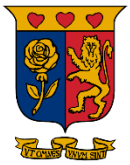

Strathmore University

School of Finance and Applied Economics

AN EXPLORATION OF THE POSSIBLE IMPACT OF COMMODITY FUTURES TRADING FOR TEA FARMERS IN LIMURU TO MITIGATE THE PRICE VOLATILITY OF TEA

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Submitted in partial fulfillment of the requirements for the Degree of Actuarial Science at Strathmore University

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Proposal contains no material previously published or written by another person except where due reference is made on the Research Proposal itself.

..……..... [*Name of Candidate*]

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This Research Proposal has been submitted for examination with my approval as the Supervisor.

..……..... [*Name of Supervisor*]

……..... [*Signature*]

……..... [*Date*]

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ABSTRACT

The research project aimed to show how the volatility of tea prices experienced by the farmer could be mitigated through the introduction of a tea commodity futures. The researched aimed at determining the significance of the volatility of the tea prices in Kenya and ho the tea futures would smooth out the volatility of the tea prices for farmers in Kenya. This involved determining the feasibility of the futures market in the Kenyan economy. The feasibility of tea as a commodity tradable in the futures market was also investigated with the help of different literatures. A mix of descriptive and quantitative research design was used in this research project. The Risk Premium Model was used to formulate the future price of the fuures contract. The population under investigation was Kenyan tea farmers and the sample under investigation were small scale farmers in the Kambaa Area of Limuru. This is because small scale farmers have the experienced highest growth over the past 10 years and have similar characteristics of small scale farmers throughout the country. The local and primary data was obtained from the farmers in Kambaa region and secondary data from the Index Mundi website for international market prices for auctioned Kenyan tea. The results and analysis show that the volatility of prices in the international market would not be reduced by introducing the future, in the short term. However, the future would reduce the effect of volatility of the prices on the farmer. Further studies showed that the volatility will be reduced with increased activity in the futures market. The analysis also shows that the farmer and the investor have a high probability of getting higher returns by trading through the futures market than the actual market. The effect of volatility will be transferred from the farmer to eh investor who sold the contract to the farmer. From the discussions, the volatility of tea prices is observed to influence the extent of gains or losses the investor experiences from the sale of the futures contract to the farmer. Information asymmetry will also be reduced between the farmer and the intermediary company that sells the tea. This is because the farmer will be able to monitor the returns the intermediary receives from the sale of tea and therefore encourage transparency in the formulation of the final bonus rate announced at the end of the financial year. It is recommended that the government should educate the farmers on the futures market and its advantages and disadvantages as this has a direct effect on the performance of the futures contract. It is recommended that further research be done on the effect the introduction of tea commodity futures in other countries will have on the volatility of the international tea prices.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Tea is one of the leading export commodities in Kenya. Kenya's tea is one of the most marketable in the world market. Currently, Kenya is the third leading exporter of tea, controlling about 15% of the world export market. Other key exporters are Sri Lanka (21%), China (18%), mainly green tea and India (11%) (OEC, 2016). In 2011, 78% of Kenyans lived and worked in rural areas (Khosla, 2012). Tea exporting in the country acts as a source of income to the farmers, creates jobs in the rural areas of the country, encourages improvement of rural infrastructure and increases export earnings to the country. A good tea price creates better living standards for a farmer and opportunities for tea agribusiness companies. In 2009, rural incomes in tea exporting countries increased due to an increase in export earnings (FAO, 2010).

A key problem in tea farming however is the volatility of prices of tea in the global market which exposes the farmer to the risk of high risk and low return. During the economic crisis in 2008, the tea prices reduced drastically to about 60%. Currencies of major export markets for example Russia and the Middle Eastern Countries that buy tea from Kenya slipped against the dollar. The purchase of tea dropped from the key importers accompanied by a large amount of volume withdrawals from the tea market. The tea prices increased to their highest point in 2009 and have remained higher than the 2006 prices. The volatility of tea prices affects the public expenditure of the country, foreign reserve holdings, terms of trade and the government fiscal revenue (Tanui, Feng, Shen, & Xinghui, 2012).

1.2 Background

A commodity is a good produced to fulfill a person wants or needs (Marx, 1977). Commodities could be divided into two; financial commodities for example stock indexes, government debt securities and currency deposits and physical commodities for example tea, wheat and sorghum. Commodity risk management decisions will involve both price and quantity risk (Poitras, 2013). This research project shall solely focus on the physical commodity whereby tea will be the principal underlying commodity to be traded. The risk management decision will only involve the price of the principal underlying commodity being traded.

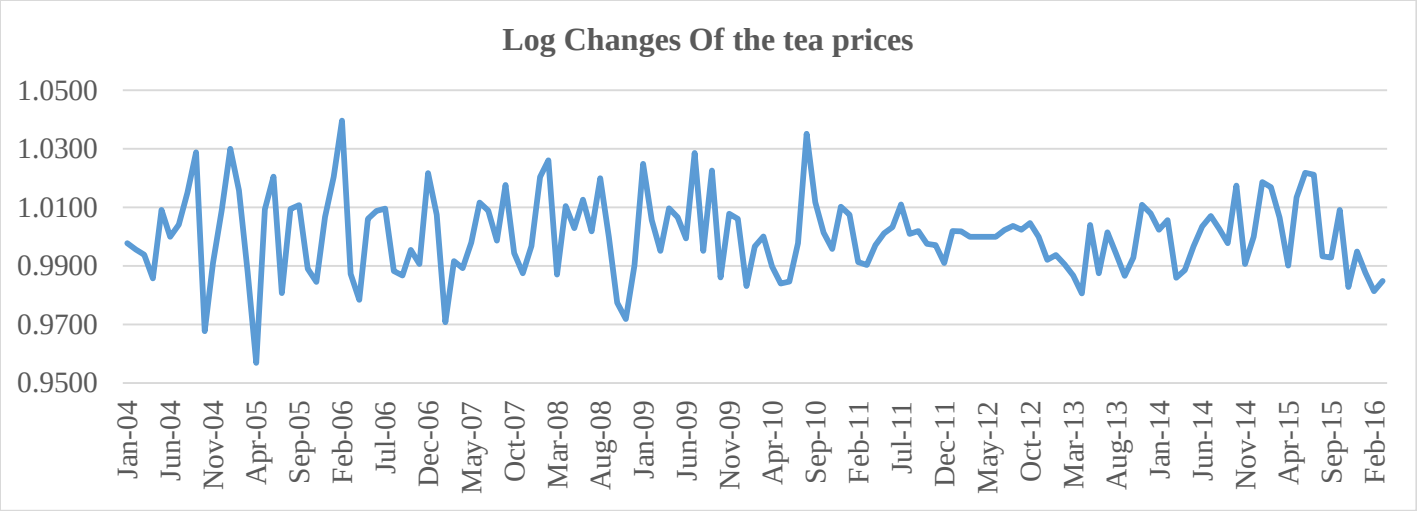

Figure 1: **The log changes of tea prices**. The graph portrays the continuous shift of prices in the global market is stochastic, depicting no trend in the change of prices therefore showing the volatility of the prices.

