

**OPTION PRICING IN NSE**

**SHADRACK MUOKI KIALA**

**A RESEARCH PROJECT PRESENTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS  
ADMINISTRATION, UNIVERSITY OF NAIROBI**

**OCTOBER, 2015**

## **DECLARATION**

**Student**

I declare that this project is my original work and it has never been submitted or presented to any other learning institution.

**Signature .....**

**Date.....**

**Shadrack Muoki Kiala**

**D61/65721/2013**

**Supervisor**

This research project has been written and submitted for examination with my approval as the university supervisor.

**Signature .....**

**Date.....**

**Dr.Otieno Odhiambo Luther**

## **ACKNOWLEDGEMENT**

I would like first to thank God, Who provided for my needs, guided and sustained me during the period of my training and academic work.

I would also like to thank my supervisor Dr.Luther Otieno for his wise counsel, incisive insight resulting to an immense contribution for this study, And to all my family members for their help. Not to mention all my fellow colleagues for cheering me up and being supportive.

## **DEDICATION**

I dedicate this project to my loving family; my late mother Mary Ndinda muoki and my two sisters Esther Muthike and Serena Mumbi. Without you I would not have made it this far.

## ABSTRACT

The primary objectives of this study were to establish the value of option pricing in the Nairobi Securities Exchange (NSE) using Black and Scholes pricing models. All the NSE 20 share index listed companies in the Nairobi Securities Exchange are the primary units of analysis for the study. Secondary data from NSE of these companies was vital for the analysis and evaluation. The values of Options were to be determined by first establishing the expected returns, level of volatility of stock for the period 2011 to 2014 and range of exercise prices. The expected returns of stocks declined from 2011 to 2013 and then stabilized in 2014. This observation was triggered by the external environment in which elections were being held in 2012 which affected the performance of stocks in the NSE. High inflation and high interest rates affected the stocks negatively. Most stocks posted significant volatilities and exercise ranges which would give investors an advantage to hedge against such movements. The exercise ranges computed were in tandem with share prices and therefore proved reasonable to use the data in managing risk. The volatilities of Black and Scholes model proved to work in the Kenyan market where stocks from NSE 20 share index were used in depicting European option prices. The calculations proved to be simple and accurate in observing price movements and hedging against the risks associated with. The study is an eye opener to investors wishing to make money in the stock market without necessarily worrying of stock movements. Investors would take advantage and reap profits when the stocks were high and at the same time when the stocks were low.

The study will play an integral role and create financial sense to numerous groups in the local financial markets sector. The NSE will be the greatest beneficiary since stock market attracts more public attention than other financial markets, such as bond and commodity thus giving a means of pricing option in the Kenyan derivative market.

Investors and financial managers will benefit by having alternative ways of controlling risks by hedging through options. Lastly, different scholars and academicians from the institutions of higher learning will have an opportunity to extend their role in advancement of option pricing and development of platforms for option trading.



# TABLE OF CONTENTS

<b>DECLARATION</b> .....	ii
<b>ACKNOWLEDGEMENT</b> .....	iii
<b>DEDICATION</b> .....	iv
<b>ABSTRACT</b> .....	v
<b>LIST OF TABLES</b> .....	ix
<b>LIST OF ABBREVIATIONS</b> .....	x
<b>CHAPTER ONE</b> .....	1
<b>INTRODUCTION</b> .....	1
1.1 Background to the Study .....	1
1.1.1. Option Pricing .....	2
1.1.2. Option Pricing Models .....	4
1.1.3. Nairobi Securities Exchange (NSE) .....	5
1.2 Statement of the Problem .....	6
1.3 Objectives of the study .....	9
1.3.1 The primary objective of the study .....	9
1.4 Value of the study .....	9
<b>CHAPTER TWO</b> .....	10
<b>LITERATURE REVIEW</b> .....	10
2.1 Introduction .....	10
2.2 Option Pricing Models .....	10
2.2.1 Black and Scholes Options Pricing Model .....	12
2.3. Determinants of Option Pricing Models .....	13
2.4. Empirical Review .....	14
2.4.1 Tests of market efficiency in the Chicago Board of Options Exchange .....	14
2.4.2 Valuing American call option using BS European formula .....	16
2.4.3 Empirical examination of the BS call option pricing model .....	17
2.4.4 The constant elasticity of variance model and its implication for option pricing .	18
2.4.5 Implied binomial trees .....	19
2.4.6 Binomial Option Pricing Model .....	20
2.5. Summary of the literature review .....	21

<b>CHAPTER THREE</b> .....	22
<b>RESEARCH METHODOLOGY</b> .....	22
3.1 Introduction.....	22
3.2 Research Design.....	22
3.3 Population .....	23
3.4 Sample .....	23
3.5 Data Collection .....	23
3.6. Data Analysis .....	25
<b>CHAPTER FOUR</b> .....	27
<b>RESEARCH FINDINGS AND INTERPRETATION</b> .....	27
4.1 Introduction.....	27
4.2. Expected Returns .....	27
4.3. Stock Volatilities.....	29
4.4. Exercise Price Ranges .....	30
4.5. Possible pay-offs .....	39
<b>CHAPTER FIVE</b> .....	41
<b>RESEARCH CONCLUSION</b> .....	41
5.1 Introduction.....	41
5.2 Conclusion .....	41
5.3 Limitation of the study .....	42
5.4 Suggestions for further research .....	42
<b>REFERENCES</b> .....	44
<b>APPENDICES</b> .....	46
Appendix I: Binomial Tree.....	46
Appendix II: Rate of Returns.....	48
Appendix III: Expected Return.....	79
Appendix IV: Volatilities .....	82
Appendix V: Exercise Price Ranges .....	86
Appendix vi: Black and Scholes Simulation .....	91



## LIST OF TABLES

Table 4.1. Summary of Expected returns .....	28
Table 4.2. Summary of stock volatilities .....	29
Table 4.3. Exercise Price Ranges .....	31
Table 4.4 Exercise Price Ranges .....	32
Table 4.5: Exercise Price Ranges .....	33
Table 4.6: Exercise Price Ranges .....	34
Table 4.7: Exercise Price Ranges .....	35
Table 4.8: Exercise Price Ranges .....	36
Table 4.9: Exercise Price Ranges .....	37
Table 4.10: Exercise Price Ranges .....	38

## **LIST OF ABBREVIATIONS**

<b>ATM</b>	At-The-Money
<b>CBK</b>	Central Bank of Kenya
<b>CBOE</b>	Chicago Board Options Exchange
<b>CMA</b>	Capital Markets Authority
<b>NSE</b>	Nairobi Securities Exchange
<b>S&amp;P 500/SPX</b>	Standard & Poor's Index

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

The way business is conducted in many economies around the world keeps on changing. This makes the investment behavior, techniques and tastes to change. For instance the under-performance of a strong economy like the United States of America could create significant problems for other countries like Kenya. However, when the countries trade and exist peacefully in their economies, there will be greater opportunities to create more wealth and become stronger. Investors have to work out how to earn profits from this transition of the world economy through use of new investment tools that provide reduction in risk or higher profits. Such investment tools are the derivatives. Derivatives are instruments with characteristics that comprise both the opportunity for lower risk and greater profits. The value of derivative depends on the value of other variables, such as stocks, indexes, interest rates, treasury bills etc. There are many kinds of derivatives such as futures, forwards, swaps and options. In this research, we focus on options and their estimated prices in the Nairobi stock exchange.

All through their course puts and calls on securities have been criticized as mere gaming opportunities. Lately, the formation of options on the American Stock Exchange, Chicago Board Options Exchange and other regional exchanges in the United States, has made options as investment vehicles. The economic significance of options is that it creates individual wealth allocation by issuing and buying securities indirectly through financial institution or individual able to affect the timing of consumption of goods and services

over time and able to redistribute among them the risk of fluctuation in the value of economy's real assets. Options by charging different prices allocate firms scarce capital among competing uses. Most economic decisions can be made from the option prices which provide useful information about the market. Thus it is easy to dismiss options as mere gambling opportunity.

### **1.1.1. Option Pricing**

Option Value is determined by variables that concern the underlying asset and financial markets. These are; current value of underlying asset, variance in value of underlying asset, dividends paid on the underlying asset, strike price of option time to expiration on option and riskless interest rate corresponding to the life of option. Option pricing is arguably the most dynamic segment of the security markets since the ratification of the Chicago Board Options Exchange (CBOE), April 1973. CBOE is the largest and business option exchange in the world, comprising more than 1 million contracts per day. However, several other option exchanges, including London International Financial Futures and Options Exchange (LIFFE), have since set up. The famous work of Black and Scholes has made the option valuation problem gain a lot of attention. According to Black and Scholes' seminar paper (1973), the presumption of log-normality was acquired and its application for valuing the range of financial instruments and the derivatives considered essential.

An option gives the holder the right to buy or sell a specified amount of an underlying asset at a fixed price (called a strike price or an exercise price) at or before the expiration

date of the option (Hull, 1987, Black and Scholes, 1973). Since it is a right and not an obligation, the holder can choose not to exercise the right and allow the option to expire. There are two types of options: call options and put options. A call option provides the buyer of the option the right to buy the underlying asset at a fixed price, called the strike or the exercise price, at any time prior to the expiration date of the option. The buyer pays a price for this right. If at expiration, the value of the assets less than the strike price, the option is not exercised and expires worthless. If, on the other hand, the value of the asset is greater than the strike price, the option is exercised the buyer of the option buys the asset [stock] at the exercise price. A put option gives the buyer of the option the right to sell the underlying asset at a fixed price, again called the strike or exercise price, at any time prior to the expiration date of the option.

The buyer pays a price for this right. If the price of the underlying asset is greater than the strike price, the option will not be exercised and will expire worthless. If on the other hand, the price of the underlying asset is less than the strike price, the owner of the put option will exercise the option and sell the stock at the strike price, claiming the difference between the strike price and the market value of the asset as the gross profit (Hull, 1987). Furthermore, netting out the initial cost paid for the put yields the net profit from the transaction making the difference between the asset value and the exercise price comprise the gross profit on the option Investment. The net profit on the stock is the difference between the gross profit and the amount paid for the call at first. If an option is American, it means it can be exercised anytime during the period of option's life. However, if the option is European, it means it can be exercised only during option's

maturity. Cao et al (2000) document abnormal trading volumes prior to mergers and takeovers announcements.

Option trading has been characterized by an unprecedented expansion particularly in American securities markets. Similarly, the option pricing theory has had an illustrious past before it underwent the 1973 revolutionary change. Fischer Black and Myron Scholes offered the first ever satisfactory equilibrium model of option pricing at that time. Robert Merton on the other hand extended the BS approach/model in several important ways. These articles have formed the foundation or basis of numerous successive academic studies and findings. As the aforementioned studies have shown, option pricing theory is relevant to almost every area of finance. For instance, virtually all corporate securities can be regarded as a collection of calls and puts on the assets of the company.

