heteroscedasticity model. The results of co-integration analysis using vector autoregressive model indicated the presence of a long run equilibrium relationship between French beans exports and exchange rate volatility. The exchange rate volatility variable had negative long run effects on French beans exports.

2.5 Summary of Literature Review

The empirical studies reviewed on this area have mainly focused on the effect of foreign exchange rate fluctuations even though there are other factors apart from fluctuations of foreign exchange rates that hinder flower export earnings, most of which are not correlated with either the floating or fixed rate regimes. These factors vary among countries with comparative advantage in the flower export sector. Although there is a wide range of factors that have been identified from related studies as factors responsible for export earnings, most studies empirically tend to narrow these factors to price variables, indicating the difficulty of quantifying non-price variables or obtaining reliable and complete set of data.

The recurring policy objectives have been to maintain an exchange rate that would ensure international competitiveness and minimal negative effects on export earnings, while at the same time keeping the domestic rate of inflation at low levels. Therefore this study will bridge the gap by analyzing fluctuations in foreign exchange rates and examining their effects on fresh cut flowers export earnings in Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology used in this study and provides a general framework for this research. The chapter presents details of the research design, population, data collection and data analysis.

3.2 Research Design

Research design refers to the way the study is planned and conducted, the procedures and techniques employed to answer the research problem or question (McMillan and Schumacher, 1984). The research design used was descriptive research that sought to study relationship between variables also refer to as interrelationship because they trace relationship among the facts obtained to gain a deeper insight into the situation.

3.3 Data Collection

This study used secondary data which was gathered from HCDA, KNBS, KFC, EPC and CBK for the period of ten years (2005 - 2014). Data on foreign exchange rate fluctuations will be obtained from CBK while data on inflation will be obtained from KNBS. Export earnings on Fresh Cut Flowers will be obtained from 58 licensed firms (see appendix 1) by HCDA, and statistical export data from KFC and EPC.

3.4 Data Analysis

The data collected will be processed, analyzed, interpreted and presented in such a manner that it is clear, precise and unambiguous. This data will quantify and coded using descriptive statistics. The Statistical package for social sciences (SPSS 22.0) will be used to describe the collected data, sort and sift through and analyze it.

3.5.1 Analytical Model

The data will be expressed in the form of an equation $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e$

Where: Y = Log of Total export earnings of flower industry (on quarterly basis)

X_1 = Quarterly Foreign exchange rate (Kshs Vs the dollar)

X_2 = Quarterly Inflation

X_3 = Quarterly Interest rate (CBK Base rate)

e = Error term

a = Constant term b_1 – b_3 = Regression coefficients – define the amount by which Y (response variable) is changed for every unit of change in the predictor variable. e = the error term, which defines the variation in the response variable, Y, which cannot be explained by the predictor variables.

Table 3.1: Operationalization of the Measurable Variables

Variable	Operationalization/ Measurement
Y = Dependent	Log of Total Export Earnings of Flower Industry in Kenya
X_1 = Independent factor	Quarterly Averaged Foreign Exchange rate fluctuations (Ksh Vs the dollar) by taking the following month's average rates less the preceding month's average rates i.e ($M_2 - M_1$)
X_2 = Control variable	Quarterly inflation rate (CBK Statistical data)
X_3 = Control variable	Quarterly interest rates

3.5.2 Test of Significance

The study will conduct an F- test to establish the significance of the independent variables (interest rate; exchange rate; inflation rate) against the dependent variable (Price Volatility). The significance of variables will be observed at 95% confidence level whereby, variables with a 'p'

value of 0.05 and below will be deemed significant while those with 'p' values above 0.05 will be deemed insignificant.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents findings from analyzed secondary data. Descriptive statistics and model results are presented. This chapter also includes results interpretation and summary of the findings.

4.2. Flower Export Performance

The Table 4.1 below gives the flower export performance for the variables used in this study.