In Kenya, the volatility of the tea prices has had a negative effect on the farming of tea. Some farmers choose to abandon the planting of tea and plant crops that experience more returns. Kenya is one of the leading markets in the production of tea. The reduction on the growth of tea would have major effects on the GDP. Tea currently gives the highest return ($957M) in exports as compared to other exported commodities (OEC, 2016). This would reduce the country's economic growth as export earnings.

Volatility of prices would also have great effects on the farmer as agricultural commodity demands and supply is inelastic (Khosla, 2012). Inelasticity in demand and supply means that should the supply of tea decrease, the demand of the tea would increase. This however would not have any effect on the prices of the Kenyan tea. If the supply of tea increases, the price of tea would reduce. This is because of the competition experienced in the global market. This would therefore have a negative effect on the farmer as they will earn less though the production of the tea was high.

Commodity futures are increasingly becoming popular in the world today. They are the instruments being used to accommodate the changes in prices. The biggest market exists in the Westernized and more developed countries. However, more organizations are keen on developing the futures market in the developing countries. Commodity futures help to reduce uncertainty and increase price correlations of different products. Commodity futures would increase the number of participants in the market (Carlton, 1984).

1.3 Problem Statement

The long term and short term movements in prices presents a challenge for Kenya to develop the tea sector as we are dependent on the on export earnings. The reduction and volatility of prices creates uncertainty to the individual producers of tea, businesses involved in agribusiness and the government of Kenya. The volatility of the tea prices will affect the country's terms of trade, public expenditure, government fiscal revenue and foreign reserve holdings.

In 2008, the there was a great increase in the volatility of tea prices in the world market. Tea prices increased by 12% before declining by 12% in August 2008 and followed by a 15% decline in September due to the world economic crisis experienced in that year (FAO, 2010; Minot 2011). The tea auction prices declined greatly during this period and equivalently the currencies of great import destinations in the Eastern countries like Middle East and Russia that buy tea from Kenya and Sri Lanka slipped against the dollar. This led to the dropping of tea from the main tea exporters. The prices later peaked in 2009, September. This shows the volatility of the prices of tea in the global sector.

Planting tea takes about four years before harvest thus it is highly costly during the unproductive periods. Consumption of tea has remained virtually unchanged in Kenya. Interestingly, the falling of the tea prices will not encourage an increase in supply as it is expected in the normal demand and supply market. (Tanui J. et al., 2012). The elasticity of prices of supply has slow responses to price incentives are asymmetric. The periods of rising prices stimulate new plantings. They price inelasticity is being curbed by the government to assist the producers through support of prices. They assist in reduced application of inputs for example, labor and fertilizers. This has an effect on the tea as it is less taken care of and delaying of tea harvest will have an effect on the quality of tea thus creating pressure on average price levels.

This research project aims to explain the effects of a commodity future on the volatility of tea prices to the Kenyan farmers. Since a future contract is an insurance related transaction, contracts that are on assets with zero or low variability might neither be popular (high trading value) nor effective (a successful hedge). Therefore, future contracts on highly variable underlying assets should be both popular and effective (Intergovernmental Group on Tea, 2012).

1.4 Research Objective

The research project aims to show how the volatility of tea prices experienced by farmers can be reduced by using commodity futures.

1.5 Research Question

1). Is the volatility in Kenya tea prices significant?

2). How can tea futures smooth out the volatility of Kenya tea prices for farmers?

1.6 Justification

Kenya is a highly agricultural based economy. With 78% of the citizen dependent on the returns from the agricultural sector as of 2011 (World Bank, 2012), the government needs to look for a solution to the volatility of prices in the agricultural sector.

The derivatives market is yet to be launched in Kenya thus making it the prime time for the introduction of the commodity futures to the Kenyan economy. The derivative market will have positive effects on the involvement of more citizens into the agricultural sector. This will boost employment and also reduce the overpopulation in most urban centers. Consequently, the production of agricultural based will increase significantly. The amount of exports will increase and with a more stable return, farmers may be able to enjoy the profits of their yield. The investment in commodity futures will become more productive which will lead to an overall growth in the Kenyan economy.

Khosla (2012) indicated that there exists a strong positive relationship between commodity futures, market development and economic growth in the agricultural sector. For a country that dominated by small scale farming, commodity futures market have advantages of price discovery and risk management, would lead to the growth in the agricultural sector and government policy encouraging the development of a commodity futures market should be formulated. (Goldsmith, 1969) indicated that there is a positive correlation between financial development and the growth of the economy. This observation shows that the introduction of the commodity futures may boost the country's economy and financial development.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter shall review commodities market with respect on what other literatures have discovered. A theoretical background of the commodity futures market shall be covered for better understanding on the structure and the functionality of the commodity market. For the application of the commodity futures, a case study of India shall also be used to determine the feasibility of the commodity futures in the Indian Economy. The success, challenges and effects of the commodity futures has had on India will be used to investigate the possible effects it would have on the Kenyan market.

2.2 Theoretical Background

A future contract is an agreement signed between two parties A and B at time 0. Party A has the obligation of delivering the asset at a future date T (Geman, 2005). Party B has the obligation to buy the asset at the future agreed date. The future price is not the price of the asset at time T but a predicted value that would act as a reference of the contract. A clearing house regulates the exchange between the two parties after the signing of the contract. The buyer of the contract may sell the asset immediately after purchase at the spot price against the payment of the future price.

In this study, Party A is the tea farmer who wants to hedge against possible rise and decline of tea prices between the dates of 0 and T (time of maturity). The future price is an estimation of the spot price at time T.

2.3 Actors in futures markets

2.3.1 Hedgers

A futures market is created primarily set to meet the needs of the hedger. For example a farmer who wants to secure a fixed price for their harvest in the future.

In a futures contract, the basic risk is the risk that remains after the hedge has been put in place. This is the difference between the futures price and the spot price. The basis risk may also include cleaning the local grade into a grade deliverable in a futures contract, the price of transportation to and from the delivery point in the futures contract and the physical cost of storage between the time of harvest and the delivery date of the futures contract (Geman, 2005).

2.3.2 Speculators

Speculators identify the ways of making a profit by getting exposure to the commodity price moves. Speculators may be the middle men in the tea market who sell the tea to the government. They may decide to enter a futures contract, though they may not be affected by the volatility of the prices, and guess whether the prices in the future will increase in the market corresponding to the profits that may make.

In developed countries commodities are becoming increasingly popular to both investors and hedge fund managers. They are viewed as an alternative asset class as they allow the investor to lower the risk in their portfolio and enhance the return.

2.3.3 Arbitragers

Arbitrage is a riskless profit realizes by entering into several transactions in two or more markets. Arbitrage opportunities are very desirable but not easy to uncover and do not last for long (Geman, 2005).

Arbitragers look for the opportunities of arbitrage in the futures market. This research project will assume that there are no arbitrage opportunities in the market.

2.4 Characteristics of commodities tradable on Futures Market

By understanding the characteristics of commodities tradable on a futures market, the research project will show the feasibility of trading tea in the futures market in Kenya.

a) Uncertainty

Figure 2: Monthly Tea prices of tea (2004-2016): The graph shows the random movement of prices of tea.

This is the main foundation of the futures market. Uncertainty of prices will encourage buyers or sellers with fixed amount of commodities to use futures markets to hedge their risks (Carlton, 1984). People with different expectations would utilize the futures market to speculate on their expectations.

