

## A Survey of Exchange Rate Fluctuation on Tea Export Earnings among Smallholder Tea Factories in Kenya

Cosmas Kiplagat Cherop<sup>1\*</sup> Jeremiah Rotich Changwony<sup>2</sup>

1. Jomo Kenyatta University of Agriculture & Technology, P.O. Box 62,000 – 00200 Nairobi, Kenya

2. Moi University, P. O. Box 3900, Eldoret

\*E-mail of corresponding: [adamscherop@yahoo.com](mailto:adamscherop@yahoo.com); [jrchangwony@gmail.com](mailto:jrchangwony@gmail.com)

### Abstract

Foreign exchange earnings are normally translated to local currency. The Kenya shilling will allow the exporter to meet local obligations which are denominated in local currency. There is always period between which transactions are concluded and the time payment is received. It is rare for the exchange rate at the time of receipt to be equal to the exchange rate when the transaction took place. The differences in the two rates will lead to either an exchange gain or exchange loss. Tea Export Trade at Mombasa Tea Auction is conducted in US dollar being the official hard currency in accordance with Kenya Government Policy as per Exchange Control Circular No. 5/92/13 of 15/10/92 (EATTA, 2010). The dollar being the official hard currency at Mombasa Tea Auction could affect earnings among tea exporters in Kenya. This study sets out on a survey to establish how earnings among smallholder tea factories is affected by this arrangement. The smallholder tea factories are managed by KTDA Ltd on behalf of smallholder tea growers.

**Keywords:** Kenya Shilling, Tea Export, Exchange Rate, US Dollar, Export Earnings

### Introduction

#### Background of the Study

The proceeds from international trade are basically paid in any of the hard currencies and they are usually exchanged to the local currency in order to facilitate and meet local obligations. The hard currencies can either be sold to a banker or foreign exchange dealer (Matsuyama et al., 1993).

Exchange from a hard currency to a local currency can lead either to foreign exchange loss or gain. Realization of gains or losses depends on the depreciation or the appreciation of the local currency against respective hard currencies relative to the date of the transaction that gave rise to earning of the hard currencies. The overall weighted index of major foreign currencies against the Kenya Shilling indicated that it depreciated by 18.0% in 2008 compared with an appreciation of 5.6% in 2007 (GoK Economic Survey, 2009).

Foreign exchange rates can either be fixed or floating. Floating exchange rates are determined by the market forces of demand and supply. Fixed exchange rates are pegged on rates which are predetermined from time to time by the Central Bank of each state. Exporters and dealers can be cushioned against exchange losses arising from erratic exchange rate appreciation by fixing the rate. Fixed exchange rates were in use until 1973 when the Bretton Woods collapsed. The Bretton Woods system was the first example of a fully negotiated monetary order intended to govern monetary relations among independent nations/states. The Bretton Woods consisted of the World Bank and the International Monetary Fund (Masson et al., 1996).

The Foreign Exchange Market is, by most accounts, the oldest, and most extensive financial market in the world (Feder, 2009). The market in Kenya as in any developing economy is unified onshore spot market mainly for US dollars and transactions are concentrated at the bank-customer level. Over a long period of time, international trade has been regarded as major path in achieving economic development (Bordo and Harold, 2006). Ezeala-Harrison (1999) stated that international trade is an important “engine” that drives economic growth of nations and international competitiveness is the “fuel” that empowers that engine and hence improves the economic performance of a country. Exchange rates are affected by various factors which either is economic, political, social, and environmental or a combination of any of them. Exchange rates react quickly to news about current and potential monetary and fiscal policies (Ezeala-Harrison, 1999). According to International Financial Services London research conducted in April 2007 (Kim, 2008) the US dollar was involved in 86% of foreign exchange transactions, followed by the euro (37%), Japanese yen (17%), pound sterling (15%), Swiss franc (7%) and (7%) for Australian dollar (Were et al., 2002).

In Kenya, some commodity auction markets have specific approved hard currency as mode of exchange. Sale No. 42 of 26th October, 1992 is fondly remembered as the sale in which the Mombasa Tea Auction went international by conducting a most successful US dollar auction in accordance with Kenya Government Policy as per Exchange Control Circular No. 5/92/13 of 15/10/92 (EATTA, 2010).

#### Exchange Rate Fluctuation

Currency appreciation occurs when there is an increase in value of one currency with respect to another currency (Papell, 1998). For instance, when the Kenyan Shilling appreciates, it means that the shilling has become more

valuable. There is a downward movement whenever there is an appreciation, that is, if the Kenyan Shilling moves downward from Kshs. 80 to Kshs. 75 per dollar then Kenyan Shilling is said to have appreciated.

Currency depreciation is the converse of currency appreciation. The depreciation of a country's currency refers to a decrease in value of that country's currency. It occurs when there is loss of value of one currency with respect to another currency (Papell, 1998). For instance, if the Kenyan Shilling depreciates relative to the dollar, then it will require more Kenyan Shillings to purchase one dollar. In many previous researches, it is found that the impacts of currency depreciation are mixed among different types of firms, industries and countries. Forbes (2002) differentiates several channels by which currency depreciations affect firm performance. First, depreciation could downgrade firm competitiveness since the cost of imported inputs rises relatively to foreign competitors. Second, depreciation may provide exporters with a relative cost advantage relative to foreign competitors. Third, depreciation could generate higher borrowing costs and a contraction in lending. The impact of currency depreciation should be based on the heterogeneity of the firms (Forbes, 2002).

### **Tea Export Performance**

Tea export is categorized under traditional agricultural export in Kenya. Tea export earnings are among the top three foreign exchange earners in Kenya. There was a sharp increase in prices of tea in the 1970s. Kenya's export structure is predominantly composed of primary commodities – mainly tea, coffee and horticulture – besides tourism. Tea exports took the lead in the 1990s. The tea industry has remained stable, with increases in production levels and therefore earnings from exports. However, the industry has also been faced with problems of overproduction, declining prices in the world markets and poor institutional management (Were et al., 2002).

Tea production is labour intensive and therefore millions of rural populations depend on the industry for their livelihoods. Kenya and Sri Lanka control 40 percent of the world exports and have large smallholder subsector (World Bank, 2008). Tea is therefore important within the economy and is critical form of export income. Until recently the price trend for tea has been downward. According to Food and Agriculture Organization (FAO) composite index, the price of tea has been gradually increasing. However, long term analysis taking inflation into account indicates that the real tea price dropped substantially as producers now receive less than half of what they did 3 decades ago (Gesimba, 2005). Tea is the leading agriculture export in Kenya. On average, it contributes 28% of the value of total agricultural exports, followed by horticulture (20%), fish (9%) and coffee (4.2%), and others (38.8%) (Gesimba, 2005).

There are currently 422,722 smallholder tea growers with 91,651 hectares of land under tea. This translates to several millions of Kenyans who depend on tea directly. There are other millions of Kenyans out there who depend on tea indirectly either as employees of tea processing factories, or employees of small scale tea growers, or as suppliers to tea factories (KTDA, 2008).

Kenya relies on agricultural exports for foreign exchange earnings. Tea in Kenya is a very important cash crop which has been and is contributing to Kenya's foreign exchange earnings since independence. This sub-sector contributed 36.6% to GDP in the period 1964-1973, 33.2% in 1974-79, 29.8% in 1980-89, 26.2% in 1990-95, and 24.5% in 1996-2000. Kenya earned Sh62.1 billion from tea exports in 2008, up from Sh43.1 billion recorded in 2007. Agriculture PS Romano Kiome said tea export volume rose from 345.8 million kg in 2007 to 383.4 million kg in 2008, while earnings rose by Sh19 billion due to improved prices. "Despite the challenges we went through last year, tea still remained a leading foreign exchange earner after horticulture," he said during a luncheon hosted by Hong Kong Development Council on Monday (Kathuri, 2009). Earnings from the horticulture sector, which is the largest exporter of cut flowers to Europe, soared to 63 per cent in 2008 to overtake tourism as the country's leading foreign exchange earner. The Central Bank said the industry, which also produces fruit and vegetables, earned Kes 70.3 billion (\$1.12 billion) from exports in 2008. This beat tourism, which earned an estimated Kes 65.4 billion in 2008, according to the Kenya Tourist Board (Oyuke, 2009). Over the past five decades, export trade of tea in Kenya to other countries has been active and significant. Empirical data (KTDA, 2006) shows that from 1992 to 2005, Kenya's tea export increased from \$1.68 billion to \$5.42 billion. Most of this tea is exported to Europe, USA and Middle East. Most of the exports and import from and into the country are done using major world currencies mainly US dollars and Euros. Amid the fascination with expanding tea export trade from Kenya, there are concerns about the facilitation of major currencies that is likely to affect the volume of export payments for the tea exports. Currently research undertakings is limited on the how the fluctuation of local currencies in Kenya has affected the earnings of tea export in Kenya. Evidence suggests that the continued depreciation of the Kenyan shillings against both the euro and the dollar are likely to affect the performance of exports both in the micro and macro- levels. On the basis of the foregoing arguments, this study will survey how exchange rate fluctuation has affected earnings among smallholder tea factories in Kenya.