Table 4.1 Flower Export Performance

Year	N	Aggregate export earnings of the flower industry (Quarterly - KSh)	Quarterly Foreign Exchange Rate (fluctuations)	Quarterly Inflation rate	Quarterly interest rates	Valid N
2005	40	2,221,736,783	.2577	.4645	.1685	40
2006	40	3,347,394,589	.2799	.4799	.1274	
2007	40	956,790,322	.3279	.4803	.1834	
2008	40	821,495,853	.4576	.5298	.2284	
2009	40	1,897,986,749	.5278	.5699	.3394	
2010	40	6,288,883,494	.5568	.5388	.4638	
2011	40	8,659,865,897	.7732	.5037	.4839	
2012	40	9,975,932,551	.8021	.4209	.5493	
2013	40	11,853,878,003	.8189	.4102	.5990	
2014	40	12,557,897,850	.8038	.3287	.6383	

The average export earnings of the flower industry were noted to have values ranging from KSh 2,221,736,783 in 2005 to as high as KSh 12,557,897,850 in 2014. The study noted that the values for the aggregate export earnings increased progressively in 2005 and 2006 with a decrease was seen in the years 2007 and 2008. This inferred that the political instability that occurred in the country in 2007-2008 had an influence on the aggregate export earnings of the flower industry. The values were then

noted to increase in 2009 to 2014. The quarterly foreign exchange rate fluctuation was at 0.2577 in 2005 with a consistent growth to a 0.8038 in 2014. The quarterly inflation rate increased progressively over the first 5 years of analysis with a downward trend noted in the years 2010 to 2014. The quarterly interest rate was also noted to increase progressively from 0.1685 in 2005 to 0.6383 in 2014.

4.3 Descriptive Statistics

The Table 4.2 below gives the descriptive statistics for the variables used in this study. The descriptive analysis of all the variables in this study was sourced using SPSS 22.0 software for the period of ten years (2005 – 2014) for the flower industry in Kenya.

Table 4.2 Descriptive Statistics

Statements	N	Mean	Std. Dev.
Log of total export earnings of flower industry	40	4.253	.874
Quarterly foreign Exchange Rate fluctuation	40	4.045	.541
Quarterly Inflation Rate	40	3.985	.461
Quarterly interest rate	40	3.487	.823

The results indicates that log of total export earnings of flower industry had a mean of 4.253 with a standard deviation of 0.874. Further, quarterly foreign exchange rate fluctuation had a a mean of 4.045 with a standard deviation of 0.541; quarterly inflation rate had a a mean of 3.985 with a standard deviation of 0.461 while quarterly interest rate had a a mean of 3.487 with a standard deviation of 0.823.

4.4 Correlation Analysis

Correlation coefficients were used to analyze the effects of exchange rate, inflation and interest rates on flower export earnings in Kenya. As a key assumption of the regression model, this study sought to establish if there was linearity between the independent variable and independent

variables. Pearson correlation was used to measure the degree of association between variables under consideration i.e. independent variables and the dependent variables.

Table 4.3 Correlation coefficients

	Log of total export earnings	Quarterly foreign Exchange Rate fluctuation	Quarterly Inflation Rate	Quarterly interest rate
Log of total export earnings	1.000			
Quarterly foreign Exchange Rate fluctuation	.603	1.000		
Quarterly Inflation Rate	-.121	.273	1.000	
Quarterly interest rate	.639	.532	.478	1.000

Source: Researcher 2015

From the SPSS analysis, it can be deduced that all the independent variables are correlated to the dependent variable. From the table 4.3 above, the foreign exchange rate had a correlation coefficient of 60.3% with the total export earnings of the flower industry. The correlation coefficient between the monthly inflation rates and the total export earnings was negative 12.1 % while the monthly interest rates had a correlation coefficient of 63.9% to the total export earnings in the flower industry.

4.5 Goodness of Fit Statistics

Table 4.3 indicates the strength of the relationship between flower export earnings and the independent variables; the monthly foreign exchange rate, monthly inflation rate and the monthly interest rate.

Table 4.4 Goodness of fitness measure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.907 ^a	0.823	0.796	0.1774832

The Adjusted R squared is the adjusted coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variables. From the findings in table 4.4 above, the value of the Adjusted R square was 0.796, an indication that 79.6% of the variations in the total export earnings in the flower industry in Kenya are explained by changes in quarterly foreign exchange rates, quarterly inflation rates and quarterly interest rate at 95% confidence interval. Other factors not stated in the model account for 20.4% of the variations in the total export earnings of the flower industry. R is the correlation coefficient which in this case was 90.7%. This showed that there was a strong positive relationship between the study variables: the foreign exchange rate, inflation rate and interest rate.