Without any uncertainty, the current owners of the commodities with the intention to sell their commodities at a fixed price in the future would see no risk of the change of prices therefore there would be no need of a futures market.

In this research project, there is uncertainty in the prices of tea in the global market therefore the importance of a futures market.

b) Price Correlations across Slightly Different Products

A futures contract is for a commodity standardized in grade and location while physical products traded can differ in specification and location. Futures market performs best when prices across different specifications and locations are correlated. This would bring about less basis risk. The basis risk is the difference between the futures price and the spot price. A perfect hedge would be established if the basis risk remains unchanged over time (Carlton, 1984).

In this research project, the tea will differ according to the different grades of tea traded in the global market.

c) Large potential Number of Interested Participants and Industrial Structure

The greater the number of different organizations that are involved in producing and distributing the commodity, the greater the number of participants in the futures market therefore the greater the possibility that a futures market will develop.

In this research project, the government would be the main organization producing and distributing the tea. This will attract both individuals and organizations to the futures market.

d) Large Value of Transactions

The greater the value of the total product sold, the larger the value of reducing risk. The riskier the commodity, the more the risk averse individuals will hedge against the risk they are exposed to (Carlton, 1984).There would be increased speculation in the futures market as the investors would be making their own predictions on a commodity in which the values are high.

In this research project, the commodity has a great value to the government as it is the country's main export. Therefore to encourage tea production in the country, the government would hedge against the price volatility so as to attain a profit back to the farmers.

e) Price freely determined and Absence of Regulation

If the equilibrium price is heavily influenced by the government regulations or controlled by one firm, the probability of finding a futures market decreases (Carlton, 1984). This would affect the price volatility of the commodity and individuals with more information will be able to have an upper hand in the futures market thus taking advantage of his futures positions.

In this research project, prices are greatly affected by the changes in the global market which are unpredictable and uncontrolled by any organizations or governments. Tea prices reflect seasonality or economic trends of major economies that have an influence on factors directly affecting the tea prices for example exchange rates.

2.5 Futures Contracts

A futures contract is an agreement between two parties to buy or sell an asset at a certain time in the future for a certain price (Hull, 2009).In the futures contract, an exchange acts as an intermediary and also standardizes and regulates how the contract is created and traded.

2.5.1 Specifications of a Futures Contract

The exchange must specify the exact nature of the agreement between the two parties, when developing a new contract. The following describe the specifications of the future contracts.

a) The Asset Quality and Description.

The type of asset that can be covered by the futures contract has to be clearly defined where it is important for the exchange to specify the grade or grades of the commodity that are acceptable (Hull, 2009).

b) The Asset Quantity or the Contract Size

Each traded futures contract provides for the delivery of a specified quantity of the asset. If the contract is too large, many investors who wish to mitigate against relatively small risks or who wish to take a relatively small speculative position may not be able to use the exchange. However, if the contract size is too small, trading may be expensive as there is a cost associated with each contract traded (Hull, 2009).

c) Price Limits and Position Limits

Daily price movements are specified by the exchange. Daily price movements are important to prevent large price movements from occurring due to speculative excesses. A limit move is a move in either direction equal to the daily price limit. Limit up is if the price moves up from the previous day's close while a limit down is if the price moves down from the previous day's close.

Position Limit is the maximum number of contracts a speculator is allowed to hold. This is to prevent speculators from exercising undue influence in the market (Hull, 2009).

d) Delivery Arrangements and Months

The place of delivery must be specified by the exchange. The exchange must also specify the exact period during the month when delivery can be made (Hull, 2009).

e) Marking to Market

Both buyers and seller of the contract are adjusted every day for the change in the market price that day. The profits or losses experienced with the price movements are credited or debited from an investor's account if he or she does not trade (Damodaran, 2002).

f) Margin Requirements for Trading

- **Futures Margins**: Deposit of funds in a futures trading account dedicated to cover potential losses from an outstanding futures position
- **Initial Margin**: Amount required when a futures contract is first bought or sold.
- **Maintenance Margin**: The minimum margin level required in a futures trading account at all times
- **Margin Call**: Notification to increase the margin level in a trading account.

2.5.2 Pricing a Futures Contract for Perishable commodities

Perishable commodities offer the exception to the rule that futures contracts are priced in the basis of arbitrage. The commodity has to be storable for arbitrage to be plausible.

The price of the perishable futures contract will be affected by:

i. The expected spot price of the underlying commodity: An increase in the spot price of the underlying commodity before expiration will result in an increase in the value of the futures contract therefore the futures prices will be greater. Consequently, a decrease in value of the

underlying commodity will result to the decrease in the value of the futures contract thus the futures prices will be lower (Damodaran, 2002).

ii. Any risk premium associated with taking the futures position: Since there is a buyer and seller in a futures contract, the size and direction of the risk premium will vary with different situations. It will depend on whether the buyer is viewed a provider to the seller or the seller is viewed as a provider to the buyer. In this research project, the farmers are the buyers of the contracts while the government is the seller of the futures contracts, the farmers are providing a service to the government thus should be rewarded. The futures price will be higher than the expected spot price (Damodaran, 2002).

This study will analyze the expected spot prices and compute the risk premium then anticipate the payoff to the farmer.

2.5.3 Role of the Exchange

The exchange provides facilities for trading, defines contracts traded, defines the rules of trading, monitors its members and disseminates information (Tomek, 1985).

2.5.4 Role of the Clearing Houses

All trades are formalized through a clearing association that is trades made by exchanges that are not authorized clearing houses are cleared through a clearing member. Clearing association acts as the opposite party to each transaction such that it acts as the buyer to every seller and the seller to every buyer. Therefore, the trader's legal obligation is to the clearing house.

The clearing house ensures financial integrity to the futures transactions. To become a clearing member, the firm must meet certain capital requirements and must follow prescribed accounting and reporting practices and the firm's ability to meet margin calls is closely monitored (Tomek, 1985).

2.6 The structure of futures markets

Derivative instruments were first uncovered in the early 17th century with the first type being the commodity derivatives (Khosla, 2012). Rice futures were being traded on the Dojima Rice Exchange. The modern form of Futures Markets appeared in the 19th Century in the American Midwest (Geman, 2005). The first organized derivative exchange was established under the

Chicago Board of Trade (CBOT) in 1848 where commodity futures were traded. The Chicago Mercantile Exchange was afterwards established in 1918. Currently there are active financial futures markets are in countries like, the UK, Japan, France, Hong Kong and the United States. The different types of commodities traded are divided among commodity groups that include grains, oil and meal, livestock, foodstuffs, textiles, forest products, metals and energy.

Derivatives are mechanisms for the efficient transfer of risk and allocation of capital. Future markets ensure the equilibrium of prices thus showing the demand and supply conditions of the market. This ensures that the parties involved in the futures contracts make prudent decisions.

Producers hedge the price risk by selling their commodities (going short) at a fixed price at a specified future date. The consumer can buy the commodity (going long) at a specified price at a specified date in the future. The parties therefore take the optimal conditions for their investments.