### **Statement of the Problem**

Exporters of all commodities expect to make a profit from their export trade. This is only possible where foreign

exchange rates are stable. Exporters are negatively exposed to foreign exchange rate fluctuations because the extent of depreciation is higher than that of appreciation which was 18.0% and 5.6% for 2008 and 2007 (GoK Economic Survey, 2009). Kimani (2007) tested the efficiency of foreign exchange market in Kenya and found out that forward exchange rates are biased predictors of future spot rates. Ndunda (2002) and Kurgat (1998) carried out studies on efficiency of foreign exchange markets in Kenya from the basis of simple trading rules and 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. 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. Kimani (2007) 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.

It is apparent from foregoing empirical review that there has been no research to study the effect of exchange rate fluctuation on tea export earnings among smallholder tea factories in Kenya. There is also inflexibility of substituting the US dollar for any other currency at Mombasa tea export market. It is apparent from studies done by Ndunda (2002), Kurgat (1998), and Kimani (2007) that there are arbitrage opportunities and market inefficiency in Kenya. There was therefore a need to conduct a research so as to find out how smallholder tea factories in Kenya are affected by exchange rate fluctuation and find out how they can manage the fluctuation exposures.

### **Research Questions**

This research will attempt to answer the following questions:

1. How has exchange rate fluctuation affected the earnings among smallholder tea factories in Kenya?
2. How has KTDA managed exchange rate exposure among smallholder tea factories in Kenya?

### **Objectives of the Study**

The specific objectives of this study are:

3. To determine how exchange rate fluctuation has affected the earnings among smallholder tea factories in Kenya.
4. To determine how KTDA has managed exchange rate fluctuation exposure among smallholder tea factories in Kenya.

### **Significance of the Study**

The outcome of this study will benefit the Government of Kenya in managing exposure to foreign exchange rate fluctuations. It will enable the government to plan with a view to cushioning its exporters and importers from foreign exchange rate fluctuation risks. It will also enable the government to improve its foreign exchange reserves management strategy. The government will be able to plan and allocate adequate resources to the export sector and enhance the capacity of smallholder tea factories and all stakeholders in the export sector. This can be done by enhancing export earnings which is an essential function of the foreign currency fluctuations. It will also benefit academicians who are interested in the study of local currency fluctuation against hard currencies. The findings from this study will also open new areas of interest in the academic world as researchers will take interest in the research findings.

This study will benefit smallholder tea factories whose major market is the export market. The study will therefore provide the information about the earnings of smallholder tea factories as such information is vital for enhancing the capacity of smallholder tea factories to realize profits by understanding the currency regulatory framework that would help them to know to manage exchange rate fluctuation exposure.

The findings will also benefit investors in managing their foreign exchange earnings. It will assist investors in management of exchange rate fluctuation exposure. It's worth noting that most developing countries of Eastern and Central African rely on export of cash crops as a means of earning the much needed foreign exchange. The stability of trading currency will guarantee projected foreign exchange income from exports and tourism. Proper management of exchange rate exposure will assist in poverty eradication, uplifting the standard of living among exporters and improve the level of GDP of concerned nations.

The results of this study will assist all the stakeholders in the export sector in making crucial decisions towards management of fluctuating exchange rates exposures. It will enable exporters to plan with some degree of certainty in circumstances where foreign exchange exposure can be managed.

## Literature Review

### 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 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.

### Theoretical Review

#### Concept of Currency and Currency Market

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).

#### Exchange Rate Regimes for Major Currencies

A country which produces hard currency has many advantages over those countries that do not. Possessing hard currency makes it much easier to do business worldwide. It can be equated to having a good credit score and shopping for a car. One will be much more likely to not just to get the car, but get it cheaper with a good credit score. Countries like Japan, Britain and United States of America have taken full advantage of printing hard currency (Duarte and Obstfeld, 2005). Over the history of currency, countries' currencies have fluctuated between hard and soft. The challenges of the world's currency super powers are to maintain their economic hold and maintain their hard currency reputation (Duarte and Obstfeld, 2005).

Exchange rate regime has undergone substantial changes. The Euro became the currency for 11 member states of the European Union (Vetlov, 2008). The Dollar-Euro exchange rates have completed a full turning since then. Euro depreciated steadily and without any major interruption since its introduction in 1999 until February 2002. It then began to rise against the dollar smoothly and reached a high of 0.74 Euros to 1 US\$ in December 2004 (Prati et al., 2010). Three years of depreciation of the Euro followed by three years of appreciation without wild fluctuations asks for an explanation which would adequately account for the position of the Euro as an emerging international currency (Robert, 2009). The greatest concern in behavior of major currency exchange rates has focused on their large medium-term movements. Wide swings are identified with "misalignments". These require to be avoided or at least their effects need to be moderated (Dufrenot, 2007).

#### Exchange Rate Determination and Foreign Currency Regulation in Major Industrial Countries

Exchange rate movements can be explained by the efficient or rational adjustment of foreign exchange markets to economic fundamentals. In the long run, the exchange rate is determined consistent with a monetary approach to exchange rates, while cyclical factors have an impact on short-run exchange rate dynamics (Johnston and Sun, 1997).

The end of convertibility of the dollar into gold in the summer of 1971 was a first step toward the breakdown of fixed exchange rate system, which collapsed with the floating of major currencies in early 1973. The US dollar remained firmly at the centre of the system after the collapse. The 1980s saw the gradual emergence of a European currency area which was slowed with the collapse of the Soviet Union (Quirk, 1987). The birth of the euro at the beginning of 1999 marks the fourth phase in the evolution of the postwar exchange rate system, a phase that will likely see an increase in bi- or tri-polar system characterized by a high degree of capital mobility and variety of exchange rate practices across countries (Prati et al., 2010).

### **Foreign Exchange Markets: Structure, Liquidity, Systemic Risks and Currency Risk Management**

Foreign exchange trading involves such large cross-border settlements that a failure by one party to deliver the currency needed for a single settlement could disrupt the global financial system. The foreign exchange market is by most account, the oldest, largest and most extensive financial market in the world. The Bank for International Settlement (BIS) estimated that daily average turnover in the global foreign exchange market was \$1,190 billion in April 1995. In comparison, average daily turnover during the same period in the next largest financial market – US government securities – was \$175 billion (excluding repurchase and reverse repurchase agreements); in the world's ten largest stock markets together, it was a mere \$42 billion (Laura, 1996).

The foreign exchange market is highly liquid. Transactions tend to be large and are executed frequently (Laura, 1996). Exchange rate is defined as the rate at which one currency can be converted, or 'exchanged', into another currency. There are four types of currencies that can be operated, which is a floating, semi-floating, managed and fixed exchange rate (Laura, 1996).

There are different strategies for managing a portfolio's foreign currency exposure, which fall into three broad categories of using hedging tools to protect against currency losses. The simplest approach adopted by international portfolio managers and investors is not to hedge the currency risks at all (Abrams, 1998). Some argue that there is a correlation between the performance of a foreign equity market and strength of the foreign currency. Others believe that currency fluctuations tend to wash out over an extended period of time. Neither of these arguments, however, can be proven conclusively, although there is practical evidence to support each of them. Another argument supporting the non-hedging approach is that foreign currency exposure helps diversify a portfolio (Levy-Yeyati, 2004).

In contrast to the non-hedging approach, some international investment managers go to the other extreme and hedge 100% of their currency exposures. This group believes that foreign exchange rates are highly unpredictable and that currency risks in non-dollar securities should always be fully hedged. In theory, an international investment portfolio would become a pure equity or fixed-income play, free of currency risk, if the foreign currency exposures of the portfolio were fully hedged. The key argument for hedging is that it reduces a portfolio's volatility resulting from currency fluctuation. But hedging costs tend to reduce overall returns over time, compared with an un-hedged portfolio (Karmin, 2007).

Balancing the pros and cons of hedging, the third strategy falls somewhere between the two extremes. Fund managers who use an actively managed hedging approach hedge selectively: sometimes no hedge, sometimes a partial hedge, and sometimes a full hedge. The selective approach is gaining in popularity. Most investment firms now offer some kind of currency service, and some firms with substantial international investments even appoint a separate manager to handle currency as a distinct asset class (Karmin, 2007).