### **1.1.2. Option Pricing Models**

#### **1.1.2.1. Black-Scholes Model**

Black-Scholes Model is a theoretical framework of price variation over time of financial instruments. First published in 1973 by Fischer Black and Myron Scholes, the model contains specific derivative investment instruments. The two scholars deduced a formula from the model popularly known as the Black-Scholes formula. The formula offers a theoretical estimation of price of the European call options. Black-Scholes Model incorporates the options strike price, the constant price variation of stock, the time value of money, and the time to the options expiry. The five basic inputs of the model include

risk-free rate, exercise price, current price of asset, and time to maturity, and implied volatility of the asset price.

#### **1.1.2.2. Binomial Tree Model**

The binomial tree model is among the fundamental concepts in contemporary financial theory. The model is widely applicable to value an option because it is transparent, exhibits multiple-period view, and often able to incorporate probabilities. Unlike the Black-Scholes model, binomial model allows a multiple-period view of the price of the option as well as the underlying asset price. Apart from its extensive application for calculating the option value, it may also be used for investments or projects with high degrees of uncertainty, resource-allocation and capital-budgeting decisions. The model is widely used in the derivative market mainly because it is often based on the account or depiction of the underlying instrument over a given period instead of a single point. It is more accurate, especially for longer-dated options on securities with dividend payments. Meanwhile, the model assumes that movements in price follow a fairly binomial distribution.

#### **1.1.3. Nairobi Securities Exchange (NSE)**

Nairobi Securities Exchange is a securities exchange market that provides stocks and securities trading facilities for all listed companies. Constituted in 1954, NSE was basically a voluntary association consisting of stockbrokers registered under Kenya's Societies Act. Only the resident European community engaged in trading of shares. Asians and Africans were not allowed to deal in securities exchange. NSE activities

slumped at the wake of political independence owing to the uncertainties that surrounded the future of an independent Kenya. Eventually, three years of calm and rapid economic growth rekindled confidence in the stock market. A CBK/IFC study (in 1984) dubbed *Development of Money and Capital Markets in Kenya* became a blueprint for systematic structural reforms particularly in the financial markets. These structural reforms culminated in the establishment of the Capital Markets Authority (CMA) in 1989. CMA is a regulatory body that helps to create an environment conducive for the growth and development of capital markets in the country. Currently, NSE has 64 listed companies from various sectors, such as banking, agricultural, commercial and services, automobile and accessories, construction and allied, energy and petroleum, insurance, investment, manufacturing and allied, investment services, telecommunication, and growth enterprise market. NSE market capitalization was KS 2.248 trillion as of October 24, 2014.

## **1.2 Statement of the Problem**

Many people have widely studied option prices in both the academic and trading context. Many approaches have been taken in the studies ranging from sophisticated generalequilibrium models to ad hoc statistical fits. For the reason that options are specializedand relatively unimportant financial securities, the time devoted to the advancement anddevelopment of the pricing theory is questionable to some extent. Options prices help greatly in management of risk in the business world.However, one justification isthat giventhat the option is a typically simple type of contingent claim asset, option pricing theory may result in a more general theory of contingent-claims pricing. Suppose the prices of calls were too high, relative to the underlying stock, then



arbitrageurs could sell calls against a long position in the stock. By this means, the stock price would rise, and the preferences and expectations of option investors would be reflected in the price. Options increase the efficiency and liquidity of the stock market.

Mark Rubinstein (1979) depicts that options help to reduce the cost of diversification, affect corporate productive decision and lead to wider dissemination of useful information. Poorly informed individuals can benefit greatly by balancing their portfolio holding which leads to elimination of unnecessary transaction cost. For example, without options, it will be impossible to take a position that benefits through price increase in stock price but which is insured against the loss resulting from decline. This can be mitigated through purchase of put on a stock that would otherwise have been held by itself. Moreover, if some important news is about to be made public like the results of a merger negotiation, which can have impact on market price of stock, and the investor does not know whether the news will be favorable or unfavourable, buying a put and a call at the same time might be an appropriate strategy. Thus, a profit is realized if stock prices makes a strong move and does not matter in which direction and if price change is minor, only cost of options is lost.

This study therefore estimates option prices in the NSE using BS pricing model. Black-Scholes and pricing model is widely used in many economies. Investors may over-rely solely on this model without referring to other common ratio and financial indicators. Both retailers and institutional investors may wish to know whether the Black-Scholes model can provide an estimation for options with different length of maturity and degree

of riskiness (volatility) of respective underlying shares, and for in-the-money versus out-of-money options (Macbeth and Merville, 1979). Nyangaya (2001) in her study option pricing using black and scholes model in the NSE found that the black and Scholes option pricing model provided a fair price of options in the NSE. In Kenya, there has been for a long time problem on the particular price to use in the valuation of option. Kenyan traded options are relatively new and many retail investors are not really well equipped with knowledge of option stock. The outcome therefore makes retail investors to hardly make good profit or achieve their respective level of expected return. Many investors have avoided options, believing them to be sophisticated and, therefore, too difficult to understand because they are not sure which option either put or call to invest making them do a guess work on which price to peg their investments. This research therefore seeks to solve the many issues related to option value in the NSE. Few researches have been done in the area of options pricing and the ones that have been done are exploratory in nature. This seeks to fill this research gap and show how options can be priced in Kenya. This research will be important especially now that derivatives' trading is being introduced in Kenya and it will offer useful insights into options pricing.

Therefore, this study aims at estimating the price using Black and Scholes Option Pricing model. The complex nature of options raises important problem statement;

- What is the price of options in the NSE?
- What is the level of volatility of the stocks traded in the NSE?

### **1.3 Objectives of the study**

#### **1.3.1 The primary objective of the study**

- To estimate option prices in the Nairobi Securities Exchange.

### **1.4 Value of the study**

The study will play an integral role and create financial sense to numerous groups in the local financial markets sector. Key players in the financial market include the Capital Markets Authority (CMA) and Nairobi Securities Exchange (NSE). Other players in the financial sector include investment promotion agent, scholars, and the academicians. The NSE, will be the greatest beneficiary since stock market attracts more public attention than other financial markets, such as bond and commodity. The popularity could significantly impact the economy of the emerging markets. Secondly, CMA will find a tool of obtaining relevant parameters from both the stock and option market. The third groups, investment promotion centers, will be provided with fast hand information which the public may find incredibly useful when making critical investment decisions. A rigorous analysis of upside potential and downward potential often drives the value investing precepts-based option pricing strategy. Lastly, different scholars and academicians from the institutions of higher learning will have an opportunity to extend their role in advancement option pricing and development of platforms for option trading.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

In this study, this chapter explicates the literature review and it is organized as follows.

Section 2.2 introduces the research by outlining of option pricing models, section 2.2.1 reviews the Black and Scholes Option Pricing Model and Binomial Option Pricing model. Section 2.2.2 reviews the additions made in both models. In Section 2.2.3., it outlines the research of empirical tests of Black and Scholes and binomial option pricing model. Section 2.2.1 gives a summary of findings and conclusions.

#### **2.2 Option Pricing Models**

Option began to be price long time ago when the French mathematician Louis Bachelier deduced a closed option pricing formula for the pricing of standard calls and puts in his 1900 PhD thesis dissertation based on the assumption that stock prices follow a Brownian motion with zero drift. Bachelier (1900) works assume lognormal rather than normally distributed asset price. It also avoids discounting (to no significant effect since many markets, particularly the U.S., option premia were paid at expiration). He shows that for non-dividend-paying stocks, and for zero interest rates, the price of a European call can be shown using the formula as shown in equation (1) (see appendix). The Bachelier formula ignores any discounting and assumes that stock prices can be negative (Merton 1973, Smith, 1976). This formula makes lots of sense for spread option and any underlying that can be negative but certainly not for stock prices. However, (Sprenkle 1961) revealed how to adapt the approach of Bachelier to non-negative prices by

assuming lognormal returns. The study assumed that investors were risk averse and come up with a formula of the type. Since that time, numerous researchers have contributed to pricing of options. A major breakthrough was provided by the paper of Black & Scholes (1973) when they published their article on option pricing. The model set a new standard in history of finance.

Other identifiable models included Sprenkle (1961), Boness (1964) assumed a lognormal asset price. The formula derived was for the price of a call option identical to the Black–Scholes–Merton, 1973 formula. Rubinstein (2006), Samuelson (1965) and Thorp (1969) published somewhat similar option pricing formulas to Boness and Sprenkle. Equation (2) (see appendix).  $\rho$  is the average rate of growth of the stock price and  $A$  is the degree of risk aversion. This formula, although being very close to the one of Black Scholes did not receive much attention because of the numerous parameters to estimate. One needs in fact to be able to calculate the degree of risk aversion  $A$  as well as the average growth of return  $\rho$ . Sprenkle (1961) in his article did not give much information how to compute them. Although all these approach provided formulae very closed to the one of Black Scholes, it is only with the groundbreaking work of Black Scholes and Merton that the option price was explicitly connected to a hedging strategy. Black Scholes (1973) realized that the expected return of the option price should be the risk free rate and that by holding a certain amount of stock, now referred to as the delta, the option position could be dynamically completely hedged.

### **2.2.1 Black and Scholes Options Pricing Model**

The Black Scholes (1973) formula has the key benefits of giving an explicit hedging strategy for the replication of the call, which only depends on the volatility of the stock price and observable amounts like the risk free rate, the time to maturity of the option, its strike, the spot stock price. It also gives universal price: the option price only depends on the volatility of the stock price and the universal risk free rate. Black Scholes shows that regardless of the investor risk aversion, the price of the option should be the same for all investors as they know how to lock in the option value. The BS is an easy to use formula as the only not easy parameter to estimate is the volatility of the stock price. In fact, at that time, volatility was mainly estimated historically and led to the famous distinction between implied and historical volatility. It is worth that the Black Scholes formula looks very similar to its predecessor formula (see equation 3 in the appendix)

Under the (BS) model implied volatilities from options should be the same regardless of which option is used to compute the volatility. Like many breakthroughs, it took quite some time to the academic research society to acknowledge the revolutionary of the idea and it is only in 1997 that Black Scholes and Merton received the Nobel price for their main innovation. There are several assumptions involved in the derivation of the Black-Scholes equation. The stock price follows a random walk in continuous time with a variance rate proportional to the square of the stock price. Thus the distribution of possible stock price at the end of any finite interval is log-normal. The variance rate of the return on the stock is constant. The short-term interest rate is known and is constant through time. The option is “European”, that is, it can only be exercised at maturity. The

stock pays no dividend or other distributions. There are no transaction costs in buying or selling the stock or the option. It is possible to borrow any fraction of the price of a security to buy it or to hold it, at the short-term interest rate. There are no penalties to short selling. Black and Scholes (1972) found that the market appeared to underestimate the effect of differences in variance rate on the value of an option. They reported the difference between the price paid by option buyers and the value given by the formula is greater for options on low-risk (variance) stocks than for options on high-risk (variance) stocks. They further found that using past data to estimate the variance has caused the model to overprice options on high variance stocks and underprice options on low variance stocks

### **2.3. Determinants of Option Pricing Models**

Merton (1973) showed that the option value as given by the B-S equation increases continuously as any one of  $t^*$ ,  $r$  or  $v^2$  increases. In each case, it approaches a maximum value equal to the stock price. The B-S valuation model was derived under the assumption that the option can only be exercised at time  $t^*$  (i.e. a European option). However, Merton (1973) has since shown that the value of the option is always greater than the value it would have if it were exercised immediately. Thus a rational investor will not exercise a call option before maturity, and the value of an American option call is the same value as a European call option.