2.7 Futures Market in Kenya

In Kenya, a Futures market has not been established yet, however, the country is anticipating the opening of a derivatives market in the Nairobi Stock Exchange. This will increase the number of futures contracts in the country. “The establishment of a vibrant derivatives markets in Kenya is one of the key projects under the Capital Market Master Plan whose delivery is key to deepening the capital market in Kenya,’’ said CMA acting chief executive Paul Muthaura (Business Daily Africa, 2015).

An investor will be introduced to the tea farmers in the Limuru region. The investor will offer to buy the tea at a specific price throughout the whole year. The anonymous investor will therefore incur all the volatility in prices of the tea prices. The farmers will therefore have a stable income for their tea however will not enjoy profits in any period.

2.8 Theoretical Framework: A case study of India.

2.8.1 The Evolution and Regulation

The use of futures in the local Indian market dates back to around the 1800s. The Forward Contracts (Regulation) Act, 1952 was passed to regulate the forward market. The Forward Markets Commission (FMC) was set up in 1953 in Mumbai to regulate the market. Commodity

derivatives were however banned in the late 1960's, this is because the speculative market of the futures market would reinforce price instability and volatility in essential commodities thus leading to further problems of food insecurity (Sushimita Bose, 2008). The market was however revived again in the 1980's. In 1999, The Government suggested that the Minimum Support Prices (MSP) as a price-hedging instrument could be replaced with the derivatives markets. The MSP involved the price the government paid to the local farmers to support them (Pahariya & Mukherjee, 2007).

In 2003, granted recognition to three electronic exchanges namely National Multi Commodity Exchange of India (NCME), Multi Commodity Exchange of India (MCX) and National Commodity and Derivatives Exchange (NCDEX) as national level multi-commodity exchanges (Inoue & Hamori, 2012). The national-level multi-commodity exchanges were allowed to set up on the conditions of being backed by internationally prevailing best practices of trading, clearing and settlement. The national commodity exchanges follow exchanges electronic and transparent trading and clearing with the replacement of an old contract or obligation with a new one (Sushimita Bose, 2008). This was done because the process was cost effective due to technology and similarly it would improve the risk management systems to improve and maintain financial integrity of futures markets in the country (Shah, 2003). MCX has become the world's largest commodity futures exchange in gold and silver, the second in natural gas and third in crude oil. NCDEX deals with a large number of agricultural and metal commodities (Majahan & Singh, 2015).

2.8.2 Challenges in the Commodity Futures Market

Commodity futures trading was reintroduced to enable farmers to hedge against price risk. The national commodity exchanges were supposed to act like an independent market and design contracts that would facilitate the participation of all players in the market including small farmers who would otherwise be unable to participate and benefit from the services offered by the exchanges. This however has not been achieved due to a conflict of interest between the regulatory role and the profit motive of demutualized exchanges (Majahan & Singh, 2015).

A properly designed regulatory and supervisory frame work improves transparency, efficiency and market integrity. The regulations could help the futures market to achieve both price discovery and management in an efficient and orderly way. However, policy reversals

concerning the effect of futures market on spot prices and the supply of important commodities has hindered the development of the commodity derivatives in India (Sushimita Bose, 2008). This problem however, has had inconclusive results.

The objective to the introduction of technology to the futures commodity market was to create affordable and accessible futures exchange that would bring about price transparency, efficient transaction, risk hedging and structured finance to the local farmer. In spite of this, the futures exchanges are introducing and providing the latest technology for the algorithmic trading for trading thus making it impossible for small traders and local farmers to afford it. Algorithmic trading is a technology driven pre-programmed complex mathematical model that allows execution of orders to benefit from arbitrage opportunities in the commodities, stocks and currencies markets. The program buys and sells contracts at a very high speed to benefit from the smallest price movements in trading in the futures market. This has created fragmentation of the market and lack of an even playing field across all commodity futures (Majahan & Singh, 2015).

Integration of spot and futures markets is an important factor for further growth for commodities futures in India. India however has a fragmented spot market with government laws and various taxes that hinder the free movement of commodities. This creates opportunities for bilateral deals in local exchanges as there is a lack of price transparency both in the fragmented spot and futures markets for many commodities and an absence of certified warehouses (Sushimita Bose, 2008).

A bulk of trading in the commodities futures markets is carried out mainly by speculators and non-commercial traders who attempt to profit from buying and selling futures contracts by anticipating future price movements but have no intention of owning the physical commodity, while the participation of hedgers such as farmers and manufacturers is almost negligible (Majahan & Singh, 2015). The main difference between a speculator and a gambler is that the speculator does not create risk but accepts the risk that already exists in the market. Speculators use all possible price information to make a profit. The speculators contribute to the improvement in efficiency of price discovery function in the futures market. A gambler however trades only in the interest of making a bet. The gambler may be involved in a futures contract however does not have the commodity required for the trading, therefore the contract has no actual delivery obligations of the commodity.

2.9 Benefits of the Commodity Futures Trading.

Futures allow for anticipatory hedging in a free-market price regime. Hedging involves taking a similar but opposite position in a futures market so as to mitigate the price risk in the cash market. Hedging involves buying and selling of a standardized futures contract against the corresponding sale or purchase respectively of the equivalent physical commodity (Sushimita Bose, 2008). The future therefore offers a method of mitigating against price risk. The futures markets will also offer a range of commodities thus creating a lot of flexibility in pricing for the individual trader as compared with a fixed policy rate regime (Sushimita Bose, 2008).

Futures markets play a role in inventory management. The basis or price spread, the price difference between futures contracts of different maturities, signals the availability of stocks to the market. The basis is a measure of storage and interest costs that must be borne by a spot market trader in holding stocks now for sale at some point in the future. As the basis gets larger, the incentive to store increases thus the level of inventories held in the spot market will be determined by the basis. This ensures that there is an efficient process of storage thus leading to smoother pattern of prices in the spot market which would reduce the price volatility.

Futures provide price support for credit needs for small producers. Better access to credit has been driving demand for commodity price hedging in the developed economies. The collateral value of the inventory is substantially enhanced if it is hedged thus enabling farmers to borrow a larger proportion of inventory value on more attractive terms (Sushimita Bose, 2008).

An efficient futures market provides reasonable accurate indications of future spot prices and thus helps in production planning. This would result to a more efficient system of asset allocation in the economy.

Commodity futures could be classified as an asset class in a portfolio that would reduce risk in the portfolio yet increase returns. Commodity futures exhibit a negative correlation with stock futures and bonds and a positive correlation with inflation (Gorton & Rouwenhorst, 2005). It therefore provides a degree of stability under volatile market conditions. This increases the investment base for the investor (Sushimita Bose, 2008).

2.10 Chapter Summary

The structure of the futures market has been analyzed using different literatures. This includes the main players in the futures market and their roles and also the characteristics of the commodities tradable on futures markets. This will investigate the feasibility of opening a futures market in the country and therefore assessing the probability that the futures market will grow depending in the economic status of the country. The research paper also investigates the feasibility of trading the tea as a commodity in the futures market. His helps the research project in determining if the tea can be sold successfully in the commodity futures market and if the futures market may be successful in the country.

The structure of the futures contract has also been reviewed using different literatures. This involves the specifications of the futures contract, how futures contracts for perishable commodities have been previously priced in other markets and the role of different institutions in the futures market. This will assist the research project in determining the process of pricing a futures contract and the requirements for the investor, the farmer and the government to meet when handling the futures contract.