### **Exchange Rate Volatility Pricing to Market and Trade Smoothing**

Firms stabilize destination prices through systematic price discrimination, limiting the degree of exchange rate pass-through. Consequently, the variability of exchange rates is not fully translated into prices and quantities at the point of destination. The pricing to-market model as developed by Clark and Faruqee point to the fact that the prices of traded goods generally are rather insulated from exchange rate fluctuations. Producers will strive to stabilize their production levels and therefore dampen the effect of exchange rate changes on the destination prices of their output. Thus the analysis suggests that the considerable short-run volatility of nominal exchange rates over the last 25 years is unlikely to have adversely affected economic performance in a significant manner (Clark, 1997).

### **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).

### **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 (the "real 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 long-run 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).

### **Interest Rate Parity**

Interest Rate Parity is an economic theory based on interest rates and exchange rates, stating that the difference between interest rates in two countries is the difference between the forward (future) rate and the spot (current) rate of their two currencies (Adrangi et al., 2007). If this parity or equilibrium is broken, then arbitrage exists resulting in a risk-free return (Edison, 1987). According to this theory, an investor who uses two different investment styles should achieve equal amount of returns from the two styles (Edison, 1987).

There are two types of interest rate parities – covered and uncovered. Covered interest rate parity is where the investor "covers" himself through a forward contract against the currency changes. Uncovered interest rate parity assumes that the difference between the interest rates of two currencies will equal the predicted depreciation of a currency (Clinton, 1988).

Adrangi et al. (2007) found out that uncovered IRP does not exist in any of the three Asian emerging markets- Korea, Philippines and Thailand - tested for the post-1990 periods. They also found evidence that the currencies of higher interest rate among emerging economies tend to depreciate in the forward market. However, their test results indicated that this relationship does not support the uncovered interest parity strictly and the currency markets in these nations are not fully efficient. Arbitrage opportunities remain for a longer periods than predicted by the uncovered interest parity (Adrangi et al., 2007).

Summaries of empirical evidence (Van Horne, 1998) shows support for covered IRP among the United States, Japan, and most European countries in that there is generally an offsetting relationship between interest rates and the forward exchange rate relative to the spot rate, and that the cost of hedging offsets any yield advantage. Specifically, studies such as those done by Rhee and Chang (1992), and Abeysekera and Turtle (1995), found out that major global markets are efficient in the sense that profit opportunities from traditional covered interest arbitrage were rarely available in the 1980s and early 1990s. This is due to an (almost) absence of imperfections among these major economies. Most studies also show that IRP is stronger for short-term rates and weakens with longer maturities (Abeysekera, 1995).

### **Empirical Review**

#### **Exchange Rate Fluctuations**

There has been an ongoing debate on the appropriate exchange rate policy in developing countries. It focuses on the degree of fluctuations in the exchange rate in the face of internal and external shocks. Exchange rate in turn is likely to determine economic performance (Devarajan et al., 1993). A depreciation (or devaluation) of the domestic currency may stimulate economic activity through the initial increase in the price of foreign goods relative to home goods. By increasing the international competitiveness of domestic industries, exchange rate depreciation diverts spending from foreign goods to domestic goods. As illustrated in Guitian (1976) and Dornbusch (1988) the success of currency depreciation in promoting trade balance largely depends on switching demand in proper direction and amount, as well as on the capacity of the home economy to meet the additional demand by supplying more goods (Frankel, 1998).

Fluctuations are realized around a steady-state trend that is consistent with variation in macro-economic fundamentals over time. Uncertainty enters the model in the form of disturbances to both aggregate demand and aggregate supply. Within this framework, aggregate demand is affected by currency depreciation through exports, imports and the demand for domestic currency. Aggregate supply is affected through the cost of imported

intermediate goods (Kandil, 2000).

### **The State of the Market and Inter-bank Variations in Exchange Rates of Major Hard Currencies**

Although participants in the foreign exchange market are increasingly scattered around the globe, most transactions still take place in London, New York, and Tokyo. London dominates the foreign exchange markets, with 30 per cent of all transactions; New York's share is 16 percent. Tokyo's share, now 10 percent, has been whittled away by the markets of Singapore and Hong Kong, which are fast gaining prominence (Laura, 1996). A key issue in the design of an international financial system is the effect of the choice of exchange rate regime on expectations. For example, a government's declaration of a floor on its exchange rate may stabilize the market, but on the other hand it may destabilize the market by providing an easy target to speculators (Wilcox et al., 2010). The policy shifts of the major industrialized countries after 2000 and the increasing significance of the European Monetary System (EMS), which involves the use of narrow, explicit currency bands, led Paul Krugman to apply stochastic process theory to the analysis of floating rates within bands (European Central Bank, 2003). Krugman's 1987 paper has stimulated considerable further research into the effects of exchange arrangements on market expectations, but much of this has yet to appear in published form. Many of the most active participants in this new area of research took part in a conference on 'Exchange Rate Targets and Currency Bands' held by the Centre for Economic Policy Research (CEPR) in collaboration with the National Bureau of Economic Research (NBER) at the University of Warwick on 10-11 July 2006 (Eichengreen, 2009). Contrary to other authors, Miller and Sutherland argued that the anticipation of a change in regime had a positive effect on the dollar value of sterling. They noted first that the trend appreciation of sterling, which others had viewed as exogenous, very probably reflected the deliberate tightening of monetary policy in order to expedite sterling's return to gold. Second, the expiry of the Gold and Silver Act at the end of 1925 implied that the relationship between the exchange rate and the fundamentals should embody a time-dependent element, pushing sterling towards the pre-war parity of \$4.86. Their principal point, however, was that price sluggishness was an important factor that had been neglected by previous studies, and they offered an alternative model with price inertia and variable international competitiveness (Krugman, 2000).

Turning to the analogies between the 1920s and the present, Miller and Sutherland noted that both 'state-contingent' and 'time-dependent' factors are currently in play. They suggested, however, that the major difference between the two periods is the lack of credibility of an ERM peg for sterling. Whereas in the 1920s there were no doubts about the commitment to return to gold, the UK Prime Minister has been explicit in her view that the UK's entry into the ERM should involve no irrevocable locking of the currencies. The authors used a continuous-time model with forward-looking labour contracts to analyze the effects of this lack of credibility, and they found out that some of the anti-inflationary benefits implied by a credible commitment to lock into a hard currency are diminished as credibility is reduced (Krugman, 2000).

Smith (1994) one of those whose results were challenged in the paper, reported the results of some tests he had carried out using the monetary model. These confirmed the authors' conclusions that a mixture of time-dependent and state-contingent factors were operating on the exchange rate, but they also provided weak evidence that the state-contingent element was the more important. While he acknowledged that the model with price inertia had a number of interesting features, he questioned whether price stickiness had been an important factor historically.

In the lively discussion that followed Obstfeld (Harvard University, NBER and CEPR) and Paul Krugman both argued against the need to introduce a new class of agents, and Krugman questioned the "pure strategy solution" proposed, since by holding the currency the arbitrageurs would prevent the appreciation from which they hoped to benefit. He suggested that a 'mixed strategy solution', in which the willingness of arbitrageurs to hold the currency is uncertain, would be logically satisfactory, although it would not provide a realistic description of economic behavior (Krugman, 2000).

Central Bank of Kenya has experienced difficulties in immediately influencing excess reserves in form of currency outside banks - one of the key component of reserve money in Kenya, and perhaps the case for other central banks in Africa. Influencing currency outside banks through open market operations (OMO) can only be affected by higher interest rates sustained over a long period time, where the public will respond by reducing their currency holdings in favor of deposits. High seasonality in currency outside banks associated with the public's high demand for currency, especially during festivities and when inflation is high due to transient factors occasioned by adverse effects of drought on food inflation and/or rising world oil prices on fuel prices, has also constrained liquidity management using open market operations (CBK, 2009). It would seem more reasonable, therefore, to focus on bank reserves only. This is because bank reserves, unlike currency in circulation, can be influenced by central banks in their short-term monetary operations. The inclusion of currency in circulation tends to complicate monetary operations. For example, in cases where expansion in reserve money is due to excess currency holdings, the central bank has no tool at its disposal to mop up the excess cash holdings by the public (CBK, 2009).

Exchange rates of the major currencies; the U.S. dollar, the deutsche mark, and the Japanese yen and those of other important industrial countries have exhibited substantial short-run volatility, large medium-term swings and long-term trends in exchange rates in nominal as well as real terms (Laura, 1996).

### **Foreign Exchange Market in Kenya**

Kimani (2007) tested efficiency of foreign exchange market in Kenya and found out that forward exchange rates are biased predictors of the future spot rates. 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. Kimani (2007) notes that under presence of efficiency in the foreign exchange market, the forward exchange rates should be unbiased predictor for the future spot rate. Kimani (2007) 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. She 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.