Table 4.5 Analysis of Variance

Model	Sum of squares	Df.	Mean Square	F	Sig.
Regression	.213	3	.071	14.200	.000 ^a
Residual	.180	36	.005		
Total	.393	39			

Source: Researcher 2015

From the analysis of variance, the F Test of 14.200 calculated which is greater than the F critical value indicate that the regressions explanatory power on the overall significance was strong. The significance value of 0.000 obtained implied that the regression model was significant in predicting the relationship between the total export earnings in the flower industry and the predictor variables as it was less than = 0.05. This significance level means that the chances are almost zero that the results of the regression model were due to random exogenous events instead of the true relationship existing in the model.

4.6 Regression Model

Regression analysis was used to predict statistical significance between the dependent and independent variables. Regression analysis measures the effect of the relationship of the independent variables on the dependent variable. The researcher conducted a multiple regression

analysis to examine the effect of the given independent variables (exchange rate, inflation and interest rate) on the flower export earnings in Kenya. The model for the regression analysis was expressed in the form of the equation below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Table 4.6: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1 (Constant)	2.316	0.123		7.367	0.000
Quarterly foreign exchange rate	0.398	0.028	0.158	3.357	0.001
Quarterly inflation rate	-.565	.022	-.329	-4.039	.000
Quarterly interest rate	0.836	0.030	0.105	1.194	0.002

a. Dependent Variable: log of total export earnings of the flower industry

b. Predictors: (Constant), quarterly foreign exchange rate, quarterly inflation rate and the quarterly interest rate.

Table 4.6 above shows the results of the regression coefficients required to form the multiple regression models. From the Regression results in table below, the multiple linear regression models finally appear as;

$$Y = 2.316 + 0.398X_1 - 0.565X_2 + 0.836X_3 + 0.123$$

Where:

X_1 = Quarterly foreign exchange rate fluctuations

X_2 = Quarterly inflation rate

X_3 = Quarterly interest rate

The multiple linear regression models indicate that all the independent variables have positive coefficient. The regression results above reveal that there is a positive relationship between dependent variable (log of total export earnings of the flower industry) and independent variables (quarterly foreign exchange rate, quarterly inflation rate, quarterly interest rate). From the findings, one unit change in the quarterly foreign exchange rate results in 0.398 units increase in the log of total export earnings of the flower industry. One unit change in the quarterly inflation rate results in a -0.565 decrease in the log of total export earnings of the flower industry. A unit increase in the quarterly interest rate results in 0.836 unit increase in the log of the total export earnings of the flower industry.

The t-test helps in determining the relative importance of each variable in the model. As a guide regarding useful predictors, we look for t values well below -0.5 or above +0.5.

4.7 Discussion and Interpretations

The average export earnings of the flower industry were noted to have values ranging from KSh 2,221,736,783 in 2005 to as high as KSh 12,557,897,850 in 2014. The study noted that the values for the aggregate export earnings increased progressively in 2005 and 2006 while a decrease was seen in the years 2007 and 2008. This inferred that the political instability that occurred in the country in 2007-2008 had an influence on the quarterly export earnings of the flower industry. The values were then noted to increase in 2009 to 2014. The quarterly foreign exchange rate fluctuation was at 0.2577 in 2005 with a consistent growth to a 0.8038. The quarterly inflation rate increased progressively over the first 5 years of analysis but a downward trend was observed from year 2010 to 2014. The quarterly interest rate was also noted to increase progressively from 0.1685 in 2005 to 0.6383 in 2014.

From the table 4.3, the foreign exchange rate fluctuation had a correlation coefficient of 60.3% with the total export earnings of the flower industry. The correlation coefficient between the quarterly inflation rates and the total export earnings was negative 12.1% while the quarterly interest rates had a correlation coefficient of 63.9% to the total export earnings in the flower industry.

The results from the model show a coefficient of determination of 82.3% and an adjusted R square of 79.6% which indicated that the model is very reliable. The value of the Adjusted R square was 0.796, an indication that 79.6% of the variations in the total export earnings in the flower industry in Kenya are explained by changes in quarterly foreign exchange rates, quarterly inflation rates and quarterly interest rate at 95% confidence interval. Other factors not stated in the model account for 20.1% of the variations in the total export earnings of the flower industry. R is the correlation coefficient which in this case was 79.6%. This showed that there was a strong positive relationship between the study variables: the quarterly foreign exchange rate, quarterly inflation rate and quarterly interest rate.