Merton (1973) has also shown that the value of an American option will be greater than the value of a European put option. This is true because it is sometimes advantageous to exercise a put option before maturity, if it is possible to do so. For instance, suppose the stock price declines almost to zero, and the probability that the price will exceed the exercise price before the option expires is negligible. Then it will pay to exercise the option immediately, so that the exercise price will be received sooner rather than later. The investor thus gains interest on the exercise price for the period up to the time he would otherwise have exercised. Roll, Geske and Whaley have also designed elaborate approximation procedures for estimating the value of American style calls, which have proven quite useful in practice.

## **2.4. Empirical Review**

Empirical studies of Black-Scholes (BS) options pricing model include Galai and Schneller (1978), Rubinstein (1985), Geske et al (1983), Macbeth and Merville (1980), Leonard and Solt (1990). Volatility bias in the Black-Scholes model has been noted on the various studies. Black and Scholes (1973) using S&P 500 option index data 1966-1969 suggest the variance that applies over the option produces a price between the model price and market price. Black and Scholes (1973) propose evidence, volatility is not stationary.

### **2.4.1 Tests of market efficiency in the Chicago Board of Options Exchange**

Galai (1977) confirm Black and Scholes (1973) that the assumption of historical instantaneous volatility need be relaxed. Galai (1977), efficiency is measured by



examining the prices of commodities for possibilities of earning abnormal profits and the option positions are adjusted on a daily basis. As in BS study, Galai(1977)created hedged portfolios of options and stocks and used these portfolios to study the correspondence between the BS model prices and actual market prices for options. In contrast to Black and Scholes study, Galai (1977)used listed option data from the Chicago Board of Options Exchange (CBOE) for each option traded between April 26, 1973 and November 30, 1973, so as to have access to daily price quotations. Therefore, he was able to compute the rate of return on the hedged option-stock portfolio for each option for each day. He also adjusted hedge ratio each day to maintain the neutral hedge – neutral in the sense that a change in the stock price would not change the overall value of the combined option-stock position.

Comparing market prices to BS model prices, Galai(1977) assumed that traders sold overpriced options and bought underpriced options each day. In other words, on day  $t$ , it is decided whether the option is over or under valued and the hedge ratio is calculated using two tests: ex ante and ex post.Galai(1977) results showed expost hedge strategy effectively located deviations from the model prices, generating substantial “book profits”. During the sample period the average hedge returns were stable across maturities. In other words, his initial results seemed to be inconsistent with an efficient market .However, this apparent result disappeared when Galai(1977) considered transaction costs. The results were quite robust with respect to various estimates of the risk-less interest rates and the variance of the rates of return. The latter was estimated in different ways from time series of past rates of return. Galai’s study emphasized that to

test market efficiency, an ex-ante test simulating the trading opportunities for the trade should be performed. The procedure used was similar to the one used in the ex-post test, except that in ex-ante test the execution of trading is delayed by one trading day. On day  $t$ , it is decided whether the option is over or under valued and the hedge ratio is calculated; the hedge is established on day  $t+1$  and liquidated on day  $t+2$ . The average hedge return for an ex-ante test was below that of the ex-post test. The returns were relatively low for the ex-ante test, but they were still positive on average. However, including transaction costs again might eliminate these positive returns. The results of the tests were: (1) The ex post hedge returns trading strategy earned significant above returns based on Black and Scholes model. (2) The ex ante hedge returns strategy depicted a positive result however positivity diminished when transaction costs were included. (3) The results are robust to changes in parameters. (4) Deviation from the model's specification led to a worse performance of the model and (5) The dividend adjustment improved assessment of deviation from equilibrium prices

#### **2.4.2 Valuing American call option using BS European formula**

Geske and Roll (1984) used the American option variant of the BS formula to explain biases related to exercise price, time to maturity and the variance. The study examined dividends yields for the S&P composite index and yields to maturity for short term governments from January 1976 to December 1978. To understand the effects of dividends and the probability of an early exercise on the three biases, they calculated implied volatilities across a range of exercise prices assuming both (i) no early exercise and (ii) certain early exercise. For no early exercise case, implied volatilities were

inversely related to the strike price and for the early exercise case; implied volatilities were directly related to the exercise price.

Geske and Roll(1984) disregarded the assumption that BS model correctly prices the at-the-money options and to compare the BS prices with the market prices replicated the Macbeth and Merville procedure using computed American call prices as market prices.

In this procedure, implied volatility values are estimated using linear regression. They concluded that American method to price options can be explained by the early exercise phenomenon. The European model exhibits an underpricing of near-maturity American call options. Moreover, in case of suspendable dividend payments, BS model and the American model systematically undervalue options on low variance stocks and overvalue options on high variance stocks

#### **2.4.3 Empirical examination of the BS call option pricing model**

Macbeth and Merville (1979) studied a sample of daily closing prices for six stocks from 31 December, 1975 to 31 December 1976; they observed this statistics to be an increasing function of the extent to which the option is in- or out-of-the-money. Their approach to testing BS model's validity is based on direct comparison of model prices to actual prices. According to this approach, they estimated the implied standard deviation by substituting the observed market prices into BS equation and numerically solving it for its only unobservable quantity, the variance. The average implied standard deviations for at-the-money options (assuming that at-the money options are efficiently priced) are placed

in the model to generate the expected option prices. Then the model prices are compared to the actual realized option prices.

The test is intended to show whether model prices are unbiased estimates of actual prices or whether there are consistent deviations that can be exploited for better prediction or for making above-normal profits. Macbeth and Merville(1980)analyses the difference between the actual and BS model call prices by computing the percentage to which the option is overvalued /under-valued relative to the market Empirical evidence of the relationship between the level of stock prices and the rate of volatility is contradictory. MacBeth and Merville (1980) found that the volatility of the underlying stock decreases as the stock price rises. Their empirical results are also consistent with the results of Geske (1979).

#### **2.4.4 The constant elasticity of variance model and its implication for option pricing**

Stan Beckers (1980) compare the Black-Scholes model against the constant elasticity of variance (CEV) model, which assumes volatility changes when the stock prices changes. Beckers (1980) tested the Black-Scholes assumption that the historical instantaneous volatility of the underlying stock is a function of the stock price, using S&P 500 index and sampled forty seven stocks each with 1253 daily returns observation covering period between September 18,1972 to September 7, 1977 and the used regression analysis to summarize the results. Chow test was used to verify the hypothesis that one characteristic exponent holds for all stocks in sample.

Beckers (1980) finds the underlying stock is an inverse function of the stockPrice. Literature proposes the Black-Scholes model may underprice options because the tail properties of the underlying lognormal distribution are too small. The empirical study performed depicts that the constant elasticity of variance could be a better descriptor of actual stock price behavior than the traditionally used lognormal model. The stocks analyzed by Beckers (1980) exhibited a significant negative relationship between the level of stock price and its volatility.

#### **2.4.5 Implied binomial trees**

Rubinstein (1994) points out that if all options on the same underlying security with the same time-to-expiration but with different strike prices should have the same implied volatility. He carried out an empirical test on the S&P500 index options from 1986 to 1992 using Black-Scholes formula and the results were statistically measured in minimax percentage errors for S&P 500 index calls with time-to-expiration of 125 to 215 days. Since most of the options listed are mostly American and not European, Rubinstein study used American options to infer risk neutral probabilities. Standard binomial tree was fitted to its current bid (ask) price for every American option. Calculations from current bid (ask) price led to values of implied risk neutral probabilities. The results showed Black Scholes miss pricing is increased each year, the error was significant; furthermore, low strike price option has significantly higher implied volatilities than high striking price options. Based on his empirical test results, Rubinstein (1994) argued that the Black-Scholes model is true, but the market was inefficient.

#### **2.4.6 Binomial Option Pricing Model**

Binomial option pricing model that is a discrete time model which contains the continuous time (B-S) model as a special limiting case was developed by Cox, Ross and Rubinstein (1979). The binomial option pricing model is based upon a simple formulation for the asset price process in which the asset, in any time period, can move to one of two possible prices. A tree of stock prices is initially produced. At each step it is assumed that the stock price will move up or down by an amount calculated using volatility and time to expiration. This produces a binomial distribution, or recombining tree, of underlying stock prices. The tree represents all the possible paths that the stock price could take during the life of the option. At the end of the tree .ie at expiration of the option all the terminal option prices for each of the possible stock prices are known as they simply equal their intrinsic values.

Next the option prices at each step of the tree are calculated working back from expiration to the present. The option prices at each step are used to derive the option prices at the next step of the tree using risk neutral valuation based on the probabilities of the stock prices moving up or down, the risk free rate and the time interval of each step. Any adjustments to stock prices (at an ex-dividend date) or option prices (as a result of early exercise of American options) are worked into the calculations at the required point in time. At the top of the tree you are left with one option price. Despite its simplicity, the model can be applied to European and American style options. The model makes the assumption that the underlying asset, hereafter referred to as a stock, takes on one of only two possible values each period. While this may seem unrealistic, the assumption leads to

a formula that can accurately price options. This “binomial” option pricing technique is often applied by Wall Street practitioners to numerically compute the prices of complex options. The formula for calculating put and call option can be shown using equation 4 and 5 (see appendix)

## **2.5. Summary of the literature review**

From the literature review, we can conclude that most of the models of option pricing are based on the initial model of Black and Scholes, and almost all the models start there and go on and relax some of the unrealistic assumptions made by the BS model of option pricing. In general, we propose that Black & Scholes assumed that the financial market is a system that is in equilibrium. Analytically, the Black-Scholes model is a continuous-time model, and the binomial model can be viewed as its discrete-time version. Being a continuous-time case, the Black-Scholes model relies on continuous risk-free hedging by revising the required hedge ratio instantaneously. The binomial model, in contrast, allows changes in the hedge ratio from one period to the next, thus follow the analytical process involved. This research uses the Binomial option pricing model and the BS model to establish option prices.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter commences with a general idea of the research design, and then provides details of the methods for the quantitative study in terms of the target population, sampling design, data collection procedure, and statistical techniques for data analysis. The last section underscores the validity and reliability of the data used in the research.

#### **3.2 Research Design**

This study attempts to investigate the prospects of introducing experimental estimation of option pricing in an effort to advance the performance of securities markets in Kenya. Experimental estimation is more sensitive than other methods in acceptability judgment and does not limit the number of values that can be used. Furthermore, the experimental estimation does not require scaling according to an absolute accuracy criterion. A quantitative research design is used in the study due to its suitability. Also, the study investigates the prospects, problems, opportunities, and challenges that listed companies encounter. Quantitative data were basically collected to study the models. Additionally, the performance measurement variables are trading pattern classifications and embrace the trading indicator, whether financial, real or commodity and are all defined within their context of company stocks. The study uses monthly closing stocks of firms quoted in the Nairobi stock exchange between 2011 to 2014.