Most studies have not focused on the impact of Kenyan shilling fluctuation on exports especially where the government has fixed a specific hard currency as is the case with the use of the US dollar in tea export auction. Many theories such as Purchasing Power Parity, Interest Rate Parity and Fisher Effect do not help to stabilize the exchange rate fluctuation as the official export currency does not belong to the export destination country. Lack of standard international currency negates the spirit of Purchasing Power Parity. Studies indicate that interest rate parity explains reliably difference in nominal rates and the spot and forward exchange rates where there is no interference from the central bank on the concern nation.

### **Effects of Liberalization on Tea Industry in Kenya**

Studies have been conducted on the effects of liberalization on income of smallholder tea producers in Central Kenya and it was found out that smallholder tea producers sell their green tea to KTDA managed factories since there is no other competitor and that the growers relied on KTDA for their farm inputs (Karugo, 2003). Karugo (2003) found out in his studies that tea output would continue to rise regardless of the trend of prices of green leave delivered to factories for processing. Smallholder tea growers stand to benefit through bonus payment if they agree to be paid lower rate as initial payment for green leave delivered. (KTDA Annual Reports, 2009)

### **Effects of Exchange Rate on Tea Pricing**

Some studies have been done to establish factors affecting tea pricing at the Mombasa Auction. Mukhweso (2003) noted that tea pricing did not obey the market forces of demand and supply. Tea pricing is dependent on quality, internal and external environment of the market. Tea Auction market is not efficient as entry by newcomers is restrictive both for buyers and brokers. Tea buyers do it on behalf of wholesalers who are resident abroad but only sent bids once they are advised on the garden prices as contained in the price catalogue (EATTA, 2007).

### **Exchange Rate Fluctuation and Arbitrage**

Achieng'-Tocho (2007) in her studies found out that there was no potential arbitrage existing at an aggregate level for all shares studied. She concludes by stating that on aggregate basis, there was no well-financed and knowledgeable finance manager or investor who can make arbitrage opportunity by trading in cross-listed stocks in East Africa. She reiterates that her studies were consistent with those conducted by Noronha et al., (1996) who found out that there was no measurable difference on daily weighted-average spread existing for US firms after listing in London or Tokyo (Achieng'-Tocho, 2007).

Akwimbi (2003) did some studies on the application of the arbitrage pricing model in predicting stock returns at Nairobi Stock Exchange (NSE). He found out that APT model holds true in the emerging market of NSE. He notes in his studies that there are five factors that are critical in explaining stock returns at NSE. The most important was the aggregate stock market return. The other four are; change in exchange rate of the US dollar, the unexpected change in both the foreign exchange reserves and the inflation rate, and the change in interest rate of loans (Akwimbi, 2003). Another study on arbitrage was done by Wekesa (2006). He did a survey to establish whether there were arbitrage opportunities in the foreign exchange market at foreign exchange bureaus. He found out that there existed arbitrage opportunities among foreign exchange bureaus in Kenya. He found out that foreign exchange market is inefficient as evidenced by the numerous arbitrage opportunities that existed. He attributed this to lack of adequate and cheap information to all market participants which allowed speculators to benefit by trading in currencies (Wekesa, 2006). Traditionally, interest rates on price differential



have been thought to be among the key determinants of changes in the exchange rate. However, the role of current account balance has become increasingly recognized. Key events and expectations associated with key announcements particularly donor funding, also influence exchange rate movements. One of the important sources of foreign exchange is tourism. By putting in place the right policies for the promotion of tourism, the country will be improving currency availability in the market at the same time (Wekesa, 2006).

### **Conclusion from Literature Review**

It is apparent from literature review that most scholars have been concentrating on currency fluctuation in general terms and on the assumption that there is a standard international currency. This has tended to force scholars to concentrate their studies alongside existing theories such as Fisher effect, Interest Rate Parity, Purchasing Power Parity which state that mechanisms exist to automatically correct differentials in exchange rates over time. It assumes further that there is a common denominator (basket of goods) which can be used to determine the actual exchange rates between two currencies. It is also apparent from the literature review that that exchange rates are constantly fluctuating at foreign exchange markets not solely because of market forces of demand and supply. The preposition presupposes that all players are knowledgeable of currency movement in the market. This is not true as foreign exchange trading involves large cross-border settlements involving huge turnover (Laura, 1996).

There is a need to relook at previous studies with a view of changing the theoretical approach of conducting researches on foreign exchange fluctuations. It is also important to relook at the underlining assumptions from the practical point of view. Most of the assumptions do not hold given vast experiences on foreign exchange fluctuation between countries and the fact that trading in foreign exchange has changed over the years owing to technological changes. Most economies have liberalized foreign exchange markets with rates being posted on the screen every other minute.

Most studies have concentrated on developed economies with little on emerging and underdeveloped economies which are most affected by vagaries of foreign exchange fluctuations. Inflation has ruined currencies of some emerging economies. The cause of this hyperinflation needs to be under studied so as to find a solution otherwise some currencies will convert to soft currencies. The need for an international currency may need to be approached from regional trading blocs. Regional currencies may ultimately convert to international currency. Studies needs to be conducted and their findings may be used to encourage countries to accept regional currencies within trading blocs. As pointed out by Kimani (2007) in her study, it is apparent that Kenyan exporter can exploit arbitrage opportunities created by inefficiency in foreign exchange market in Kenya. The above conclusion was confirmed by a study conducted by Wekesa (2006). He concluded that there existed arbitrage opportunities among foreign exchange bureaus in Kenya.

The studies have not clearly shown the impact of Kenyan shilling fluctuation arising from timing differences between prices at the fall of the hammer and the actual dollars received on the date of receipt which comes every fortnight from the date of sale. Little has been done to address losses arising from appreciating Kenyan shilling given the magnitude of tea export sale proceeds.

This study has specifically addressed the effect of Kenyan shilling fluctuation against the US dollar as most studies have concentrated in exchange rate fluctuations in major hard currencies in major economies with little attention given to emerging and underdeveloped economies. The study will bring out the reality of fluctuation between two currencies one of which is not the destination currency of the most tea exports coming out of Mombasa Tea Auction. This has been informed by the fact that the government of Kenyan elected the dollar as the official hard currency at Mombasa auction with effect from 26<sup>th</sup> October 1992. Sale No. 42 of 26th October, 1992 is fondly remembered as the sale the Mombasa Tea Auction went international by conducting a most successful US dollar auction in accordance with Kenya Government Policy as per Exchange Control Circular No. 5/92/13 of 15/10/92 (EATTA, 2010).

## **Research Methodology**

### **Introduction**

This chapter details the type of research that was conducted, the target population, the sample size, how the researcher gathered the necessary data, how the collected data was arranged and analyzed. It also details the type of software package which was used in data analysis.

### **Research Design**

The research design used in this study is survey design. This involved collecting data from members of the population in order to determine the current status of that population with respect to various variables. It entailed asking respondent questions by administering a questionnaire and by interviewing them. This was suitable for this study as it obtained information that described existing phenomenon through asking individuals about their perceptions, attitudes and behaviours. It was also suitable for this study as entailed retrieval of actual data and by asking management about their perception and how they have been managing exchange rate fluctuations

exposure in the past.

### Target Population

This study considered export earnings from all factories owned by smallholder tea growers. There are 59 smallholder tea factories exporting their tea produce through Mombasa Tea Auction. These factories are situated on the highlands. They are spread some to the East and some to the West of the Great Rift Valley. The factories are managed by KTDA Ltd.

### Sample and Sampling Techniques

This study has reviewed data from all the 59 smallholder tea factories. It was a census.

### Data Collection Tools and Techniques

This study utilized a questionnaire in conjunction with interviews and content analysis. Questionnaire and content analysis was used in this study. Kothari (2005) notes that questionnaires are simple to administer and they are relatively cheap to analyze. Unlike interviews, questionnaires pose same structured and standardized questions, and the reply is in the words of the respondent and thus it is free from interviewer's bias. It gives the respondent adequate time to give thoughtful answers and it can cover extensive content within a short time and at reasonable cost.

The study relied on a questionnaire and secondary data. It considered tea export sales data reports for period 2000 to 2009. The 10 year period has been chosen as this is a period long enough for a trend to be established. The study retrieved annual export sales data which had already been translated to Kenya shillings from US dollars. This data was sourced from reports maintained by Sales and Marketing Department, and Accounts Department of KTDA Ltd. The source of data on foreign exchange fluctuations was Central Bank of Kenya.

### Data Analysis Techniques

This study employed correlation analysis technique. This is a statistical technique for determining the strength of a relationship between two variables. It determines the extent to which changes in the value of an attribute are associated with changes in another attribute. It is measured between the numbers of +1 and -1 and is depicted on a scatter gram or a line graph. This technique was suitable for this study as there was ethical use of data; it was unobtrusive as it made use of available data, and the relationships were clear and simple to view on a line graph.

### Data Analysis

#### Introduction

Data has been collected from KTDA Ltd. The data used include annual average exchange rate, average selling price, total annual sales in kilograms, total annual earnings in Kenya shillings, and amounts paid out per kilogram of green leaf to tea grower.