These findings positively agreed with Otieno and Mudaki (2011), who posits in their study that, factors influencing real exchange rate and export sector performance in Kenya argue that the real exchange rate has positive effects in the short-run but these effects are found to be statistically insignificant. Nevertheless, the short run elasticities are high and positive as in the case of coffee and manufactured goods which are close to unity. Therefore the effects of the real exchange rate are more likely to be long term in nature rather than short term. Concerns over short run effects of real exchange rate appreciation are therefore unwarranted. From their findings, they also conclude that exchange rate fluctuations have not been to levels that harm export growth and thereby earnings, that is, there could exist a threshold level at which exchange rate fluctuations harm exports. The positive relationship between export performance and depreciation of the shilling in real terms in Kenya has raised questions over underlying determinants of demand for the country's exports. While it has been argued by some that the exchange rate is a factor, others point to

favorable economic growth prospects in export destination countries. They also conclude in their studies that the exchange rate is an important determinant of a countries export earnings; conclusions which are consistent with those made in this study.

The regression results revealed that there is a positive relationship between dependent variable (log of total export earnings of the flower industry) and independent variables (foreign exchange rate, inflation rate, interest rate). From the findings, one unit change in the quarterly foreign exchange rate results in 0.398 units increase in the log of total export earnings of the flower industry. One unit change in the quarterly inflation rate results in a -0.565 decrease in the log of total export earnings of the flower industry. A unit increase in the quarterly interest rate results in 0.836 unit increase in the log of the total export earnings of the flower industry.

The study conducted by Qian and Varangis (1992) found that the relationship between foreign exchange rate and aggregate exports to Sweden and UK are positive and statistically significant and this is consistent with the findings of this study.

CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter is a synthesis of the entire study, and contains summary of research findings, exposition of the findings, commensurate with the objectives, conclusions and recommendations based thereon.

5.2 Summary of Findings

The objective of the study was to examine the effect of foreign exchange rate fluctuations on flower export earnings in Kenya. The research methodology involved the use of secondary data collected from KNBS, HCDA, CBK, KFC and EPC. This study established that there was significant influence of foreign exchange rate fluctuations to the total export earnings. Table 4.3 showed the results of the correlations from which the foreign exchange rate had a correlation coefficient of 60.3% to the log of the total export earnings; monthly inflation rate had a negative coefficient of correlation of 12.1% while monthly interest rate had a correlation coefficient of 63.9%. In summary therefore and based on these correlation coefficients, the higher the exchange rate and interest rate, the higher the total export earnings of the flower industry in Kenya. The correlation coefficient matrix revealed the relationship between inflation rate and the total export earnings to be a negative.

The coefficient of determination as explained by the adjusted R squared for the study was 79.6% which means that the independent variables (monthly foreign exchange rate, monthly inflation rate, monthly interest rate) account for 79.6% of the changes in flower export earnings in Kenya at 95% confidence level. This also means that other factors not stated in the model account for 20.4% of the log of total export earnings of the flower industry. From the research findings and based on the magnitude of the beta coefficients, the monthly foreign exchange rate is the greatest predictor

of Kenya's total export earnings in the flower industry (0.398, $t = 3.357$, sig. 0.001) followed by monthly interest rate (0.836, $t = 1.194$, sig. 0.002) and lastly monthly inflation rate (-0.565, $t = -4.039$, sig. 0.000). The exchange rate is therefore a major determinant of the total export earnings in Kenya. The significance values of the coefficients in the model are less than 0.05 indicating that the coefficients are significant. Foreign exchange is a significant determinant of Kenya's total export earnings.

From the findings, one unit change in the monthly foreign exchange rate results in 0.098 units increase in the log of total export earnings of the flower industry. One unit change in the monthly inflation rate results in a -0.565 decrease in the log of total export earnings of the flower industry. A unit increase in the monthly interest rate results in 0.836 unit increase in the log of the total export earnings of the flower industry. Looking at the study as a whole, the findings were statistically significant since the significance values of the coefficients were found to be close to 0.000 and less than 0.05. This is an indication that the error rate on making conclusions using the model derived from the findings was low and therefore the recommendations from these findings reflect the true picture of the effects of these independent variables (monthly foreign exchange rate, monthly inflation rate, and monthly interest rate) on the total export earnings of the flower industry.