### **3.3 Population**

The population in this study consists of companies listed on Nairobi Securities Exchange (NSE) 20 share index and formally registered with the CMA. NSE 20 share index comprises of companies that are actively trading therefore the data will reflect the performance of active stocks from 31<sup>st</sup> January, 2011 to 31<sup>st</sup> December, 2014 (See appendix 1). The equity prices on the listed companies will give enough information in the performance of stock and therefore determine all the variables used in the option pricing models. Equity prices are also easy to use in the calculation of option prices because they can depict the rise and fall of shares in the period traded where the information will be used in computing the level of volatility, the exercise prices, the expected returns and option prices.

### **3.4 Sample**

The study not only proposes but also theoretically adopts the NSE 20 share index. This sample comprises of companies which are actively trading in the NSE. Apparently, the population is made up of members of stock exchange, licensed by the Capital Markets Authority that formed the sampling frame. Data is apparently sampled from the monthly reports of the NSE and CMA stock data of 2011 to 2014 for listed companies that constantly traded for a 12-month period.

### **3.5 Data Collection**

The study fundamentally relies on the data collected mainly from secondary sources, especially the NSE and CMA. The data used comprises of monthly closing stocks of

companies that are listed in the NSE 20 share index from 2011 to 2014. On the other hand, quantitative data is basically categorized, properly documented and the findings presented in graphical and tabular presentations, including analytical interpretation narratives. The data required carrying out the Black and Scholes includes the following;

i. Exercise prices

Exercise prices were computed and used for the period under study.  $\ln S_T \sim \Phi \left[ \ln S + \left( \mu - \frac{\sigma^2}{2} \right) T, \sigma \sqrt{T} \right]$  see appendix 6 where  $S$  is the current stock price,  $\mu$  is the expected return per annum and  $\sigma$  is the volatility per annum of the stock price.  $\Phi(m, s)$  denotes a normal distribution with mean  $m$  and standard deviation  $s$ .

ii. Stock volatility.

Stock volatility is determined by a record of stock price movements and computed and estimated from historical data of stock prices from the period between 2011 to 2014.

$n + 1$ : number of observations,  $S_t$ : stock price at end of  $i$ th interval and  $\tau$ : length of time intervals in years in which  $u_i = \ln \left( \frac{S_i}{S_{i-1}} \right)$ .  $s = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (u_i - \bar{u})^2}$   $\bar{u}$  is the mean of the  $u_i$  the standard deviation of  $u_i$  is  $\sigma \sqrt{\tau}$  therefore volatility  $\sigma$  can be estimated as  $s^* = \frac{s}{\sqrt{\tau}}$  see appendix 5.

iii. Riskless rate of return

Riskless rate of return depicts interest rate on government securities, treasury bills. Treasury bill rates for the years 2011-2014 were collected from the central bank of Kenya.

iv. Cumulative probability functions(Nd)

Cumulative probability functions demonstrated using the values of cumulative probability function were determined from the standard probability distribution tables.

Lastly

v. Time to expiration

Due to efficiency and consistency, the time to expiration for options was assumed to be 6months(January-June and July-December).

vi. Expected Returns

The expected returns were calculated by subtracting the old price from the new price and getting the percentage change.

### **3.6. Data Analysis**

The option calculation of option prices will be split in the following manner: Price testing data analysis from 2013 to 2014 and (2) determine the option prices from the data 2010 to 2012 to build option pricing models. The range of option values was obtained through use of black and scholes model. For the Black and Scholes it will be as shown (see equation 3 in the appendix.



## **CHAPTER FOUR**

### **RESEARCH FINDINGS AND INTERPRETATION**

#### **4.1 Introduction**

This chapter gives an analysis of expected returns of companies listed in the NSE 20 share index, the volatilities, the exercise price ranges and the summary of stocks that are in the money and out of the money call or put option. Calculations of possible payoffs is given to show the choices an investor has to make in order to make money when the market is bullish or bearish.

#### **4.2. Expected Returns**

Table 4.1 shows that all companies registered negative returns with exception of Sasini. Barclays Bank Kenya Ltd posted the lowest return of -73% in 2011, followed by Kenya Airways at -55% and CFC Holdings at -50%. The gradual drop of stock prices in 2011 was caused by political factors during election periods where Kenya was electing a new President. The inflation was high and the interest rates were high resulting to decline of stocks. Improvement in stock returns was registered in 2012 where B.A.T Kenya, Scangroup and E.A.B.L posted 90%, 73% and 60% respectively. During this period, elections were over and the economy was taking shape with new leaders taking position in a devolved government. Most resources were devolved and structures put in place to start devolution. Stanchart and Kenya Airways registered a negative performance of -92% and -42% respectively in 2012 due to the fall in currency. In 2013, Centum and Britam performed best returns at 149% and 140% respectively. The economy was stabilizing

where new employment opportunities were created due to devolution of government activities. Sasini, Kenol Kobil and Kplc registered negative performances due to bad climatic conditions which affected the generation of electricity and poor harvest which resulted to oil prices fluctuating. In 2014, most companies registered average returns. This was due to terror threats and international sanctions which saw the tourist population decline therefore affecting the economy greatly.

**Table 4.1. Summary of Expected returns**

	2011	2012	2013	2014
<b>Sasini</b>	3%	-5%	-27%	-32%
<b>Barclays bank ltd</b>	-73%	28%	9%	-1%
<b>Equity Bank ltd</b>	-42%	34%	17%	61%
<b>Kenya Commercial Bank</b>	-27%	57%	45%	32%
<b>Stanchart</b>	-41%	-92%	16%	14%
<b>Co-operative Bank</b>	-40%	-3%	37%	15%
<b>Kenya Airways ltd</b>	-55%	-42%	24%	-27%
<b>Nation Media Group</b>	-18%	57%	21%	-17%
<b>Scangroup</b>	-34%	73%	-27%	-11%
<b>Centum</b>	-44%	-13%	149%	72%
<b>Athi River</b>	-16%	50%	73%	0%
<b>Bamburi</b>	-38%	37%	2%	-32%
<b>Kengen</b>	-49%	10%	14%	-15%
<b>Kenol Kobil Ltd</b>	-1%	51%	-26%	-6%
<b>KPLC</b>	-27%	10%	-20%	-2%
<b>B.A.T Kenya Ltd</b>	-11%	90%	16%	59%
<b>E.A.B.L</b>	-7%	60%	-4%	19%
<b>CFC Stanbic Holdings Ltd</b>	-50%	5%	104%	44%
<b>Safaricom Kenya Ltd</b>	-34%	58%	99%	28%
<b>Britam</b>	Unlisted	29%	140%	65%

### 4.3. Stock Volatilities

Table 4.2 shows that the highest volatility in stock prices was registered by Centum in 2011 at 194% then followed by Kenya commercial Bank in 2012 at 156% and then Barclays Bank of Kenya Ltd in 2011 at 140%. The statistical values of mean and median were highest in 2011, 2013, 2012 and 2014. The lowest volatilities were registered by StanChart Bank Ltd in 2014 at 6%, B.A.T Kenya Ltd in 2013 at 7% and Equity Bank Ltd in 2012 at 11%.

**Table 4.2. Summary of stock volatilities**

	2011	2012	2013	2014
<b>Sasini</b>	44%	82%	64%	23%
<b>Barclays bank Ltd</b>	140%	24%	24%	12%
<b>Equity Bank Ltd</b>	30%	11%	82%	25%
<b>Kenya Commercial Bank</b>	37%	156%	26%	13%
<b>StanChart</b>	18%	18%	19%	6%
<b>Co-operative Bank</b>	25%	24%	22%	28%
<b>Kenya Airways Ltd</b>	37%	31%	32%	17%
<b>Nation Media Group</b>	17%	20%	41%	14%
<b>Scangroup</b>	36%	23%	25%	39%
<b>Centum</b>	194%	28%	32%	29%
<b>Athi River</b>	24%	17%	28%	18%
<b>Bamburi</b>	20%	18%	13%	24%
<b>Kengen</b>	37%	25%	28%	34%
<b>Kenol Kobil Ltd</b>	30%	34%	40%	21%
<b>KPLC</b>	19%	23%	21%	35%
<b>B.A.T Kenya Ltd</b>	18%	30%	7%	32%
<b>E.A.B.L</b>	22%	14%	37%	13%
<b>CFC Stanbic Holdings Ltd</b>	76%	29%	110%	29%
<b>Safaricom Kenya Ltd</b>	33%	19%	25%	17%
<b>Britam</b>	Unlisted	21%	44%	54%
<b>Mean</b>	0.52761323	0.394128	0.457496	0.335153
<b>Median</b>	30%	24%	28%	23%
<b>Mode</b>				

#### **4.4. Exercise Price Ranges**

Table 4.3.1 to 4.3.8 shows a summary of exercise price ranges for European call option which were calculated semiannually from 2011 to 2014 for the NSE 20 share index using BS model. The summary indicates a linear relationship between the volatility and exercise price ranges. The higher the volatility the higher the exercise price ranges. For instance, Centum with highest volatility of 194% posted high exercise price range of between 7 to 762 from January to June 2011. Barclays bank with high volatility of 140% registered high exercise price range of between 10 to 517 from January to June 2011. Stan chart, B.A.T and Equity had lowest volatilities of 6%, 7% and 11% respectively and their exercise price ranges were low at 172 to 288, 204 to 301 and 16 to 37 respectively in January to June 2011.

The summary of exercise price ranges also indicate that from January to June 2011, most of the values depicted a bearish market where the option was out of the money with Centum and Barclays posting 74 to 762 and 19 to 517 respectively suggesting an investor to hedge risk by buying a put option. In 2011 July to December, the exercise price ranges were bearish where the highest performers were Centum and Barclays at 3 to 699 and 3 to 141 respectively depicting put option the choice of investors. However in 2012, the pattern changed to both in the money call option and out of the money put option where both bullish and bearish markets existed. Scangroup and CFC stanbic Holdings registered high in the money call option of 42 to 80 and 28 to 64 respectively. Kenya Commercial Bank posted 44 to 416 in the out of the money put option. In July to December 2012, the pattern changed slightly to most values depicting a bullish market where in the money



call option was the preferred choice of investment with only four companies in out of the money put option. Almost all companies shared both the In the money call option and out of the money put option in January to June 2013 up to July to December 2014.