### A Relationship between Opening Average Annual Exchange Rates and Closing Average Annual Exchange Rates

Table 1

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
Opening Average Annual Exchange Rate	78.97	77.70	76.55	79.00	72.30	69.95	64.73	78.54
Closing Average Annual Exchange Rate	77.83	76.55	77.70	72.80	69.95	63.97	84.00	79.17

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
78.97	77.83	7	6	1	1
77.70	76.55	5	4	1	1
76.55	77.70	4	5	1	1
79.00	72.80	8	3	5	25
72.30	69.95	3	2	1	1
69.95	63.97	2	1	1	1
64.73	84.00	1	8	7	49
78.54	79.17	6	7	1	1

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 1 + 1 + 1 + 25 + 1 + 1 + 49 + 1$$

$$= 80$$

**Step 2:**

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Step 3:** The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 80}{8(8^2 - 1)}$$

$$\rho = 1 - \frac{480}{504}$$

$$\rho = 1 - 0.952$$

$$\rho = 0.048$$

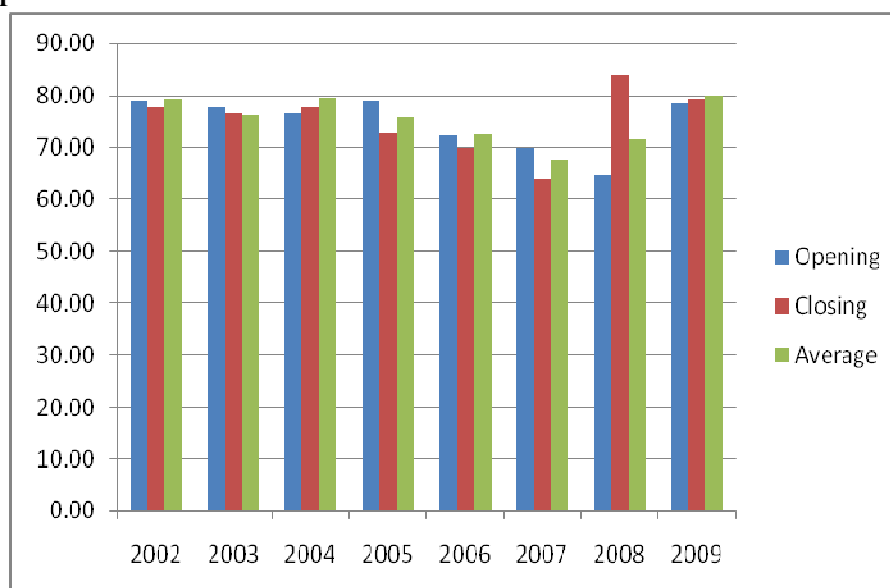
Therefore, the Spearman coefficient is **0.048**.

**Table 2 below shows; Opening, Closing and Average Exchange Rates**  
**Table 2**

Variable	2002	2003	2004	2005	2006	2007	2008	2009
Opening	78.97	77.70	76.55	79.00	72.30	69.95	64.73	78.54
Closing	77.83	76.55	77.70	72.80	69.95	63.97	84.00	79.17
Average	79.15	76.32	79.55	75.72	72.62	67.82	71.46	79.95

**Relationship between Opening, Closing and Average Exchange Rates**

**Figure 1**



The exchange rates as depicted in figure 1 above shows that the rates had higher swings within the year and this is explained by higher average rates in 2002, 2004, and 2009. This implies that more information could be revealed by looking at month to month averages or better still by looking at daily averages.

### A Relationship between Percentage Change in Average Annual Exchange Rate and Percentage Change in Average Annual Net Pay per Kilogram of Green Leaf

Table 3

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Average Annual Exchange Rate	0.51	(3.57)	4.22	(4.80)	(4.10)	(6.61)	5.36	11.89
%age Change in Net Pay Per Kilogram of GL	3.17	8.11	(0.19)	16.96	(12.03)	15.36	42.75	22.35

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
.51	3.17	5	3	2	4
-3.57	8.11	4	4	0	0
4.22	-0.19	6	2	4	16
-4.80	16.96	2	6	4	16
-4.1	-12.03	3	1	2	4
-6.61	15.36	1	5	4	16
5.36	42.75	7	8	1	1
11.89	22.35	8	7	1	1

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 4 + 0 + 16 + 16 + 4 + 16 + 1 + 1 = 58$$

**Step 2:**

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Step 3:** The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 58}{8(8^2 - 1)}$$

$$\rho = 1 - \frac{348}{504}$$

$$\rho = 1 - 0.690$$

$$\rho = 0.310$$

Therefore, the Spearman coefficient is **0.310**.

### A Relationship between Percentage Change in Average Annual Exchange Rate and Percentage Change in Gross Sales (Kshs)

Table 4

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Average Annual Exchange Rate	0.51	(3.57)	4.22	(4.80)	(4.10)	(6.61)	5.36	11.89
%age Change in Gross Sales (Kshs)	(1.15)	17.45	(7.52)	11.18	9.23	2.85	20.36	35.91

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
0.51	-1.15	5	2	3	9
-3.57	17.45	4	6	2	4
4.22	-7.52	6	1	5	25
-4.80	11.18	2	5	3	9
-4.1	9.23	3	4	1	1
-6.61	2.85	1	3	2	4
5.36	20.36	7	7	0	0
11.89	35.91	8	8	0	0

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 9 + 4 + 25 + 9 + 1 + 4 + 0 + 0 = 52$$

**Step 2:**

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Step 3:** The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 52}{8(8^2 - 1)}$$

$$\rho = 1 - \frac{312}{504}$$

$$\rho = 1 - 0.619$$

$$\rho = 0.381$$

Therefore, the Spearman coefficient is **0.381**.

### A Relationship between Percentage Change in Average Annual Exchange Rate and Percentage Change in Gross Sales (Kgs)

Table 5

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Average Annual Exchange Rate	0.51	(3.57)	4.22	(4.80)	(4.10)	(6.61)	5.36	11.89
%age Change in Gross Sales (Kgs)	(4.16)	14.37	(6.53)	1.56	16.50	(2.55)	(8.10)	6.27

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
0.51	-4.16	5	3	2	4
-3.57	14.37	4	7	3	9
4.22	-6.53	6	2	4	16
-4.80	1.56	2	5	3	9
-4.1	16.50	3	8	5	25
-6.61	-2.55	1	4	3	9
5.36	-8.10	7	1	6	36
11.89	6.27	8	6	2	4

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 4 + 9 + 16 + 9 + 25 + 9 + 36 + 4 = 112$$

Step 2:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Step 3: The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 112}{8[(8)^2 - 1]}$$

$$\rho = 1 - \frac{672}{504}$$

$$\rho = 1 - 1.333$$

$$\rho = -0.333$$

Therefore, the Spearman coefficient is **-0.333**.

### A Relationship between Percentage Change in Average Annual Net Pay per Kilogram of Green Leaf and Percentage Change in Annual Gross Sales (Kshs)

Table 6

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Average Net Pay Per Kilo of Green Leaf	3.17	8.11	(0.19)	16.9 6	(12.0 3)	15.3 6	42.7 5	22.3 5
%age Change in Annual Gross Sales (Kshs)	(1.15)	17.4 5	(7.52)	11.1 8	9.23	2.85	20.3 6	35.9 1

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
3.17	-1.15	3	2	1	1
8.11	17.45	4	6	2	4
-0.19	-7.52	2	1	1	1
16.96	11.18	6	5	1	1
-12.03	9.23	1	4	3	9
15.36	2.85	5	3	2	4
42.75	20.36	8	7	1	1
22.35	35.91	7	8	1	1

Step 1: Summation of the differences in ranks squared ( $d_i^2$ ).

$$\begin{aligned} \sum d_i^2 &= 1 + 4 + 1 + 1 + 9 + 4 + 1 + 1 \\ &= 22 \end{aligned}$$

Step 2:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Step 3: The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 22}{8[(8)^2 - 1]}$$

$$\rho = 1 - \frac{132}{504}$$

$$\rho = 1 - 0.262$$

$$\rho = 0.738$$

Therefore, the Spearman coefficient is **0.738**.