5.3 Conclusion

The study sought to examine the effects of foreign exchange rate fluctuations on the total export earnings in Kenya using monthly time series data from 2005-2014. In this study, the dependent variable was the log of total export earnings of the flower industry while foreign exchange rate, inflation rate and interest rates were independent variables. The independent variables were found to be statistically significant determinants of the total export earnings in the flower industry.

The study established that exchange rates are constantly fluctuating on the foreign exchange market. As demand rises or falls for particular currencies, their exchange rates adjust accordingly.

Instantaneous rate quotes are available from a service provided by Reuters. A rate of exchange for currencies is the ratio at which one currency is exchanged for another (Cross, 1998).

Export performance of successful economies has been driven mostly by supply capacity although this has a limited effect on developing countries and this includes Kenya. Political instability, weak and poor institutional and macroeconomic environment and poor infrastructure have continued to drag the performance of the flower industry in Kenya thereby negatively affecting export earnings from this sector. In this study a conclusion was drawn that the foreign exchange rate is a major determinant of the total export earnings. This was consistent with the findings of Were et al (2002) whose study on Kenya's export performance revealed that the exchange rate had a profound effect on Kenya's horticultural export performance.

5.4 Limitations of the Study

One of the limitations of this study was the time engaged in the collection, analysis and interpretation of data. The voluminous data required plenty of time to collate and check for quality. This is especially so because the required data was not available in one file, format or location and had to be collated from several different sources.

The cost of obtaining some of the data was also inhibitive with each yearly data set being sold separately. For some of the inputs, the data had to be purchased on a month by month basis making the cost even more prohibitive. Political instability, weak and poor institutional and macroeconomic environment and poor infrastructure have continued to drag the performance of the flower industry in Kenya thereby negatively affecting export earnings from this sector.

The time taken to carry out this study was in no means sufficient for the amount of detail and analysis the study involved. With more time, detailed tests could be conducted to determine

whether the same conclusions could have been derived with more variables included in the research model. The period within which this study was conducted was short and the researcher therefore had to consider a period of 10 years (2005 - 2014) as opposed to a longer period say 20 years if the duration of the study was longer.

5.5 Recommendations for Policy

Kenya's economy largely relies on the agriculture sector. Horticulture is one of the top foreign exchange earners for the country with the flower industry contributing significantly to the national GDP. As Kenya strives to transform itself into an industrialised middle income country, as envisaged in Vision 2030, there is need to provide quality life to all of its citizens. If this is to be realized, there is need for the government to encourage and boost exports from the country and flower exports in particular in order to boost the country's export earnings. The government needs to establish special economic zones in partnership with private investors to support increased exports and competition and this will definitely lead to export diversification and hence increased export earnings. There is need for policy makers to work towards increasing the volume of exports through diversification of market destinations by targeting local, regional and export markets as opposed to the current practice. This can be realized through regional and export market promotion initiatives as well as consistent compliance with quality standards. Innovative ways of meeting the standards and facilitation of smallholder farmers to meet these standards is required.

In order to cushion exporters from high exchange rate fluctuations, the government could set up a flower export stabilization facility. The fund could be capitalized by charging exporters a tax so that during periods of high flower prices and high export earnings, the country would accumulate the fund which it would draw down during periods of low flower prices. The flower price stabilization fund would be introduced by the government through imposition of a tax on exports.

This fund would ensure predictability in flower prices so that fluctuations would not affect flower exporters drastically in future.

There is need for the government to ensure political stability and national security by dealing with the current terror threats and ensure a stable and conducive macroeconomic stability in the country in order to attract both domestic and foreign investors. Macroeconomic stability in Kenya is key to the success of the country's development and improved export performance and growth.

The government needs to come up with structures to support flower export performance which will in effect lead to job opportunities. Creation of employment opportunities leads to increased production and this therefore leads to improved export performance. Kenya should move away from concentration in production of primary products like coffee and tea whose prices are ever fluctuating in the world market. These primary products are always subject to external shocks because their prices are determined by economic situations in developed countries which form the base markets for the country's export products.

There is also need to boost supply in the flower sector through incentives and subsidies that will lead to lower cost of production. The EAC common market protocol allows for free movement of capital and labour, goods and services and this contributes positively to increased trade and Kenya appears to be one of the biggest beneficiaries of this act in the region.