**Table 4.3. Exercise Price Ranges**

	2011 Jan-June			
	<i>Exercise prices</i>		<i>in the money call out of the money</i>	
<b>Sasini</b>	7 to	26	Nil	13 to 26
<b>Barclays</b>	10 to	517	Nil	19 to 517
<b>Equity</b>	16 to	37	Nil	27 to 37
<b>K.C.B</b>	12 to	35	Nil	31 to 35
<b>Stanchart</b>	172 to	288	Nil	235 to 288
<b>Co-operative</b>	12 to	24	Nil	17 to 24
<b>K.Q</b>	21 to	61	Nil	40 to 61
<b>N.M.G</b>	124 to	199	Nil	171 to 199
<b>Scangroup</b>	33 to	90	Nil	55 to 90
<b>Centum</b>	3 to	762	Nil	74 to 762
<b>Athi River</b>	125 to	249	Nil	191 to 249
<b>Bamburi</b>	127 to	223	Nil	181 to 223
<b>Kengen</b>	8 to	23	Nil	14 to 23
<b>Kenol Kobil</b>	7 to	16	Nil	27 to 16
<b>KPLC</b>	16 to	28	Nil	22 to 28
<b>B.A.T Kenya</b>	204 to	341	Nil	270 to 341
<b>E.A.B.L</b>	132 to	247	Nil	193 to 247
<b>CFC</b>	25 to	211	Nil	55 to 211
<b>Safaricom</b>	2 to	6	Nil	4 to 6
<b>Britam</b>	Not listed			

The exercise price ranges are out of the money and nil in the money. The stocks performance was declining resulting to out of the money options where an investor would invest in a put option. Centum and Barclays posted a wide range of 3 to 762 and 10 to 517 respectively. Safaricom depicted the lowest of 2 to 6.

**Table4.4 Exercise Price Ranges**

	2011 July-Dec.			
	<i>Exercise Ranges</i>		<i>in the money call</i>	<i>out of the money put</i>
<b>Sasini</b>	6 to	22	Nil	35 to 22
<b>Barclays</b>	3 to	141	Nil	23 to 141
<b>Equity</b>	14 to	33	Nil	17 to 33
<b>K.C.B</b>	13 to	36	Nil	17 to 36
<b>Stanchart</b>	148 to	249	Nil	161 to 249
<b>Co-operative</b>	10 to	19	Nil	13 to 19
<b>K.Q</b>	18 to	50	Nil	21 to 50
<b>N.M.G</b>	121 to	194	Nil	141 to 194
<b>Scangroup</b>	28 to	76	Nil	43 to 76
<b>Centum</b>	3 to	699	Nil	33 to 699
<b>Athi River</b>	121 to	240	Nil	161 to 240
<b>Bamburi</b>	113 to	198	Nil	126 to 198
<b>Kengen</b>	7 to	18	Nil	9 to 18
<b>Kenol Kobil</b>	8 to	18	Nil	11 to 18
<b>KPLC</b>	14 to	25	Nil	18 to 25
<b>B.A.T</b>	195 to	326	Nil	250 to 326
<b>E.A.B.L</b>	130 to	244	Nil	178 to 244
<b>CFC</b>	16 to	132	Nil	48 to 132
<b>Safaricom</b>	2 to	4	Nil	4 to 4
<b>Britam</b>	Unlisted			

The exercise price ranges were still in the out of the money with Centum and B.A.T Kenya posting highest of 3 to 699 and 195 to 326 respectively. Safaricom registered the lowest of 2 to 4.

**Table 4.5: Exercise Price Ranges**

	2012 Jan -June		<i>In the money</i>		<i>in the money</i>	
	<i>Exercise ranges</i>		<i>call option</i>		<i>put option</i>	
<b>Sasini</b>	4 to	45	Nil		19 to	45
<b>Barclays</b>	10 to	20	Nil		16 to	20
<b>Equity</b>	18 to	25	18 to	25	Nil	
<b>K.C.B</b>	5 to	416			44 to	416
<b>Stanchart</b>	78 to	129	78 to	129	Nil	
<b>Co-operative</b>	9 to	18	Nil		9 to	18
<b>K.Q</b>	11 to	25	Nil		11 to	25
<b>N.M.G</b>	144 to	250	Nil		144 to	250
<b>Scangroup</b>	42 to	80	42 to	80		
<b>Centum</b>	9 to	20	Nil		9 to	20
<b>Athi River</b>	154 to	247	Nil		154 to	247
<b>Bamburi</b>	127 to	211	Nil		200 to	211
<b>Kengen</b>	6 to	12	6 to	12	Nil	
<b>Kenol Kobil</b>	7 to	19	Nil		7 to	19
<b>KPLC</b>	12 to	23	12 to	23	Nil	
<b>B.A.T Kenya</b>	272 to	637	Nil		272 to	637
<b>E.A.B.L</b>	185 to	273	185 to	273	Nil	
<b>CFC</b>	28 to	64	28 to	64	Nil	
<b>Safaricom</b>	3 to	6			3 to	6
<b>Britam</b>	4 to	7			4 to	7

Exercise price ranges were partly in the money and partly out of the money. Both bullish and bearish markets were anticipated with Kenya Commercial Bank registering the highest price ranges and Safaricom and Britam the lowest.

**Table 4.6: Exercise Price Ranges**

	2012 July-dec		<i>in the money</i>		<i>out of mone</i>	
	<i>Exercise ranges</i>		<i>call option</i>		<i>put option</i>	
<b>Sasini</b>	4 to	44	Nil		19 to	44
<b>Barclays</b>	11 to	21	4 to	12	Nil	
<b>Equity</b>	22 to	30	11 to	28	Nil	
<b>K.C.B</b>	6 to	504	22 to	38	Nil	
<b>Stanchart</b>	99 to	165	99 to	178	Nil	
<b>Co-operative</b>	8 to	16	8 to	11	Nil	
<b>K.Q</b>	7 to	17	7 to	12	Nil	
<b>N.M.G</b>	180 to	312	180 to	292	Nil	
<b>Scangroup</b>	58 to	110	58 to	94	Nil	
<b>Centum</b>	8 to	18	Nil		14 to	18
<b>Athi River</b>	204 to	327	204 to	310	Nil	
<b>Bamburi</b>	155 to	258	155 to	156	Nil	
<b>Kengen</b>	6 to	13	6 to	11	Nil	
<b>Kenol Kobil</b>	12 to	31	Nil		15 to	31
<b>KPLC</b>	12 to	22	12 to	15	Nil	
<b>B.A.T Kenya</b>	389 to	911	389 to	842	Nil	
<b>E.A.B.L</b>	253 to	373	253 to	328	Nil	
<b>CFC</b>	30 to	69	Nil		46 to	69
<b>Safaricom</b>	4 to	6	4 to	5	Nil	
<b>Britam</b>	5 to	9	5 to	7	Nil	

Most stocks registered a bullish market where the exercise price ranges registered in the money call option. Stocks from the majority of the companies had an upward movement with B.A.T Kenya registering the highest price range and safaricom and Britam lowest. Only four companies; Sasini, Centum, Kenol Kobil and Cfc had their stock in the out of money. The upward movements of the stocks was due to stability in the economy where the inflation and interest rates had gone down. The political environment was conducive for most businesses because Kenya had just concluded its election and a president was

elected. The devolution government the first one in Kenya was taking shape gradually. The investor would invest in a call option to reap profits.

**Table 4.7: Exercise Price Ranges**

**2013 Jan-June**

	2013 Jan-June		<i>in the money</i>		<i>out of the money</i>	
	<i>Exercise ranges</i>		<i>call option</i>		<i>put option</i>	
<b>Sasini</b>	8 to	48	Nil		15 to	48
<b>Barclays</b>	12 to	24	Nil		24 to	24
<b>Equity</b>	11 to	108	11 to	26	Nil	
<b>K.C.B</b>	30 to	61	30 to	60	Nil	
<b>Stanchart</b>	220 to	373	220 to	258	Nil	
<b>Co-operative</b>	12 to	22	Nil		12 to	22
<b>K.Q</b>	8 to	19	Nil		11 to	19
<b>N.M.G</b>	167 to	540	167 to	250	Nil	
<b>Scangroup</b>	41 to	84	Nil		63 to	84
<b>Centum</b>	18 to	45	18 to	26	Nil	
<b>Athi River</b>	51 to	114	51 to	102	Nil	
<b>Bamburi</b>	174 to	250	174 to	213	Nil	
<b>Kengen</b>	9 to	19	9 to	10	Nil	
<b>Kenol Kobil</b>	7 to	22	Nil		9 to	22
<b>KPLC</b>	12 to	22	Nil		15 to	22
<b>B.A.T Kenya</b>	512 to	617	512 to	527	Nil	
<b>E.A.B.L</b>	181 to	516	181 to	318	Nil	
<b>CFC</b>	21 to	458	21 to	30	Nil	
<b>Safaricom</b>	6 to	13	6 to	9	Nil	
<b>Britam</b>	7 to	25	7 to	15	Nil	

Most companies were in the money call option meaning most stocks had an upward trend. Only seven companies recorded slow performance and registered out of the money option. East African Breweries Limited and Nation Media Group were the highest with 181 to 516 and 167 to 540 respectively. Safaricom and Britam registered a low of 6 to 13 and 7 to 25 respectively. Government policies like taxes and competition made Britam and Safaricom post dismal performance.

**Table 4.8: Exercise Price Ranges**

	2013 July-Dec					
	<i>Exercise ranges</i>		<i>In the money call option</i>		<i>Out of the money put option</i>	
<b>Sasini</b>	5 to	33	21 to	33	Nil	
<b>Barclays</b>	13 to	26	Nil		13 to	20
<b>Equity</b>	13 to	135	Nil		13 to	45
<b>K.C.B</b>	37 to	77	39 to	77	Nil	
<b>Stanchart</b>	241 to	409	300 to	409	Nil	
<b>Co-operative</b>	14 to	26	15 to	26	Nil	
<b>K.Q</b>	7 to	18	7 to	18	Nil	
<b>N.M.G</b>	195 to	627	397 to	627	Nil	
<b>Scangroup</b>	38 to	76	Nil		38 to	49
<b>Centum</b>	30 to	74	44 to	74	Nil	
<b>Athi River</b>	63 to	141	126 to	141	Nil	
<b>Bamburi</b>	182 to	262	Nil		182 to	213
<b>Kengen</b>	11 to	25	Nil		11 to	14
<b>Kenol Kobil</b>	5 to	14	9 to	14	Nil	
<b>KPLC</b>	10 to	18	Nil		10 to	15
<b>B.A.T Kenya</b>	535 to	645	Nil		535 to	545
<b>E.A.B.L</b>	201 to	571	Nil		201 to	305
<b>CFC</b>	30 to	669	52 to	669	Nil	
<b>Safaricom</b>	8 to	16	11 to	16	Nil	
<b>Britam</b>	9 to	31	20 to	31	Nil	

Barclays,Equity,Scangroup,Bamburi,Kengen,Kenya Power and Lighting Company,Kengen,B.A.T Kenya and East African Breweries Limited registered a slow growth in their stocks.Kengen and KPLC was affected due to bad climatic conditions where hydro electricity was affected due to lack of rain.Barclays and Equity was affected by high interest rates due to the rise in terrorism which caused the shilling to depreciate and inflation rise.Scangroup and B.A.T Kenya was affected likewise by the unfavourable market conditions.However,most companies had significant performance in their stocks with CFC and Nation Media Group registering 30 to 669 and 195 to 627.