A case study on the futures market in India has been reviewed. This includes the history and regulation of the futures market, the challenges faced while regulating the futures market and the benefits of opening a futures market in India. This will assist the research project in determining the possible positive and negative effects of opening the futures market to the government, the farmer and the investor.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This section will describe steps taken to undertake the study. The population, sampling techniques, data analysis methods and research design used to carry out the study shall be defined. The technique in which the commodity future was priced will also be defined in this chapter.

3.2 Research Design

The research design adopted in this research project is a mix of descriptive and quantitative research design. The objective of the descriptive research design is to portray an accurate profile of persons, or events or situations (Robson, 2002). One of the earliest known examples of a descriptive survey is the Domesday Book which described the population of England in 1085 (Saunders, Lewis, & Thornhill, 2009).

This research project shall describe the volatility of tea prices in Kenya according to the global tea prices and therefore formulate a futures exchange that would assist to mitigate the effects of the volatility of the prices to the local tea farmer.

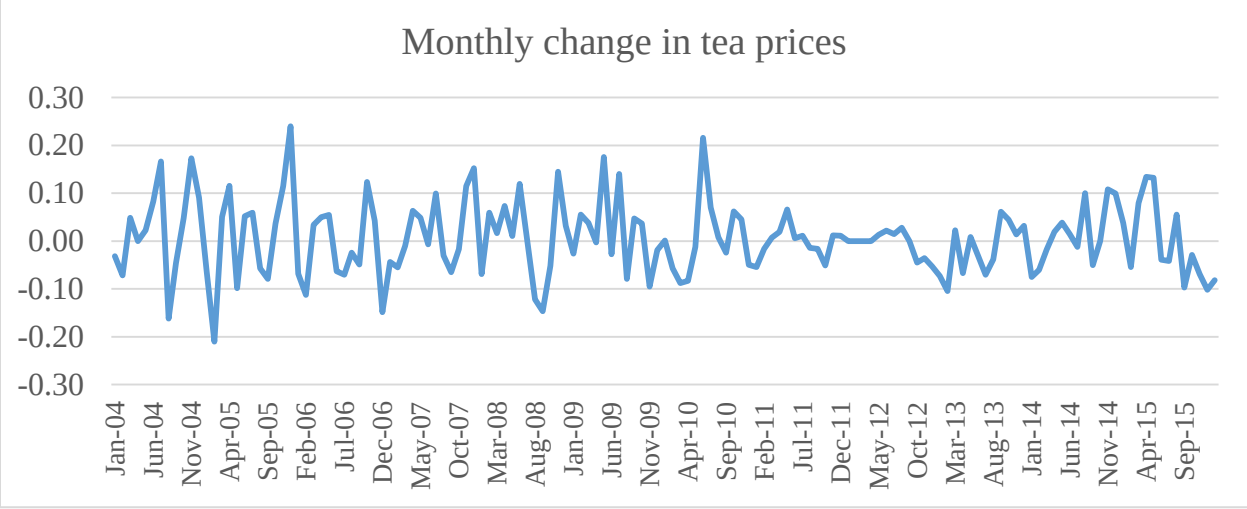

Figure 3: Monthly change in Global Tea Prices from 2004-2016. The tea prices are seen to have a random walk about the mean. There is no evident pattern seen in the data thus showing the volatility of price changes in the global tea market

This research project looks to price a futures exchange that will ensure that when the price of the tea goes below a certain price limit, the farmer will be compensated beyond the limit. There will be a maintenance margin.

3.2.1 Margin Requirements of the Futures Trading

The Initial margin is determined by the clearing house depending on the number of futures contracts one owns.

(Initial margin per kilogram of tea) * (Kilograms of tea per contract) * (Number of contracts)

The initial margin was determined by the New York Stock Exchange as a defined initial margin is set by the exchange. Since this research project is using the global prices for futures, New York the margin call would work efficiently for this investigation.

The maintenance margin would be determined by the returns gotten by the government from the futures exchange. The maintenance margins will be obtained from the New York Stock Exchange.

The margin call will be determined by the returns to the farmers from the futures contract. Should the price go below the maintenance margin, the farmer will be required to pay the margin call to ensure the farmer does not experience extreme losses.

(Change in price of tea per Kilogram of tea) * (Kilograms of tea per contract) * (Number of contracts)

3.2.2 Determining the Future Price

The relationship between the futures and spot prices are said to exhibit normal backwardation.

Normal backwardation is where the spot price at time T is greater than the future price set at time T.

This research project will consider a series of futures contracts that differ in the maturity date T.

Under the risk premium model, the reference point for determining the forward price is the conditional expectation of the spot price; S_0 will be discounted at the appropriate continuously compounded market interest, *r*:

$$\mathbf{F_0 = S_0\, e^{rT}}$$

Where : $\mathbf{F_0}$ is the futures price at time 0

: $\mathbf{S_0}$ is the spot price at time 0

: **r** is the market interest rate

: **T** is the term to maturity

Storage costs will be treated as negative income. Let U be the present value of all the storage costs, net of income, during the life of the forward contract. Therefore,

$$\mathbf{F_0 = (S_0 + U)\, e^{rT}}$$

Incorporating any possible convenience yield in the storage of tea,

$$\mathbf{F_0\, e^{yT} = (S_0 + U)\, e^{rT}}$$

Where : **y** is the convenience yield

If the storage costs per unit are a constant proportion of the spot price;

$$\mathbf{F_0\, e^{yT} = S_0\, e^{(r+u)T}}$$

Or

$$\mathbf{F_0 = S_0\, e^{(r+u-y)T}}$$

3.3 Population

The research project aims to investigate the effect of the volatility of tea prices of the tea farmers in Kenya. The population under investigation will be tea farmers in Kenya who sell tea via a tea exchange. The research project will investigate how the tea prices affect the production of tea by the farmers in Kenya and the application of futures on the market. The benefits of the futures will be investigated on the tea farmers in Kenya independent of the types and grades of tea.

There will be the presence of a clearing house between the government and the farmers for example a financial institution or a broker who will ensure the marking to market of the futures contract.

3.4 Sampling Methods

A non-probabilistic purposive sampling technique has been used in this research project. Purposive sampling frame is often used when working with very small samples (Saunders, Lewis, & Thornhill, 2009).

Table 1: Summary comparison of Area under tea and production in 1963 and 2006

Sector/Export		**1963**	**2006**	**% increase**
Small-scale Tea farming	Exported (Kg)	296,381	172,537,298	58,214%
Estate-Tea Farming	Exported (Kg)	16,881,864	113,430,932	672%

The Kenyan Tea industry is divided into two categories; the small scale tea farmers and the large scale tea farmers (estates) (The Tea Detective, 2011). The small scale farmers are the fastest growing population currently.

Farmers in the Kambaa area in Limuru will be used as a representation of the entire population under investigation. The farmers are small scale tea farmers. The sample used is an efficient representation as the characteristics of the small scale farmers are similar throughout the country. Tea survives in a cold and wet climatic conditions, the tea thrives in volcanic soil conditions. Therefore the geographical area and climatic conditions in which the farmers live are similar. The price of the tea is similar depending on the grades of tea. The futures will be priced according to the different grades of tea.