**A Relationship between Percentage Change in Average Annual Net Pay per Kilogram of Green Leaf and Percentage Change in Annual Gross Sales (Kgs)**

Table 7

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Average Net Pay Per Kilo of Green Leaf	3.17	8.11	(0.19)	16.9 6	(12.0 3)	15.3 6	42.7 5	22.3 5
%age Change in Annual Gross Sales (Kgs)	(4.16)	14.3 7	(6.53)	1.56	16.50	(2.5 5)	(8.1 0)	6.27

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
3.17	-4.16	3	3	0	0
8.11	14.37	4	7	3	9
-0.19	-6.53	2	2	0	0
16.96	1.56	6	5	1	1
-12.03	16.50	1	8	7	49
15.36	-2.55	5	4	1	1
42.75	-8.10	8	1	7	49
22.35	6.27	7	6	1	1

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 0 + 9 + 0 + 1 + 49 + 1 + 49 + 1 = 110$$

**Step 2:**

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Step 3:** The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:

$$\rho = 1 - \frac{6 \times 110}{8[(8)^2 - 1]}$$

$$\rho = 1 - \frac{660}{504}$$

$$\rho = 1 - 1.310$$

$$\rho = -0.310$$

Therefore, the Spearman coefficient is **-0.310**.

**A Relationship between Percentage Change in Annual Gross Sales (Kshs) and Percentage Change in Annual Gross Sales (Kgs)**

Table 8

Variable Scores	2002	2003	2004	2005	2006	2007	2008	2009
%age Change in Annual Gross Sales (Kshs)	(1.15)	17.4 5	(7.52)	11.1 8	9.23	2.85	20.3 6	35.9 1
%age Change in Annual Gross Sales (Kgs)	(4.16)	14.3 7	(6.53)	1.56	16.50	(2.5 5)	(8.1 0)	6.27

Variable scores, their ranks, differences in ranks ( $d_i$ ) and the differences in ranks squared ( $d_i^2$ ).

Score 1	Score 2	Rank 1	Rank 2	$d_i$	$d_i^2$
-1.15	-4.16	2	3	1	1
17.45	14.37	6	7	1	1
-7.52	-6.53	1	2	1	1
11.18	1.56	5	5	0	0
9.23	16.50	4	8	4	16
2.85	-2.55	3	4	1	1
20.36	-8.10	7	1	6	36
35.91	6.27	8	6	2	4

**Step 1:** Summation of the differences in ranks squared ( $d_i^2$ ).

$$\sum d_i^2 = 1 + 1 + 1 + 0 + 16 + 1 + 36 + 4 = 60$$

**Step 2:**

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Step 3:** The sum of  $d_i^2$  information from Step 2 above and the number of scores in each variable ( $n$ ) is substituted into the formula:



$$\rho = 1 - \frac{6 \times 60}{8[(8)^2 - 1]}$$

$$\rho = 1 - \frac{360}{504}$$

$$\rho = 1 - 0.714$$

$$\rho = 0.286$$

Therefore, the Spearman coefficient is **0.286**.

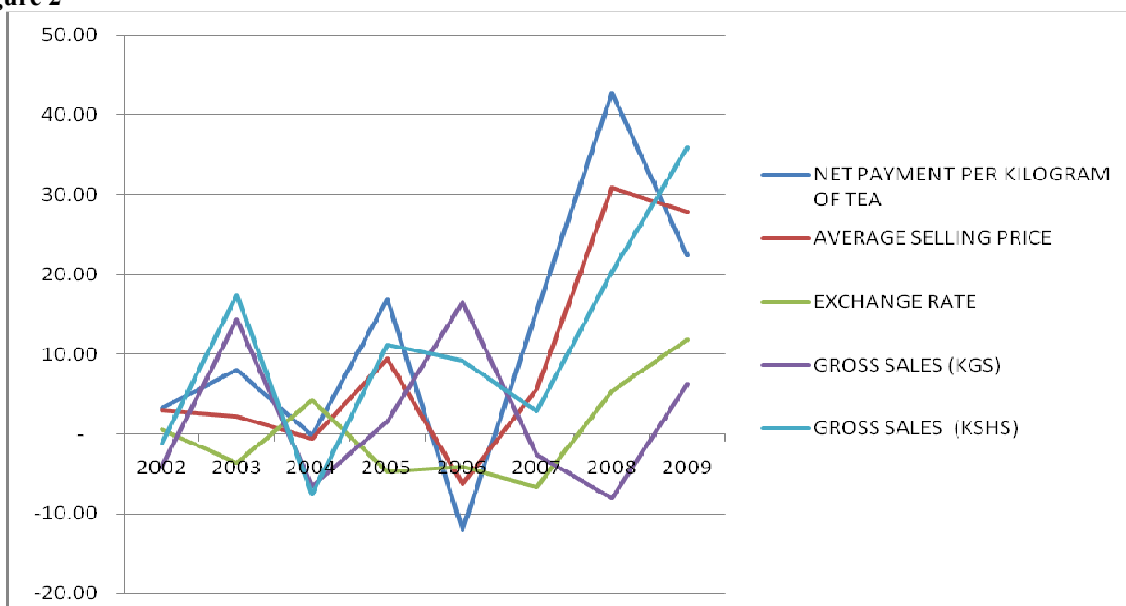
**Table 9 below shows the Percentage Change in Net Payment, Average Selling Price, Exchange Rate, Gross Sales (Kgs) and Gross Sales (Kshs)**

**Table 9**

VARIABLES	2002	2003	2004	2005	2006	2007	2008	2009
NET PAYMENT PER KILOGRAM OF TEA	3.17	8.11	(0.19)	16.96	(12.03)	15.36	42.75	22.35
AVERAGE SELLING PRICE	2.94	2.23	(0.60)	9.47	(6.24)	5.62	30.88	27.89
EXCHANGE RATE	0.51	(3.57)	4.22	(4.80)	(4.10)	(6.61)	5.36	11.89
GROSS SALES (KGS)	(4.16)	14.37	(6.53)	1.56	16.50	(2.55)	(8.10)	6.27
GROSS SALES (KSHS)	(1.15)	17.45	(7.52)	11.18	9.23	2.85	20.36	35.91

**Figure 2 below shows the Relationship between Percentage Changes in Net Payment, Average Selling Price, Exchange Rate, Gross Sales (Kgs) and Gross Sales (Kshs)**

**Figure 2**



## Findings, Conclusion and Recommendation

### Introduction

The aim of this study was to examine how exchange rate fluctuation has affected the earnings among smallholder tea factories in Kenya. The study also aimed at examining how KTDA Ltd has managed exchange rate fluctuations among smallholder tea factories in the past. It is apparent from the findings that exchange rate fluctuation is one of the factors that affect earnings among smallholder tea factories. Given this scenario it is necessary for the government to consider liberalizing the currency to be used at Mombasa Tea Auction.

### Effects of Kenya Shilling fluctuation on Earnings among Smallholder Tea Factories in Kenya

The analysis shows that there is a positive relationship between percentage changes in exchange rate and percentage change in net pay per kilogram of green leaf paid. Table 3 shows that as Kenya shilling appreciates payment for each kilo of green leaf increases which is peculiar given that exports earnings is expected to go down as the shilling appreciates. Further analysis shows that the foregoing scenario was reversed by a marked increase in quantities exported. Table 9 shows that when the shilling appreciated by 3.57%, net pay per kilogram of green leaf went up by 8.11%. It should be noted that during the same period, selling price improved by 2.23%, gross sales in quantities when up by 14.37% and this is reflected in gross sales in shillings which also went up by 17.45%. The huge jump in gross sales could further be explained by appreciation of Kenya shilling on month to month basis within the year which is not apparent from the annual average figures which have been used in the analysis.

It can also be noted from table 9 that the highest appreciation of the shilling in the period under study was witnessed in 2009. The shilling appreciated by 11.89% pushing the selling price to go up by 27.89%, gross sales in shillings went up by 35.91% and net pay per kilogram of green leaf went up by 22.35%. The appreciation restricted growth in quantities sold which went up by a modest 6.27%. It should be noted that a small appreciation of 5.36% in 2008 pushed net pay per kilogram of green leaf to go up by a huge 42%. The quantities sold decreased by 8.1% with growth in value of sales by 20.36%. The plausible reason here for the huge increase could be attributed to high appreciation of the shilling within the year which could have been lost through averaging.

Appreciation of the shilling by 4.22% in 2004 was able to stabilize net pay per kilogram of green leaf paid despite decrease in quantities sold by 6.53% which pushed down the value of sales by 7.52%. A similar scenario is replicated in 2002 in which the shilling appreciated by 0.51%, quantities sold decreased by 4.16% with value of gross sales dropping by 1.15% but the net pay per kilogram of green leaf went up by 3.17% explaining the fact that the appreciation of the shilling is an important factor in export trade.

The shilling experienced the highest depreciation of 6.61% in 2007. The analysis in table 9 shows that net pay per kilogram of green leaf improved by 15.27%. This cannot be explained by quantities sold as it fell by 2.55%, value of sales improved by 2.85% and average selling price improved by 5.62%. This scenario can only attributed to an appreciation of the shilling within the larger part of the year.