**Table 4.9: Exercise Price Ranges**

	2014 Jan-June					
	<i>Exercise ranges</i>		<i>in the money call option</i>		<i>out of the money put option</i>	
<b>Sasini</b>	12 to	22	Nil		16 to	22
<b>Barclays</b>	14 to	20	Nil		17 to	20
<b>Equity</b>	30 to	61	30 to	55	Nil	
<b>K.C.B</b>	42 to	61	42 to	59	Nil	
<b>Stanchart</b>	288 to	346	288 to	297	Nil	
<b>Co-operative</b>	13 to	28	Nil		18 to	28
<b>K.Q</b>	8 to	13	Nil		11 to	13
<b>N.M.G</b>	241 to	353	Nil		241 to	353
<b>Scangroup</b>	29 to	87	Nil		50 to	87
<b>Centum</b>	34 to	79	34 to	70	Nil	
<b>Athi River</b>	67 to	112	Nil		82 to	112
<b>Bamburi</b>	126 to	248	Nil		248 to	248
<b>Kengen</b>	7 to	19	Nil		12 to	19
<b>Kenol Kobil</b>	7 to	12	Nil		7 to	12
<b>KPLC</b>	9 to	25	Nil		15 to	25
<b>B.A.T Kenya</b>	499 to	1242	499 to	550	Nil	
<b>E.A.B.L</b>	238 to	343	238 to	252	Nil	
<b>CFC</b>	73 to	165	73 to	175	Nil	
<b>Safaricom</b>	10 to	16	10 to	11	Nil	
<b>Britam</b>	12 to	58	12 to	22	Nil	

The first six months of 2014 registered nine companies in the money call option and eleven in the out of money put option. Most banks except Barclays and Co-operative had their stocks growing positively. B.A.T Kenya had the highest in the money call option and Nation media Group with highest out of the money put option with 499 to 1242 and 241 to 353 respectively. Kenya Airways registered an all time low of 8 to 13. This low performance was due to its anticipated huge loss due to hedging of fuel prices in which the fuel prices had gone down globally. The increase of terrorism also contributed to the fall of its growth.

**Table 4.10: Exercise Price Ranges**

	<b>2014 July-Dec</b>					
	<i>Exercise ranges</i>		<i>in the money</i>		<i>out of the mon</i>	
			<i>call option</i>		<i>put option</i>	
<b>Sasini</b>	10 to	19	Nil		13 to	19
<b>Barclays</b>	14 to	20	14 to	18	Nil	
<b>Equity</b>	44 to	91	44 to	48	Nil	
<b>K.C.B</b>	50 to	72	50 to	70	Nil	
<b>Stanchart</b>	303 to	363	303 to	377	Nil	
<b>Co-operative</b>	14 to	32	14 to	23	Nil	
<b>K.Q</b>	7 to	12	Nil		9 to	12
<b>N.M.G</b>	237 to	347	Nil		264 to	347
<b>Scangroup</b>	26 to	78	Nil		53 to	78
<b>Centum</b>	40 to	92	Nil		75 to	78
<b>Athi River</b>	62 to	105	62 to	82	Nil	
<b>Bamburi</b>	25 to	50	25 to	72	Nil	
<b>Kengen</b>	6 to	17	Nil		12 to	17
<b>Kenol Kobil</b>	6 to	12	Nil		10 to	12
<b>KPLC</b>	8 to	22	8 to	15	Nil	
<b>B.A.T Kenya</b>	568 to	1414	568 to	1414	Nil	
<b>E.A.B.L</b>	260 to	375	260 to	276	Nil	
<b>CFC</b>	109 to	247	Nil		133 to	247
<b>Safaricom</b>	11 to	18	11 to	18	Nil	
<b>Britam</b>	14 to	64	14 to	67	Nil	

Twelve out of twenty companies posted positive results towards the end of 2014. All the banks had positive results with the options in the money. The results were due to favorable working conditions where devolution was working with most counties embracing new infrastructure. B.A.T Kenya registered the highest in the money call option with exercise price ranges of 568 to 1414. The Kenya Airways was lowest with exercise price range of between 7 to 12.



#### 4.5. Possible pay-offs

An investor would manage risks through observation of stock prices and their volatilities to determine which options to buy. A bullish market indicated that the stocks were positive and the returns from companies were positive. Purchase of a call option would be prudent to the investor as it is in the money. If the market was bearish, it meant the stock returns were negative and the option was out of the money. The investor would buy put option to protect against the negative returns of stocks without limiting profits.

The study assumed no dividends and nil transaction costs. Possible payoffs were as stipulated below for the period between 2011 to 2014.

In 2011, the company with highest volatility was Centum in 2011. An investor would have hedged as follows: the share price of Centum at the beginning of July to December 2011 was sh. 75. Assuming a bearish market, an investor may have invested in put option which allow purchase of shares at sh.sh.30. the actual share price at end of December 2011 was sh.13.5. The investor's profit is as follows:

Exercise put option by buying Centum shares at sh.30 (say 100 shares at sh.30=sh.3000)

The true value of option would be sh.3000 less cost of buying the option (sh.1.095 the price of put option per share thus sh.10.95) which results to sh.2989.05.

Had the investor not protected the risk and he wanted to sell shares in December 2011, the market value would have been sh.1,350(100 shares at sh.13.5). The investors therefore gets a profit of sh.1,639.05(sh.2,989.05-1,350=sh1,639.05) using options.

In 2013 July to December, the company with highest volatility was CFC stanbic holdings. Using options, the investor would have hedged as follows:

The share price at beginning of July 2013 was sh.68.5. Assuming a bullish market, an investor may have invested in a call option at sh.68.5 per share at end of period. The actual share price at end of December 2013 was sh.87.

Thus exercise call by buying CFC at Sh.40 (for instance, 100 shares at sh.68.5=sh.6, 850)

Value of option would be sh.6.850 less cost of buying option (call price=sh.0.18 per share;  $0.18 \times 100 = \text{sh.}180$ ). Thus,  $6,850 - 180 = \text{sh.}6, 670$ .

The investor sells shares at sh.87 thus gaining Sh.2, 030 ( $87 \times 100 - 6,670 = \text{sh.}2.030$ ).

## **CHAPTER FIVE**

### **RESEARCH CONCLUSION**

#### **5.1 Introduction**

This chapter commences with various conclusions made from the analysis of NSE 20 share index stocks using Black and Scholes model. Limitations of the study is shown and finally the suggestions for further research.

#### **5.2 Conclusion**

The study depicted that the expected returns of the NSE 20 share index stocks declined from 2011 to 2012. This decline was caused by political factors considering elections was still going on in most parts of the country. Embracing devolution for the first time also affected the returns of most companies. In 2013 to 2014, most stocks slightly stabilized which was a sign of finished elections and devolution had begun to work. However challenges of terrorism which saw the Kenyan shilling depreciate and inflation rise affected returns of most companies during this period.

Despite the many challenges in the market environment, the study found that the stocks in the NSE 20 share index could indeed be used by investors to hedge risk and make money. Most stocks posted significant volatilities and exercise ranges which would give investors an advantage to hedge against such movements. The exercise ranges computed were in tandem with share prices and therefore proved reasonable to use the data in managing risk.

Black and Scholes model proved to work in the Kenyan market where stocks from NSE 20 share index were used in depicting European option prices. The calculations proved to be simple and accurate in observing price movements and hedging against the risks associated with the study is an eye opener to investors wishing to make money in the stock market without necessarily worrying of stock movements. Investors would take advantage and reap profits when the stocks were high and at the same time when the stocks were low.

### **5.3 Limitation of the study**

Dividends issued by the companies were not included in the computation of option values. Dividends were major components in depicting share prices therefore its effect would make option prices adjusted. The project assumed nil dividends in the entire period.

Central Bank of Kenya annual rate was used as risk free rate from 2011 to 2014 in which use of semiannual risk free rate would make option value adjusted.

Time constraints taken to undertake the project proved impossible to compute volatilities of daily stocks.

### **5.4 Suggestions for further research**

Managing risks through computation of stock movements to determine volatilities which enable option prices determined is still new in Kenya. Most investors buy shares in anticipation that they will rise in prices and therefore get money only when the prices are high. When they fall, most investors get losses. The study therefore gives a paradigm

shift to investors to manage risks without worrying with stock movements.

Further research includes but not limited to the following areas:

Predicting option prices using the Binomial option pricing model. The binomial option pricing model values American option in which the option can be exercised anytime. This research determined European option prices, Inclusion of dividends in the valuing of option in both binomial and Black and Scholes model and the impact of risk free interest rate changes on value of an option. Hull (1987) concluded that risk free interest rate affects the price of an option. As interest rate in the economy increase; the expected growth rate of the stocks tends to increase. This research used a fixed rate to determine option prices.

## REFERENCES

- Aloo, R. M. (2011), An exploratory study of currency options in the Kenyan financialmarket.
- Beckers, S, The constant Elasticity of variance model and its implications for Option Pricing,*journal of finance*, June 1980
- Black, F., & Scholes, M. (1973), The Pricing of Options and Corporate Liabilities.*The Journal of Political Economy*, 81 (3), 637-654.
- Black Fisher, studies of stock price volatility changes, proceedings of the meetings of the American statistical association, business and economic statistics section. Chicago, 1976. Models. *The Journal of Finance*, 52 (5), 2003 - 2049.
- Cao, Charles, Zhiwu Chen, and John M. Griffin, 2000, The informational content of option volume prior to takeovers, working paper, penislyvinia state university Capital markets Authority, June 2000 annual report
- Chicago Board Options Exchange (CBOE), options education equity options basics, CBOE website, www, cboe.com
- Cox, J.C., & Rubinstein, M. (1979), Option pricing: A Simplified Approach,*Journal of Financial Economics*, 7, 229-263.
- Dumas, B., Fleming, J., & Whaley, R.E. (1998), Implied Volatility Functions: Empirical Tests,*The Journal of Finance*, 53, 2059-2106.
- Ekrem Kilic, 2005, the comparison of option pricing models.
- Galai, D,Tests of market efficiency on the Chicago board of options exchange, journal of business, April 1977
- Geske R,and R Roll,on valuing American call options with the black-scholes European Formula,*journal of finance*,1984
- .Hull, J., & White, A. (1987),The Pricing of Options on Assets with StochasticVolatilities.*Journal of Finance*, 42 (2), 281-300.
- Judy, A, Nyang'aya. (2001),Pricing of option using Black and Scholes Model –the case of Nairobi stock exchange stocks
- Kolb, R. W. (1995). Understanding options. New York: Wiley.
- Mark Rubinstein.(1994),implied binomial trees, *The Journal of Finance*

- Mark Rubinstein.(1979),an economic evaluation of organized option market
- Macbeth, D., &Merville, L. J. (1979), An Empirical Examination of the Black-Scholes Call Option Pricing Model,*The Journal of Finance*, 34, 5, 1173-1186.
- Merton, R. C. (1973), Theory of Rational Option Pricing.*The Bell Journal of Economicsand Management Science*, 4, 1, 141-183.
- Merton, R. C. (1976), Option Pricing when underlying Stock Returns are Discontinuous. *Journal of Financial Economics*, 3, 125-144.
- Merton, R. C. (1998), Application of Option Pricing Theory: Twenty-Five Years Later. *The American Economic Review*,88, 3, 323-349.
- Rubinstein, M. (1983) Displaced Diffusion Option Pricing. *The Journal of Finance*, 38, 1, 213- 217.
- Samuelson P,Proof that properly Anticipated Prices Fluctuate Randomly,*Industrial Management Review*,1965

## APPENDICES

### Appendix I: Binomial Tree

$$c(S, T) = SN\left(\frac{S-K}{\sigma\sqrt{T}}\right) - KN\left(\frac{S-K}{\sigma\sqrt{T}}\right) - \sigma\sqrt{T}n\left(\frac{S-K}{\sigma\sqrt{T}}\right) \text{equation (1)}$$

$$C(S, T) = e^{\rho T} SN(d_1) - (1-A)KN(d_2) \text{equation(2)}$$

$$\text{With } d_1 = \frac{1}{\sigma\sqrt{T}} \left[ \ln\left(\frac{S}{K}\right) + \left(\rho + \frac{1}{2}\sigma^2\right)T \right] \text{ and } d_2 = d_1 - \sigma\sqrt{T}$$

$$C_t = S_t N(d_1) - X e^{-r\tau} N(d_2) \text{equation (3)}$$

and the price of put option on a non-dividend stock can be written as:

$$P_t = X e^{-r\tau} N(-d_2) - S_t N(-d_1)$$

Where;

$$d_1 = \frac{\ln\left(\frac{S_t}{X}\right) + \left(r + \frac{\sigma_s^2}{2}\right)\tau}{\sigma_s \sqrt{\tau}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{X}\right) + \left(r - \frac{\sigma_s^2}{2}\right)\tau}{\sigma_s \sqrt{\tau}} = d_1 - \sigma_s \sqrt{\tau}$$

$$\tau = T - t$$

Where;

K= Option's exercise price

$\sigma$ = Volatility (as measured by the standard deviation) of the price of underlying asset.