The harvest and returns of tea from their plantations shall be used to evaluate the volatility of returns of tea in the local market and therefore relate the returns from the global market. An efficient futures exchange shall therefore be formulated from the findings.

3.5 Data Collection Methods

Primary data of the amount of tea produced will be obtained from raw data from the Kambaa tea farmers. Additionally, the local tea prices will also be obtained.

Secondary data will also be collected for this study. The raw data of tea prices will be obtained from Index Mundi Data Bank which has all trading data for commodities in the global market.

The returns from the Index Mundi Data Bank are obtained directly from the trade carried out in the global market. The data from the Kambaa tea farmers are obtained directly from the records of tea the farmers produce monthly.

3.6 Chapter Summary

The descriptive research design has been applied in this research where the use of futures will be applied to describe the effects it may have on the volatility of tea prices locally with respect to the tea prices in the global market. The Risk Premium model has been used for the pricing of the futures contract. The population size was the tea farmers in Kenya. The sampling technique used is systematic sampling where the Kambaa tea farmers have been picked to represent the other tea farmers around the country. Secondary data was mainly used in this study to obtain the price of tea in the global market.

CHAPTER 4: DATA ANALSIS AND FINDINGS

4.1 Introduction

This section will give a description of the data, the interpretation and conclusion of the research results. Recommendations drawn from the research will then be discussed.

The aim of this study was to curb the effects of volatility of prices on the Kenyan tea by the use of tea futures for the farmer. The data below shows the income received from the small scale tea farmers in Kambaa Area. The small scale farmers represent a majority of tea farmers in Kenya.

Data was obtained from one of the farmers in Kambaa area, Limuru Kenya. The Kambaa area has the highest concentration of small scale tea farmers in Kenya. Table 3 shows the harvest of the small scale farmer from the year 2008.

July - Dec	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**
Total leaf in Kgs	331	1,981	2,332	3,572	5,044	5,629	5,323	9,769
Total monthly payments	3,972	23,772	27,979	42,865	70,620	78,802	74,515	136,772
Mini bonus (5/kg)		3,353	5,145	9,994	11,375	12,949	11,877	20,958
Bonus declared/kg	-	33.00	40.00	38.00	35.50	20.50	29.97	40.00
Bonus earned	-	65,373	93,224	135,736	179,086	115,388	159,494	390,776
Total earnings	3,972	92,498	126,348	188,595	261,081	207,139	245,886	548,506

Table 2: Shows the harvest and the returns of the small scale farmer from the year 2008 – 2016. The government buys the tea at a constant rate of 14kshs per kg of tea that meets the KTDA requirements.

4.2 Data Analysis

The Government pays a constant rate of 14 Kenyan Shillings (Kshs) per kg of tea produced. The tea however has to meet the standards set by the Kenya Tea Development Agency (KTDA). The requirements include:

i. A bud and 2 leaves
ii. The leaves should be of healthy condition i.e. no holes on the leaf
iii. The tea should be free of weeds and other foreign plants: dirty tea

The standards help to maintain the quality of the Kenyan tea in the international market.

The mini bonus is charged only when the farmer produces tea every month of the year despite the amount. The mini-bonus is charged at a constant rate of 5Kshs per kg produced and it is paid annually at the third quarter of the financial year i.e. March of the preceding year.

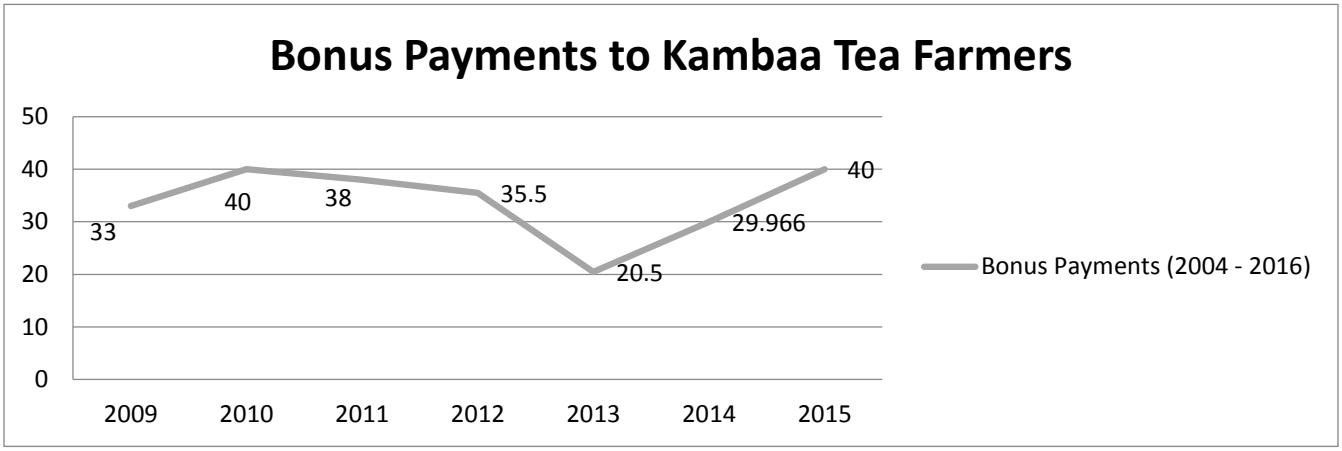

Figure 4: Shows the trend of the bonus payments to the farmer in Kambaa area.

The final bonus of the year is variable with the performance of tea in the international market. The bonus from the tea is obtained after KTDA has paid for the production and maintenance costs for all their factories. They are also taxed from the production of the tea. The residual amount is paid to the farmers as bonuses.

The bonus payments have been declining from the year 2010. In 2013, when the bonus payments got to their lowest, the government stepped in to raise the bonus payments in 2014. In the current year, the bonus increased to 40Kshs. This was attributed to the increase in revenues from the tea, cost management, favorable exchange rate and market diversification. Different bonus payments are paid according to the different grades of tea.

The price volatility is mostly reflected by the bonus payments to the farmers. The futures contract will be based on the bonus payments to be made to the farmers. A futures market will have to be made revolving the bonus payments since all the other factor costs are constant.

An investor would be introduced to the farmer offering a bonus rate depending on the previous revenues of tea. The farmer would buy the futures contract depending on the speculation of the bonus rate. If the bonus rate declared by KTDA is higher than the bonus rate offered by the investor, the farmer will make a loss and the investor will make a gain. However, if the bonus

rate declared by KTDA is lower than the bonus declared by the investor, the farmer will make a profit and the investor will be at a loss.

4.2.1 Pricing of the derivative product

Using the risk premium model where, the future price is the future value of the current price with respect to the interest rate, the expenses rate and the convenience yield.

$$F_0 = S_0 e^{(r+u-y)T}$$

Where : F_0 is the futures price at time 0

: S_0 is the spot price at time 0

: **r** is the market interest rate

: **T** is the term to maturity

: **u** is the expense rate

: **y** is the convenience yield

In the model used in the research project, the expenses and convenience yield are not constant rates. The expenses incurred will be directly added to the spot rate and the convenience yield of the tea will be subtracted directly from the spot rate.