The analysis shows that quantity of tea sold has been rising steadily from 172 million kilograms in 2002 to 217.8 million kgs in 2006 dropping to 212 million kgs and 195 million kgs in 2007 and 2008 respectively. Again the volume of teas sold rose in 2009 by over 12 million kgs to close at 207 million kgs. The percentage change in quantities sold does not explain the rise in earnings. The differences can be explained by depreciation of Kenya shilling.

Earnings realized declined by a whopping Kshs 258 million between 2001 and 2002. It dropped by Kshs 2 billion to reach Kshs 24.1 billion in 2004. It rose again by Kshs 2.7 billion to stand at Kshs 26.8 billion in 2005. Thereafter it rose rapidly to reach Kshs 49.3 billion in 2009. It rose by 2.85 percent in 2007, 20.36 percent in 2008 and 35.91 percent in 2009. Exchange rate within the same period was relatively stable. There was a marked increase of 11.89 percent in 2009 followed by 5.36 percent in 2008 and 4.22 percent in 2004. The highest was in 2007 where the shilling appreciated by 6.61 percent from Kshs.72.62 to the dollar to Kshs.67.82 to the dollar.

Kenya shilling appreciated by 10.43 percent between 2005 and 2007 but total annual earnings decreased by 12.03 percent between 2005 and 2006. It increased by 15.36 percent from Kshs 85.40 to Kshs 98.52 per kilogram of green leaf between 2006 and 2007. This mismatch can be explained by an increase in quantities sold which rose by 16.5 percent between 2005 and 2006 followed by a decrease of 2.5 percent between 2006 and 2007. The selling price also decreased by 6.24 percent between 2005 and 2006. This was followed by an increase of 6.24 percent between 2006 and 2007.

Kenya shilling exchange rate to the US dollar has been oscillating within the range of Kenya shilling 70s to the dollar between 2001 and 2006. It appreciated and reached a high of 67.82 to the dollar in 2007. It depreciated by 11.89 percent from Kshs 71.46 in 2008 to close at a low of Kshs 79.95 to the dollar in 2009.

Average selling price rose from a low of Kshs 125.50 per kilogram in 2001 to a high of Kshs 238.20 in 2009. There was a decline of 6.24 percent with selling price falling from Kshs 143.71 to Kshs 134.74 between 2005 and 2006. The highest price increase was realized in 2008 where the selling price rose by 30.88 percent

from Kshs. 142.31 to Kshs 186.25. This price increase forced the demand to fall by 8.1 percent. The high selling price was as a result of depreciation of Kenya shilling by 5.36 percent (from Kshs 67.82 to Kshs 71.46).

### **Measures taken by KTDA Ltd to manage exchange rate fluctuations among smallholder tea factories**

KTDA Ltd used to collect all sales proceeds from Mombasa Tea Auction under one account called pool account until 2001. It was after this year that Board of directors decided that each factory under management of KTDA Ltd was to open and maintain a dollar denominated account at a bank of their choice.

All accounts opened for smallholder tea factories are managed by Treasury Department. Tea Buyers remit their payments to each tea factory's dollar account which is maintained on their behalf by KTDA Ltd. The dollars are retained in the account and are only translated to meet specific obligations such as payment for goods and services, and payment to tea growers either as initial payment or interim bonus or final bonus. Dollars are sold to bank dealers or factories which are in need of dollars to meet foreign denominated obligations such loan repayment and payment for imported tea machinery.

This research established that KTDA Ltd does not have in place measures to guard against adverse fluctuations. Dollars are translated to Kenya shillings as soon as they are received. Any surplus is invested to earn some interest income. Factories are asked to borrow temporarily to finance major payments when the investments have not matured.

### **Conclusion**

It is also important that exporters are asked to keep proper records on earnings from export of commodities which can be of use during researches in export sector of the economy. It is beneficial as well for exporters to distinguish sources of income which forms integral part of their performance. Income from normal operations needs to be distinguished from income arising from foreign exchange translations. This will enable appropriate interventions to be put in place so as to minimize effects of exchange rate fluctuations on export earnings. This is one area in which adequate and sufficient data was not available during the research thus affecting the researcher from deciding conclusively as to how the exchange rate fluctuation as affected earnings among smallholder tea factories.

The study revealed that KTDA Ltd does not have in place any measures for intervention against adverse foreign exchange rate fluctuations among smallholder tea factories. There is need for large scale exporters such as those in the tea industry to employ the services of experts in order to maximize returns from depreciating Kenya shilling or minimize losses arising from a strong Kenya shilling. Studies as conducted by Kimani (2007) revealed that there exists arbitrage opportunities in Kenya which is as a result of inefficiency in foreign exchange market. KTDA Ltd as the managing agent of smallholder tea factories can create a department for the purpose of exploiting the opportunities for the benefit of smallholder tea factories.

The effect of selling price might not appear clearly in this study since this is directly affected by gains and losses from translation which is not currently accounted for separately. The selling price could have been ideal parameter in isolating effects of selling large quantities and exchange rate fluctuation in this study. However, this is not possible given that KTDA Ltd does not isolate exchange gains or losses.

This study cannot conclusively say whether trading in US dollar affects smallholder tea factories either positively or negatively. There is positive correlation between changes in exchange rate and changes in quantities sold, amount of earnings and the selling price as demonstrated by Spearman's coefficient computation. There is need for further studies to be done to consider exchange rate fluctuations on month to month basis. There are exchange rate fluctuations which are quite significant but the information is lost in averaging the rates by taking annual averages. The month to month outliers which may have significantly contributed to the improvement in earnings are lost when an average is taken.

### **Qualification and Limitation of the Study**

The study was going to sample 25 smallholder tea factories but it has taken all 59 factories which participated in the auction with the above period. It is worth noting at this stage that KTDA Ltd does not compute exchange gains or losses arising from translation of tea earnings which is received mainly in dollars. The amount held in foreign denominated accounts is translated at the ruling exchange rate on the last day of the period. This is for purposes of establishing the amount of cash in Kenya shilling equivalent which will be used in preparing financial statements. The only exchange gains or losses reported in the financial statements by KTDA Ltd are those which are due to translation of foreign denominated loans.

Under this scenario it became difficult to establish the relationship between depreciation and gains and also relationship between appreciation of Kenya shilling and any losses. This denied this study the opportunity to conclusively indicate whether foreign exchange fluctuation has affected the earnings of smallholder tea factories either positively or negatively.

It is clear from the study that the Kenya shilling appreciated by 15.51 per cent between 2005 and 2007

but the paid per kilogram of sold tea improved by 20.29 per cent. The other element is rise in quantity of tea sold which rose in the period by 15.51 per cent. Selling price per kilogram of tea during this period improved by 8.85 per cent.

#### Areas Recommended for Further Study

There is need for further research into how firms manage exchange rate fluctuations. This may lead to best ways of deal with adverse effects and how to enhance favorable effects. There is also need for a study to establish how the importers are affected by exchange rate fluctuations. This will enable the economy to handle exchange rate fluctuations fairly without hurting one side of the economy.

There is also need to study sensitivity of exchange rate as to export earnings and import costs. Some areas of the economy do not respond equally, effectively and efficiently to exchange rate fluctuations. When the economy establishes sensitivities then efforts will be direct towards addressing the imbalances or towards mitigating the impact.