Ln = Natural log = a mathematical constant number= 2.718...

N is the cumulative distribution function of the standard normal distribution

T - t is the time to maturity



$S$  is the spot price of underlying asset

$K$  is the strike price

$r$  is the risk free rate (annual rate, expressed in terms of continuous compounding), and

$C$  the price of option

$e$  base of the natural logarithm

## Appendix II: Rate of Returns

	2011	returns		
<b>COMPANY</b>				
<b>Sasini</b>	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
<b>Month</b>	<b>sh</b>	<b>S1/S1-1</b>	<b>U1=ln(S1/S1-1)</b>	<b>U1*U1</b>
January	12.90	0	0	0
February	11.55	0.8953	-0.1105	0.0122
March	9.10	0.7879	-0.2384	0.0568
April	10.00	1.0989	0.0943	0.0089
May	12.50	1.2500	0.2231	0.0498
June	11.30	0.9040	-0.1009	0.0102
July	10.40	0.9204	-0.0830	0.0069
August	10.90	1.0481	0.0470	0.0022
September	12.05	1.1055	0.1003	0.0101
October	13.75	1.1411	0.1320	0.0174
November	12.90	0.9382	-0.0638	0.0041
December	13.25	1.0271	0.0268	0.0007
		<b>TOTAL</b>	<b>0.0268</b>	<b>0.1793</b>
<b>Barclays bank ltd</b>				
January	63			
February	69	1.0952	0.0910	0.0083
March	58	0.8406	-0.1737	0.0302
April	66	1.1379	0.1292	0.0167
May	17.85	0.2705	-1.3077	1.7100
June	17.2	0.9636	-0.0371	0.0014
July	15.45	0.8983	-0.1073	0.0115
August	12.95	0.8382	-0.1765	0.0312
September	10.65	0.8224	-0.1955	0.0382
October	14.75	1.3850	0.3257	0.1061
November	11.95	0.8102	-0.2105	0.0443
December	13.05	1.0921	0.0881	0.0078
		<b>TOTAL</b>	<b>-1.5743</b>	<b>2.0055</b>
<b>Equity Bank ltd</b>				
January	29			
February	28.5	0.9828	-0.0174	0.0003
March	25	0.8772	-0.1310	0.0172
April	27	1.0800	0.0770	0.0059

<b>Month</b>	<b>Closing stock</b>	<b>Price relative</b>	<b>Monthly return</b>	
May	25	0.9259	-0.0770	0.0059
June	25.75	1.0300	0.0296	0.0009
July	23	0.8932	-0.1129	0.0128
August	19.4	0.8435	-0.1702	0.0290
September	17.65	0.9098	-0.0945	0.0089
October	19.75	1.1190	0.1124	0.0126
November	17.5	0.8861	-0.1210	0.0146
December	16.85	0.9629	-0.0379	0.0014
		<b>TOTAL</b>	<b>-0.5429</b>	<b>0.1096</b>
<b>Kenya Commercial Bank</b>				
January	23			
February	23.25	1.0109	0.0108	0.0001
March	23.5	1.0108	0.0107	0.0001
April	25.75	1.0957	0.0914	0.0084
May	25.25	0.9806	-0.0196	0.0004
June	24	0.9505	-0.0508	0.0026
July	23	0.9583	-0.0426	0.0018
August	19.9	0.8652	-0.1448	0.0210
September	16.35	0.8216	-0.1965	0.0386
October	18.05	1.1040	0.0989	0.0098
November	15	0.8310	-0.1851	0.0343
December	16.85	1.1233	0.1163	0.0135
		<b>TOTAL</b>	<b>-0.3111</b>	<b>0.1305</b>
<b>Stanchart</b>				
January	271			
February	279	1.0295	0.0291	0.0008
March	263	0.9427	-0.0591	0.0035
April	251	0.9544	-0.0467	0.0022
May	246	0.9801	-0.0201	0.0004
June	234	0.9512	-0.0500	0.0025
July	224	0.9573	-0.0437	0.0019
August	203	0.9063	-0.0984	0.0097
September	178	0.8768	-0.1314	0.0173
October	180	1.0112	0.0112	0.0001
November	159	0.8833	-0.1241	0.0154
December	160	1.0063	0.0063	0.0000
		<b>TOTAL</b>	<b>-0.5269</b>	<b>0.0538</b>

<b>Co-operative Bank</b>		<b>Closing stock</b>	<b>Price relative</b>	<b>Monthly return</b>
January	20.25			
February	20.25	1.0000	0.0000	0.0000
March	16.6	0.8198	-0.1988	0.0395
April	17.5	1.0542	0.0528	0.0028
May	17.4	0.9943	-0.0057	0.0000
June	16.35	0.9397	-0.0622	0.0039
July	15.3	0.9358	-0.0664	0.0044
August	14.3	0.9346	-0.0676	0.0046
September	14.05	0.9825	-0.0176	0.0003
October	14.45	1.0285	0.0281	0.0008
November	12.45	0.8616	-0.1490	0.0222
December	12.25	0.9839	-0.0162	0.0003
		<b>TOTAL</b>	<b>-0.5026</b>	<b>0.0787</b>
<b>Kenya Airways Ltd</b>				
January	45.75			
February	39.5	0.8634	-0.1469	0.0216
March	32.5	0.8228	-0.1951	0.0380
April	32.25	0.9923	-0.0077	0.0001
May	36	1.1163	0.1100	0.0121
June	38	1.0556	0.0541	0.0029
July	32.5	0.8553	-0.1563	0.0244
August	31.5	0.9692	-0.0313	0.0010
September	25.75	0.8175	-0.2016	0.0406
October	23.5	0.9126	-0.0914	0.0084
November	20	0.8511	-0.1613	0.0260
December	20.75	1.0375	0.0368	0.0014
		<b>TOTAL</b>	<b>-0.7906</b>	<b>0.1765</b>
<b>Nation Media Group</b>				
January	171			
February	173	1.0117	0.0116	0.0001
March	174	1.0058	0.0058	0.0000
April	185	1.0632	0.0613	0.0038
May	182	0.9838	-0.0163	0.0003
June	167	0.9176	-0.0860	0.0074
July	149	0.8922	-0.1140	0.0130
August	140	0.9396	-0.0623	0.0039
September	140	1.0000	0.0000	0.0000

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	140	1.0000	0.0000	0.0000
November	139	0.9929	-0.0072	0.0001
December	140	1.0072	0.0072	0.0001
		TOTAL	-0.2000	0.0286
<b>Scangroup</b>				
January	62.5			0.0000
February	58	0.9280	-0.0747	0.0056
March	54	0.9310	-0.0715	0.0051
April	62.5	1.1574	0.1462	0.0214
May	51	0.8160	-0.2033	0.0413
June	52.5	1.0294	0.0290	0.0008
July	48.5	0.9238	-0.0792	0.0063
August	42.25	0.8711	-0.1380	0.0190
September	36.5	0.8639	-0.1463	0.0214
October	39	1.0685	0.0662	0.0044
November	38.75	0.9936	-0.0064	0.0000
December	41.5	1.0710	0.0686	0.0047
		TOTAL	-0.4095	0.1301
<b>Centum</b>				
January	24			0.0000
February	22	0.9167	-0.0870	0.0076
March	21.5	0.9773	-0.0230	0.0005
April	23	1.0698	0.0674	0.0045
May	22.5	0.9783	-0.0220	0.0005
June	22	0.9778	-0.0225	0.0005
July	75	3.4091	1.2264	1.5042
August	18.8	0.2507	-1.3836	1.9144
September	17.1	0.9096	-0.0948	0.0090
October	15.5	0.9064	-0.0982	0.0097
November	15.3	0.9871	-0.0130	0.0002
December	13.5	0.8824	-0.1252	0.0157
		TOTAL	-0.5754	3.4667
<b>Athi River</b>				
January	189			0.0000
February	178	0.9418	-0.0600	0.0036
March	169	0.9494	-0.0519	0.0027
April	167	0.9882	-0.0119	0.0001

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
May	186	1.1138	0.1078	0.0116
June	182	0.9785	-0.0217	0.0005
July	179	0.9835	-0.0166	0.0003
August	168	0.9385	-0.0634	0.0040
September	161	0.9583	-0.0426	0.0018
October	179	1.1118	0.1060	0.0112
November	155	0.8659	-0.1440	0.0207
December	158	1.0194	0.0192	0.0004
		TOTAL	-0.1792	0.0569
<b>Bamburi</b>				
January	201			0.0000
February	196	0.9751	-0.0252	0.0006
March	170	0.8673	-0.1423	0.0203
April	168	0.9882	-0.0118	0.0001
May	170	1.0119	0.0118	0.0001
June	179	1.0529	0.0516	0.0027
July	175	0.9777	-0.0226	0.0005
August	165	0.9429	-0.0588	0.0035
September	150	0.9091	-0.0953	0.0091
October	150	1.0000	0.0000	0.0000
November	141	0.9400	-0.0619	0.0038
December	125	0.8865	-0.1204	0.0145
		TOTAL	-0.4750	0.0552
<b>Kengen</b>				
January	16.6			0.0000
February	15.2	0.9157	-0.0881	0.0078
March	14.5	0.9539	-0.0471	0.0022
April	15.35	1.0586	0.0570	0.0032
May	15.6	1.0163	0.0162	0.0003
June	13.55	0.8686	-0.1409	0.0198
July	11.1	0.8192	-0.1994	0.0398
August	10.05	0.9054	-0.0994	0.0099
September	9.35	0.9303	-0.0722	0.0052
October	10.7	1.1444	0.1349	0.0182
November	8.45	0.7897	-0.2361	0.0557
December	8.45	1.0000	0.0000	0.0000
		TOTAL	-0.6752	0.1621