The future price will therefore be calculated from:

$$F_0 = (S_0+u-y) e^{(r)T}$$

The term to maturity was assumed to be monthly as the tea is traded weekly in the Auction Centre in Mombasa.

T is therefore 1/3 in the model as the model uses the 91 day T-bill rates therefore approximating the interest rate in 3 months.

The convenience yield is constant. This is because the farmer receives a bonus of 5 Kshs per kg of tea for the first six months of the financial year. The farmer however only qualifies if he has delivered tea during each of those months. The farmer receives and additional payment of 14 Kshs during the end of the financial year depending on the amount of tea delivered to KTDA from the beginning of the financial year. The additional bonus is also added at the beginning of the financial year. The additional income declared is divided evenly per month during the

financial year. The declared bonus will differ depending on the rate announced per kg. The bonus rate announced by the KTDA will also be divided evenly throughout the year.

The expenses are constant per kg of tea produced. The model assumes that the farmer produces a constant amount of kilograms of tea per month. The model also assumes that the farmer incurs regular expenses per month. The model has used the dollars as the standard rate of transactions as the tea is traded in dollars in the auction market.

The derivative price is a reflection of the previous month's spot price. It may be higher or lower than the actual price at time t. The investor may also be able to speculate whether the tea prices picks or falls depending on the conditions experienced by the farmer in that month.

4.2.2 Projections

The model has used a random generating factor to anticipate the changes of tea prices in the year. A maximum and minimum limit has been set to cap the change of prices from one period to the next. The limits were obtained by determining the maximum and minimum rate of change experienced per year. The investor may be able to anticipate the maximum and minimum rate of change per month. Depending on the conditions of the tea market, the investor may be able to speculate within the limits.

The 91-day T-bill rate is expected to stabilize at the current level for the remaining part of the fiscal year. This is despite the gradual decrease during the past two months. However, it is believed that the rates have bottomed out (Cytonn Investments, 2016).

The Kenyan Shilling to Dollar Exchange rate is expected to rise to 102 by the end of the current fiscal year. It is therefore expected to rise to 105 by September 2017. The rate is therefore assumed to gradually increase to 105 up to September 2017. The Kenyan Shilling is expected to trade at 102.00 by the end of this quarter, according to Trading Economics global macro models and analysts' expectations. Looking forward, we estimate it to trade at 105.00 in 12 months' time (Trading Economics, 2016).

4.3 Findings

From the analysis of the data, the futures commodity will not reduce the volatility of the underlying asset. (Shenbagaraman, 2006) examined the effects of the introduction of the Nifty futures and options contracts on the underlying spot market volatility using a model that captures the heteroscedasticity in returns that characterize stock market returns. The results indicate that derivatives introduction has had no significant impact on spot market volatility. However it will reduce the impact of the volatility of prices on the farmer and the investor.

Speculation of the tea prices using the tea futures will affect the extent of gains or losses the farmer will have to incur. In the long term projection of the futures price, the future may act as magnet for speculative investment. This will result to a medium term abnormal inflationary pressure on the spot price which will be followed by a severe correction where the actual demand of the tea will weaken (FAO, 2012).

The investor is more likely to make a gain from the future derivative if he sells the future to the farmer. When the tea prices continue to grow however, the investor will have to face a loss as the future prices may be lower than expected. This depends however on the equilibrium between the spot price and the futures price. It may be affected risk aversion of hedgers, demand and supply conditions expected by the hedgers in the spot market and the expectations and responsiveness of speculators about the current spot market. However, in the case that the future prices and spot market prices correlate, there would be high demand for the commodity due to the speculator's expectations of increase in spot prices therefore resulting to high demand for the future (Kaur & Anjum, 2013).

The term of the future may range from monthly to yearly. The model assumes future that expires in a month at which the farmer would sell the tea to the investor at the future price while the investor would trade it at the auction market at the market price. This would generate a profit or loss to the investor depending on the change in price in the actual market. If the tea prices rise higher than the future price at which the investor sold the tea to the farmer. If the price of tea decreases in the following month, the investor would make a gain of the difference of the future price and the actual tea price.

The farmer may be able to earn more as the farmer would be transferring all the risk to the investor. The volatility of the price may be unaffected however, the price may gain more from the future as compared to the sale bonuses currently earned per kilogram sold. The commodity futures in India was observed to provide higher hedging effectiveness and a price management role due to increased activity in the market (Brajesh & Pandy, 2012).This indicates that with increased participation in the futures market, the volatility of the prices may be reduced as the futures will assist in price determination.

CHAPTER 5: DISCUSSIONS, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

This section will give a description of the data, the interpretation and conclusion of the research results. Recommendations drawn from the research will then be discussed.

The aim of this study was to curb the effects of volatility of prices on the Kenyan tea by the use of tea futures for the farmer. The data was analyzed using the Risk Premium Model where the tea price would correspond to the changes in the market.

5.2 Discussions

One of the research questions being investigated in the research project was the how the tea futures can smoothen out the volatility of tea prices in the country. The findings from the research project were that the futures will not have any effect on the volatility. This is in line with Shenbagaraman (2006), who investigated the effect of the futures options on tea and concluded that the derivatives introduction has no significant impact on the spot market volatility. However, research done by Sarris, Conforti, & Prakash (2010) investigating the effect of futures on import products from the year 1987 to 2012 showed that hedging with futures reduces considerably the unexpected variability of import prices. This concludes that futures may smoothen out the volatility of the tea market prices in the long run.

The other research question was investigating the significance of the volatility of tea in the country. Kaur & Anjum (2013) discovered that speculator's expectation of increase in spot prices resulted in high demand for future and in opposite situation of low prices the speculators by doing reverse trade creates off setting positions. This increases the variability of future prices of the tea thus increasing the risk the tea is exposed to. This will affect the return of the tea from futures prices. Future may act as a magnet for speculative investment. This will result to a medium term increase in the spot price of tea which will be followed by a severe drop in the tea prices where the demand of the tea will reduce significantly (FAO, 2012). This in line with the research project shows that the futures will significantly affect the demand and the underlying price of tea in the short term. This will however by corrected in the long term use of the futures.

From the results in the data analysis, the farmer or any part directly involved in the tea farming business will eventually make a profit if they are involved in the derivatives market. This is

because the volatility of the tea market will indirectly impact the trader in the transactions as they have already set the prices of the tea in the coming period. The volatility of the tea market will only influence the gain or loss in which the trader makes. If the price of the tea continues to fall, the farmer will make gains. However, of the prices of the tea improves, the trader will make losses on the derivative market. This is based on the assumption that the demand for the tea will remain unchanged after the introduction of the futures. This is in line with the discoveries of Kaur & Anjum (2013) where speculator's expectations determine the demand for the commodity. When the investor speculates an increase in the spot price of the tea, the demand for the tea increases therefore increasing the probability of making a gain. He the speculation of the tea price is low; the demand for the tea falls therefore increasing the probability of making a loss.