#### References

- Abrams, Richard, and P. Beato (1998). *The Prudential Regulation and Management of Foreign Exchange Risk*. IMF Working Paper 98/37, March (Washington: International Monetary Fund).
- Abeysekera, S. and H. J. Turtle. (1995). Long-Run Relations in Exchange Markets: A Test of Covered Interest Parity, *Journal of Financial Research*, 18, 431-47.
- Achieng'-Tocho, J. (2007). "An Investigation of Arbitrage Opportunities of Cross Listed Stocks in East Africa". UON-MBA Project, Nairobi. School of Business.
- Adrangi, B., Raffiee', K. & Shank, T. M. (2007). An Ex-Post Investigation of Interest Rate Parity in Asian Emerging Markets. *International Business & Economics Research Journal*.
- Akwimbi, A. W. (2003). "Application of the Arbitrage Pricing Model in Predicting Stock Returns at the NSE". UON-MBA Project, Nairobi. School of Business.
- Alreck, P. L., & Settle, R. B. (2004). *The survey research handbook* (3rd ed.). Boston: McGraw-Hill/Irwin.
- Bordo, M. & Harold J. (2006). One World Money, "Then and Now". Mimeo Harvard University, Rutgers University, and Princeton University. *Journal of Business Management*, 122: 131-139.
- Brodkin, C. (2007). Terms of Trade and Exchange Rate Regimes in Developing Countries. *Journal of International Economics*, 63(1): 31-58.
- Clark, P. B. and Faruquee, H. (1997). *Exchange Rate Volatility, Pricing to Market and Trade Smoothing*. IMF Working Paper 97/126, October (Washington: International Monetary Fund).
- Clinton, K. (1988). "Transactions Costs and Covered Interest Arbitrage: Theory and Evidence," *Journal of Political Economy*, pp. 358-70.
- Cross, S. (1998). *All About the Foreign Exchange Market in the United States*. Federal Reserve Bank of New York, chapter 11, pp. 113–115.
- Devarajan, Shantayanan, Jeffrey D. Lewis, and Sherman Robinson (1993). External Shocks, Purchasing Power Parity, and the Equilibrium Exchange Rate. *The World Bank Economic Review*, Vol. 7, pp. 45-63.
- Dornbusch, R. (1988). *Open Economy Macroeconomics*, 2nd Edition, New York.
- Duarte, M. & Obstfeld, M. (2005). Monetary Policy in the Open Economy Revisited: The Case for Exchange-Rate Flexibility Restored" mimeo UC Berkeley.
- Dufrenot, G. and E. Yehoue (2007), "Equilibrium Real Exchange Rate and Misalignment in LDC's: A Panel Co-integration Approach?" mimeo UC Berkeley.
- Edison, H. (1987). "Purchasing Power Parity in the Long Run: A Test of the Dollar/Pound Exchange Rate (1890-1978)", *Journal of Money, Credit, and Banking*, 19, August, pp. 376-387.
- Eichengreen, Barry, Mody Ashoka, Nedeljkovic Milan, Sarno Lucio, (2009). *How the Subprime Crisis Went Global: Evidence from Bank Credit Default Swap Spreads*, Working Paper 14904
- Engel, C. (1996). "Long-Run PPP May Not Hold After All", *NBER*, 5646, July.
- European Central Bank (2003). "Review to the Foreign Exchange Market Structure," March (Frankfurt: European Central Bank).
- Ezeala-Harrison, F. (1999). *Theory and Policy of International Competitiveness*, Praeger Publisher.
- Frankel, J., Rose, A. (1998). The Endogeneity of the Optimum Currency Area Criteria. *Economic Journal* 108, 1009–1025.
- Feder, G. (2009). On Exports and Economic Growth. *Journal of Development Economics*, 12(1/2), 59-73.
- Forbes, Kristin J. (2002). "How do large depreciations affect firm performance?" *IMF Staff Paper*, Vol.49, Special Issue.
- Frenkel, J. A. & Levich, R. M. (1975). "Covered Interest Arbitrage: Unexploited Profits?" *Journal of Political Economy*, pp. 325-38.
- Gesimba, R. M. et al., (2005). The Tea Industry in Kenya; the Challenges and Positive Developments, *Journal of*

- Applied Sciences* 5 (2): 334-336.
- Government of Kenya, GoK. (2009). *Economic Survey 2009*. Government of Kenya Printers: Nairobi: Kenya.
- Guitian, M. (1976). "The Effects of Changes in the Exchange Rate on Output, Prices, and the Balance of Payments," *Journal of International Economics*, Vol. 6, 65-74.
- Grilli, V. U., Krugman, P. and Miller M. (1991). *Exchange Rates and Currency Bands*. Cambridge University Press, Cambridge, U.K., pp. 140-176.
- Johnston, R. B. and Sun, Y. (1997). "Some Evidence on Exchange Rate Determination in Major Industrial Countries," IMF Working Paper 97/98 (Washington: International Monetary Fund).
- Kandil, Magda (2000). "The asymmetric Effects of Exchange Rate Fluctuations: theory and Evidence from Developing Countries". IMF Working Paper 00/184 (Washington: International Monetary Fund).
- Karmin, Craig (2007). "Hedge Funds Do About 60% Of Bond Trading, Study Says". The Wall Street Journal. <http://online.wsj.com/article/SB118843899101713108.html>. Retrieved 2007-12-19. Durbin Hunter.
- Karugo, J. G. (2003). "Effects of Liberalization on Income of Smallholder Tea Producers in Central Kenya". UON-MBA Project, Nairobi. School of Business.
- Kathuri, B. (2009, March 24) Good prices boost tea earnings to Sh62b: *The Standard*, 24.03.2009 On-line Edition.
- Kim, L.O. (2008). Utilization of the foreign exchange in volume modulation of the international trade. *Journal of risk Management*, 11: 19-27.
- Kim, Y. (1990). "Purchasing Power Parity in the Long Run: A Cointegration Approach", *Journal of Money, Credit, and Banking*, 22, 4, pp. 491-503.
- Kimani, S. W. (2007). "Efficiency of Foreign Exchange Market in Kenya: The Rational Expectation Approach". UON-MBA Project, Nairobi. School of Business.
- Kiptui, M. (2007, July). *Does the Exchange Rate matter for Kenya's Exports?* Presented at the African Econometric Society 2007 Conference, Cape Town.
- Krugman, P. R. & Obstfeld, M. (2000). *International Economics*, fifth edition. Addison-Wesley Longman, Inc. pp. 302-311.
- Kurgat, P. (1998). *Exchange Rate Instability*. Cambridge: MIT Press.
- Laura, E. Kodres (1996). Foreign Exchange Markets: Structure and Systemic Risks. *Journal of Finance and Development*, 22-24.
- Leming, Michael R. "Research And Sampling Designs: Techniques For Evaluating Hypotheses". Found at: <http://www.stolaf.edu/people/leming/soc371res/research.html>.
- Levy-Yeyati, E. and F. Sturzenegger (2004). "Classifying Exchange Rate Regimes: Deeds vs. Words." *European Economic Review*.
- Malmsten, H. (2004). *Evaluating exponential GARCH models*. SSE/EFI Working paper Series in Economics and Finance.
- Masson, Paul, Peter, I., and Hamid Faruquee (1996). "A Framework for Estimating Equilibrium Exchange Rates", mimeograph.
- Mukhweso, Levi (2003). "Factors Affecting Tea Pricing at the Mombasa Tea Auction". UON-MBA Project, Nairobi. School of Business.
- Matsuyama, K., Kiyotaki, N., Matsui, A. (1993). "Toward a theory of International Currency," *RES* 60, 283-307.
- Ndunda, F. (2002). "Testing whether Forward Exchange Rates are Predictors of Future Spot Rates in Kenya". UON-MBA Project, Nairobi. School of Business.
- Oyuke, J. (2009, January 1). Low tourist arrivals haunt struggling sector. *The Standard Newspaper*, p. 8
- Papell, D. (1998). "The Great Appreciation, the Great Depreciation, and the Purchasing Power Parity Hypothesis", *Oesterreichische Nationalbank*, 30.
- Prati, A., Bartolini, L., & Bertola, G. (2010). The overnight interbank market: Evidence from the G-7 and the euro zone. *Journal of Banking and Finance*, 27: 2045–2083.
- Quirk, Peter J. and others (1987). *Floating Exchange Rates in Developing Countries Experience with Auction and Interbank Markets*, IMF Occasional Paper No. 53 (Washington: International Monetary Fund)
- Rhee, Ghon, S. and Rosita P. Chang. (1992). Intraday Arbitrage Opportunities in Foreign Exchange and Eurocurrency Markets, *Journal of Finance*, XLVII, (2), 363-379.
- Robert, M. (2009). "The Case for a World Currency". *Journal of Policy Modeling*, 27(4): 465-475.
- Rogoff, Kenneth (1996). "The Purchasing Power Parity Puzzle", *Journal of Economic Literature*, June, Vol 34, pp. 647-668.
- Smith, J.W. (1994). The World's Wasted Wealth 2. *Institute for Economic Democracy*, p. 143.
- Taylor, M. P. (1989). "Covered Interest Arbitrage and Market Turbulence," *The Economic Journal*, pp. 376-91.
- Van Horne, James C. (1998). *Financial Market Rates and Flows*, 5th Edition, Prentice Hall, Upper Saddle River, New Jersey.
- Vetlov, I. (2008). *Monetary transmission mechanism in Lithuania*. In Mayes, D. G. (Ed.). *The Monetary*

- Transmission Mechanism in Baltic States, pp. 61–107.
- Wei, S. & Parsley, D. (1995). “*Purchasing Power Disparity During the Floating Rate Period: Exchange Rate Volatility, Trade Barriers and Other Culprits*”, NBER, 5032, February.
- Wekesa, K. T. (2006). “*A Survey of Arbitrage Opportunities in the foreign Exchange Market: The Case of Foreign Exchange Bureaus*”. UON-MBA Project, Nairobi. School of Business.
- Were, M., Ndung’u, N.S., Geda, A. and Karangi, S. N. (2002). “*Analysis of Kenya’s Export Performance: An Empirical Evaluation.*” KIPPRA Discussion Paper No. 22.
- Wilcox, F., Shapin, M. Klose, S., Marvin, P. and Jarkovich, K.P. (2010). Reviews of barriers to international trade. *International Journal of Trade*, 54: 143-152.
- World Bank, Kenya (2008, June). *Investment Climate Assessment*. Regional Program for Enterprise Development.