Lastly, Policy makers should create an enabling environment to maintain and sustain a stable exchange rate system that is resistant to external shocks. This can only be achieved through independence of the Central Bank especially the monetary policy committee.

5.6 Recommendations for further Research

The study mainly focused on the effects of foreign exchange rate fluctuations on export earnings; with the evidence being from the flower industry. This study focused on the US Dollar as the foreign exchange currency (KSh Vs US\$). This study recommends a further study on other currencies of other foreign countries that form markets for the Kenyan flower export sector such as the British Pound or Japanese Yen.

This study focused on three independent variables i.e. foreign exchange rate, inflation rate and interest rates. This study recommends for another study to be undertaken with more independent variables that affect export earnings from the flower industry in Kenya such as domestic transport infrastructure and foreign direct investment as a percentage of GDP as these could influence the results obtained from such a similar study.

The study was conducted on the flower industry in Kenya; further research could be carried out on other economic sectors of the country and even the broader East African or Comesa region to establish the effect of foreign exchange rate fluctuations on export earnings from the different sectors under study and across the EAC and Comesa region.

A similar study should be conducted over a longer period of time for example twenty years to try and see the behaviour of Kenya's export earnings and foreign exchange rate fluctuations over such a longer period in the flower industry.

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**APPENDIX I: LIST OF CUT-FLOWER COMPANIES AND THEIR
LOCATIONS AS AT 31/08/2014**

No	Company Name	Location	No	Company Name	Location
1	Africana Lillies Ltd	Nairobi	30	Longonot Horticulture Ltd	Nairobi
2	Aquila Dev Co Ltd	Nairobi	31	Liki River farm	Nanyuki
3	Bawan Roses Ltd	Thika	32	Live wire Ltd	Naivasha
4	Beverly Flowers Ltd	Nairobi	33	Magana Flowers (K) Ltd	Nairobi
5	Bilashaka Flowers Ltd	Naivasha	34	Matasia Valley Roses	Nairobi
6	Black Petals Ltd	Nairobi	35	Mosi Ltd	Nairobi
7	Bondet Ltd	Nanyuki	36	Mt. Elgon Flowers Ltd	Kitale
8	Charm Flowers Ltd	Nairobi	37	Mweiga Growers Ltd	Nyeri
9	Country wide Connections Ltd	Nanyuki	38	Nini LTD	Naivasha
10	Dave Roses	Nairobi	39	Ol Njorowa Ltd	Naivasha
11	Elbur Flora Ltd	El Burgon	40	Oserian Dev Co Ltd	Naivasha
12	Finlay Flowers Ltd	Kericho	41	P.J. Dave Flower Ltd	Nairobi
13	Florema (K) Ltd	Nivasha	42	Pollen Ltd	Ruiru
14	Florensis (K) Ltd	Naivasha	43	Primarosa flowers Ltd	Athi River
15	Gatoka Ltd	Thika	44	Primarosa Zuri Ltd	Njororok
16	Grandi Flora Ltd	Nairobi	45	Redlands Roses Ltd	Ruiru
17	Groove Ltd	Naivasha	46	Roseto Ltd	Nakuru
18	Hamwe Ltd	Naivasha	47	Sian Roses Ltd	Nairobi
19	Harvest Ltd	Nairobi	48	Simbi Roses	Thika
20	Highlands Plants Ltd	Ol Kalao	49	Subati Flowers Ltd	Nairobi
21	Homegrown (K) Ltd	Nairobi	50	Suera Flowers Ltd	Nairobi
22	Isinya Flowers	Nairobi	51	Terrasol Ltd	Nairobi
23	Kariki Ltd	Thika	52	Timaflor Limited	Nanyuki
24	Kenya Highlands Nurseries	Nakuru	53	Tambuzi Ltd	Nanyuki
25	Kreative Roses	Nairobi	54	Valentine Growers co ltd	Nairobi
26	Kisima Farm Ltd	Timau	55	Waridi ltd	Nairobi
27	Kudenga Ltd	Molo	56	Wildfire Ltd	Naivasha
28	Lake Flowers Ltd	Nairobi	57	Windsor Flowers	Thika
29	Lathyflora Ltd	Nairobi	58	Xpressions Flora Ltd	Nairobi

Source: Kenya Flower Council (KFC)