Futures contracts will be able to bridge of the lack of information between the farmer and the intermediaries. This includes the proceeds from the tea that the intermediary receives from the international market. This will create transparency and accountability of the intermediaries and the farmers will be able to receive a fair bonus at the end of the financial year. This has been observed in the Indian Market where, both NCDEX and MCX claim to have demonstrated that simultaneous open transparent spot and futures markets in commodities have a significant effect on the allocation of proceeds of sale between producers and intermediaries. Because the marketing and supply chains of tea give greater market power to the import side than that to the export side, prices are largely determined by importers. The result is a growing gap between prices paid to tea and coffee growers and that paid by consumers in importing countries. The exchanges have claimed that the gap is narrowing in case of those commodities where futures trading are established (Intergovenmental Group on Tea, 2012).

For the farmer to make a gain from the derivatives market, they have two options. The first would be for the farmer to invest in a processing plant. This would eliminate the need for an intermediary organization (in this case, KTDA) to sell their tea in the international market. The farmer would have a largely increased income from the sale of tea from the derivatives market. This income would be used to service the maintenance of the machinery of the processing of tea and also for profits gotten from the trade of tea. This would increase the production of tea in the country as farmers would invest more of their profits to increase the production of tea. This is however seemingly unlikely as the machinery is extremely expensive and large. The farmer

would have to build a factory in order to make this feasible. The initial capital required would be too great for the farmer to incur.

The farmer would make a profit of 8.1790% if they had sold the tea from the previous year using the derivative market. Other factors that would influence the amount of profits made would be the exchange rate of the Kenyan Shillings to the dollar. If the value of the shilling should decrease over the year, the gain made from the derivatives market would increase. If the value of the shilling should increase, the gain made from the derivatives market would decrease. The change however, is very little over the fluctuation of the exchange rates.

Table 3: Show the earnings the farmer would make in 2015 if they invested directly in the derivative market instead of the actual market without the use of an intermediary organization.

2015	**Derivatives Market**	**Actual Market**
KG OF TEA PRODUCED	**Earnings in dollars**	**Earnings in dollars**
377	1,396	1,519.42
545	2,291	2,109.79
744	3,034	2,762.92
848	3,394	3,323.98
620	2,538	2,193.37
1,057	3,876	3,631.72
1,035	3,704	3,310.88
1,027	3,414	2,950.16
1,102	3,270	2,906.08
1,084	2,955	2,580.29
833	2,049	2,059.43
497	1,269	1,335.14
	33,191	30,683
Earnings in KES	**3,392,882**	**3,136,361**
GAINS IN PRODUCTION		**256,521**

The second option would be for increased income from the intermediary organization. The amount of bonus payable would be increased depending on the profits made by the intermediary organization. In this case the intermediary organization would be Kenya Tea Development Agency (KTDA). KTDA would buy the tea from the farmer and sell it to the international market after processing it. They would therefore be the direct traders in the derivative market. It will therefore incur all the risks from the derivative market. KTDA would therefore be the direct recipients of the profits from the derivative market. This would increase the revenues from the sale of the tea. The tea farmer would therefore gain from the increased bonus paid by KTDA

from the sale of tea. The bonus from KTDA would depend on the amount profit allocation of the organization. Though the tea farmer would expect higher bonus payment as the company would be impacted less by the movements of tea prices in the market as they anticipate a loss or a gain.

The objective of this research project was to investigate the volatility of the tea prices for farmers and how tea futures may be used to reduce the volatility of the tea. From the analysis of the data, the volatility of the tea, in the short term, may not be reduced. However, the effect of volatility on the farmer will be eliminated. This is because the investor will bear all the risk of the volatility. The volatility will only affect the investor in terms of the gains and losses the investor is likely to experience in the effect of changing spot prices of the tea in the international market.

Further research indicates that with increased activity in the futures market, the volatility of the spot prices will be reduced as the futures market will act as tool for price determination of the spot price. The futures will therefore effectively be a risk management tool in the tea market.

The main way in which the farmer may benefit from the futures contract in Kenya, is through the bonus payments at the end of the financial year. The futures market will reduce the information asymmetry between the farmer and the intermediary. If the futures market is open and freely available to every farmer in the country, they may be able to determine the returns from the sale of tea the intermediary may receive. This will make the process of determining the bonus payments at the end of the financial year more transparent.

5.3 Conclusions

The study was aimed at researching how the volatility of tea prices experienced by farmers can be reduced by using commodity futures.

Kenya is highly dependent on the agricultural sector as a source of production. Kenya is the third leading exporter of tea. It controls about 15% of the world export market. Kenya is therefore highly dependent on the returns from tea. The volatility of tea pries however, makes the income expected from the tea very uncertain. The volatility of tea prices exposes the farmer to a high risk however, a low expected return. This has a direct effect to both the farmers and the economy of the country. The farmers are forced to abandon the planting of tea and plant other crops that experience more returns. The country will therefore have a lower GDP and reduced export earnings. The tea sector is constituted of both small scale and large scale tea farmers. Small scale

tea farmers however, have a grown at a higher more accelerated rate than the large scale tea farmers. This research project solely focuses on the small scale tea farmers in Limuru Area.

From the research undertaken, the commodities futures reduces the direct impact of the volatility of tea prices to the farmer. The risk of the volatility of the prices is experienced by the investor. The changes in prices affect the gain or loss the investor will have to face due to the future. The investor in this research project will be the processing firms of the tea that take the tea to the international market, KTDA. The lower the price of tea falls, the higher the gain experienced by the investor. The higher the price of tea rises, the higher the loss experienced by the investor. Depending on the profits made by the investor, the farmer may experience a greater return in the form of bonuses from the investor. Other factors that may affect the commodity futures exchange rate from Kenyan shillings to dollars and the interest rates in the country.

Conclusively, the results show that the tea futures will effectively reduce the impact of the changes in tea prices for the farmers in Kenya. This will consequently smooth out the volatility of Kenya tea prices for farmers. The futures will cushion against the drastic changes of prices. However, keen consideration should be put on the assumptions of the model. The forecasted values will vary with changes in interest rates and exchange rates.

5.4 Recommendations

Based on the findings, the following recommendations arise. The government should educate the farmers on the derivative market. This will encourage the participation of the farmers in the derivative market. The farmers will also be able to understand the risks they are expose do in the derivative market and the benefits of the derivatives market. This will encourage more investors to be involved in the tea industry. This will eventually encourage more production of tea in the tea sector thus increasing the returns to the country. Commodity futures were found to be inefficient particularly in agricultural commodities in terms of price discovery due to non-integration of the futures and spot market prices. This was attributed to non-awareness of the futures market among farmers, infrequent trading, thin volume, low market depth and lack of participation of members in the futures market (Kaur & Anjum, 2013).

5.4.1 Suggestions for Further Research

Further research could be done on the effect of the use of commodity futures in other countries and how it will influence international tea market prices. The effect of volatility would be reduced in the tea market. What would be the effect of this in the long run on the tea market prices and the changes of the tea market prices.

Further research could also be done on the effect the commodity futures would have on the competition of the sale of tea in different countries. If the futures is successfully introduced to different countries, what would be the effect on the competition on the sale of tea in the global market.

The effect the future commodity will have on the growth of participants in the tea market. Due to the reduced effect of volatility in the market, there may be a change in the number of the participants in the market. The introduction of the futures may increase the number of buyers of tea in the market.

A future of another country should be formulated to investigate on the effectiveness of a tea commodity futures in another market for example in Sri Lanka.

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