<b>Kenol Kobil Ltd</b>		<b>Closing stock</b>	<b>Price relative</b>	<b>Monthly return</b>
January	10			0.0000
February	9.35	0.9350	-0.0672	0.0045
March	9.55	1.0214	0.0212	0.0004
April	9.95	1.0419	0.0410	0.0017
May	9.7	0.9749	-0.0254	0.0006
June	11.5	1.1856	0.1702	0.0290
July	11.75	1.0217	0.0215	0.0005
August	10.2	0.8681	-0.1415	0.0200
September	9.8	0.9608	-0.0400	0.0016
October	10.5	1.0714	0.0690	0.0048
November	9.3	0.8857	-0.1214	0.0147
December	9.95	1.0699	0.0676	0.0046
		<b>TOTAL</b>	<b>-0.0050</b>	<b>0.0824</b>
<b>KPLC</b>				
January	24			0.0000
February	22	0.9167	-0.0870	0.0076
March	21	0.9545	-0.0465	0.0022
April	21	1.0000	0.0000	0.0000
May	21.5	1.0238	0.0235	0.0006
June	21.5	1.0000	0.0000	0.0000
July	19.6	0.9116	-0.0925	0.0086
August	19.25	0.9821	-0.0180	0.0003
September	17.2	0.8935	-0.1126	0.0127
October	18.05	1.0494	0.0482	0.0023
November	16.7	0.9252	-0.0777	0.0060
December	17.55	1.0509	0.0496	0.0025
		<b>TOTAL</b>	<b>-0.3130</b>	<b>0.0427</b>
<b>B.A.T Kenya Ltd</b>				
January	276			0.0000
February	291	1.0543	0.0529	0.0028
March	269	0.9244	-0.0786	0.0062
April	261	0.9703	-0.0302	0.0009
May	249	0.9540	-0.0471	0.0022
June	264	1.0602	0.0585	0.0034
July	263	0.9962	-0.0038	0.0000
August	239	0.9087	-0.0957	0.0092
September	230	0.9623	-0.0384	0.0015

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	235	1.0217	0.0215	0.0005
November	230	0.9787	-0.0215	0.0005
December	246	1.0696	0.0673	0.0045
		TOTAL	-0.1151	0.0316
<b>E.A.B.L</b>				
January	184			0.0000
February	182	0.9891	-0.0109	0.0001
March	204	1.1209	0.1141	0.0130
April	209	1.0245	0.0242	0.0006
May	195	0.9330	-0.0693	0.0048
June	182	0.9333	-0.0690	0.0048
July	175	0.9615	-0.0392	0.0015
August	162	0.9257	-0.0772	0.0060
September	155	0.9568	-0.0442	0.0020
October	160	1.0323	0.0317	0.0010
November	155	0.9688	-0.0317	0.0010
December	172	1.1097	0.1041	0.0108
			-0.0674	0.0456
<b>CFC Stanbic Holdings Ltd</b>				
January	80.5			0.0000
February	79	0.9814	-0.0188	0.0004
March	75.5	0.9557	-0.0453	0.0021
April	59.5	0.7881	-0.2382	0.0567
May	53.5	0.8992	-0.1063	0.0113
June	50.5	0.9439	-0.0577	0.0033
July	52	1.0297	0.0293	0.0009
August	50.75	0.9760	-0.0243	0.0006
September	44.25	0.8719	-0.1371	0.0188
October	41	0.9266	-0.0763	0.0058
November	25	0.6098	-0.4947	0.2447
December	40	1.6000	0.4700	0.2209
		TOTAL	-0.6994	0.5654
<b>Safaricom Kenya Ltd</b>				
January	4.45			0.0000
February	4	0.8989	-0.1066	0.0114
March	3.85	0.9625	-0.0382	0.0015
April	3.95	1.0260	0.0256	0.0007



	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
May	3.55	0.8987	-0.1068	0.0114
June	3.05	0.8592	-0.1518	0.0230
July	2.95	0.9672	-0.0333	0.0011
August	3.4	1.1525	0.1420	0.0202
September	3.2	0.9412	-0.0606	0.0037
October	3.55	1.1094	0.1038	0.0108
November	3	0.8451	-0.1683	0.0283
December	2.95	0.9833	-0.0168	0.0003
			-0.4111	0.1123
<b>Britam</b>	Unlisted			

		2012		
<b>COMPANY</b>				
<b>Sasini</b>	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
<b>Month</b>	<b>Sh</b>	<b>S1/S1-1</b>	<b>U1=ln(S1/S1-1)</b>	<b>U1*U1</b>
January	12.35			
February	12.1	0.9798	-0.02045	0.0004
March	11.05	0.9132	-0.09078	0.0082
April	11.45	1.0362	0.035559	0.0013
May	12.7	1.1092	0.103612	0.0107
June	11.95	0.9409	-0.06087	0.0037
July	12.15	1.0167	0.016598	0.0003
August	11.55	0.9506	-0.05064	0.0026
September	10.95	0.9481	-0.05335	0.0028
October	11.2	1.0228	0.022574	0.0005
November	19.6	1.7500	0.559616	0.3132
December	11.7	0.5969	-0.51594	0.2662
			-0.05407	0.6099
<b>Barclays bank ltd</b>				
January	12.35			0.0000
February	13.7	1.1093	0.10374	0.0108
March	12.05	0.8796	-0.12833	0.0165
April	12.8	1.0622	0.060381	0.0036
May	13	1.0156	0.015504	0.0002

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
June	13.05	1.0038	0.003839	0.0000
July	14.1	1.0805	0.077387	0.0060
August	14.65	1.0390	0.038266	0.0015
September	14.6	0.9966	-0.00342	0.0000
October	15.8	1.0822	0.078988	0.0062
November	14.5	0.9177	-0.08586	0.0074
December	15.75	1.0862	0.082692	0.0068
			0.243184	0.0590
<b>Equity Bank Ltd</b>				
January	17.7			0.0000
February	19	1.0734	0.070874	0.0050
March	19.25	1.0132	0.013072	0.0002
April	20.75	1.0779	0.075035	0.0056
May	21	1.0120	0.011976	0.0001
June	21.25	1.0119	0.011834	0.0001
July	21.5	1.0118	0.011696	0.0001
August	22.5	1.0465	0.045462	0.0021
September	23.25	1.0333	0.03279	0.0011
October	24.25	1.0430	0.042111	0.0018
November	23.25	0.9588	-0.04211	0.0018
December	23.75	1.0215	0.021277	0.0005
			0.294018	0.0184
<b>Kenya Commercial Bank</b>				
January	19			0.0000
February	20.5	1.0789	0.075986	0.0058
March	22.25	1.0854	0.081917	0.0067
April	22.5	1.0112	0.011173	0.0001
May	23	1.0222	0.021979	0.0005
June	23	1.0000	0	0.0000
July	24	1.0435	0.04256	0.0018
August	25	1.0417	0.040822	0.0017
September	75	3.0000	1.098612	1.2069
October	27.5	0.3667	-1.0033	1.0066
November	29	1.0545	0.05311	0.0028
December	29.75	1.0259	0.025533	0.0007
			0.44839	2.2336

<b>Stanchart</b>	<b>Closing stock</b>	<b>Price relative</b>	<b>Monthly return</b>	
January	157			0.0000
February	169	1.0764	0.073653	0.0054
March	174	1.0296	0.029157	0.0009
April	165	0.9483	-0.05311	0.0028
May	179	1.0848	0.08144	0.0066
June	201	1.1229	0.115919	0.0134
July	195	0.9701	-0.03031	0.0009
August	204	1.0462	0.04512	0.0020
September	207	1.0147	0.014599	0.0002
October	228	1.1014	0.096627	0.0093
November	236	1.0351	0.034486	0.0012
December	235	0.9958	-0.00425	0.0000
			0.40334	0.0429
<b>Co-operative Bank</b>				
January	12.95			0.0000
February	11.75	0.9073	-0.09724	0.0095
March	12.7	1.0809	0.077749	0.0060
April	13.65	1.0748	0.072138	0.0052
May	13.05	0.9560	-0.04495	0.0020
June	11.2	0.8582	-0.15287	0.0234
July	11.55	1.0313	0.030772	0.0009
August	11.9	1.0303	0.029853	0.0009
September	12.55	1.0546	0.053182	0.0028
October	12.15	0.9681	-0.03239	0.0010
November	12	0.9877	-0.01242	0.0002
December	12.6	1.0500	0.04879	0.0024
			-0.0274	0.0543
<b>Kenya Airways ltd</b>				
January	19.6			0.0000
February	17.4	0.8878	-0.11906	0.0142
March	13.95	0.8017	-0.22099	0.0488
April	14.85	1.0645	0.06252	0.0039
May	15.05	1.0135	0.013378	0.0002
June	13.1	0.8704	-0.13877	0.0193
July	14.1	1.0763	0.073563	0.0054
August	13	0.9220	-0.08123	0.0066
September	12	0.9231	-0.08004	0.0064
October	12.45	1.0375	0.036814	0.0014

	<i><b>Closing stock</b></i>	<i><b>Price relative</b></i>	<i><b>Monthly return</b></i>	
November	11.9	0.9558	-0.04518	0.0020
December	11.4	0.9580	-0.04293	0.0018
			-0.54192	0.1100
Nation Media Group				
January	141			0.0000
February	148	1.0496	0.048452	0.0023
March	166	1.1216	0.114776	0.0132
April	167	1.0060	0.006006	0.0000
May	165	0.9880	-0.01205	0.0001
June	176	1.0667	0.064539	0.0042
July	174	0.9886	-0.01143	0.0001
August	205	1.1782	0.163955	0.0269
September	213	1.0390	0.038282	0.0015
October	226	1.0610	0.059243	0.0035
November	226	1.0000	0	0.0000
December	222	0.9823	-0.01786	0.0003
			0.453917	0.0522
Scangroup				
January	39.5			0.0000
February	41.75	1.0570	0.055399	0.0031
March	50.75	1.2156	0.195212	0.0381
April	54.5	1.0739	0.071289	0.0051
May	51	0.9358	-0.06638	0.0044
June	54.5	1.0686	0.066375	0.0044
July	53.5	0.9817	-0.01852	0.0003
August	57.54	1.0755	0.072799	0.0053
September	58	1.0080	0.007963	0.0001
October	60	1.0345	0.033902	0.0011
November	66.5	1.1083	0.102857	0.0106
December	68.5	1.0301	0.029632	0.0009
			0.550533	0.0734
Centum				
January	14.2			0.0000
February	14.75	1.0387	0.038001	0.0014
March	13.05	0.8847	-0.12245	0.0150
April	15.5	1.1877	0.172052	0.0296
May	14.6	0.9419	-0.05982	0.0036

	<i><b>Closing stock</b></i>	<i><b>Price relative</b></i>	<i><b>Monthly return</b></i>	
June	12.75	0.8733	-0.13549	0.0184
July	12.3	0.9647	-0.03593	0.0013
August	12	0.9756	-0.02469	0.0006
September	12.05	1.0042	0.004158	0.0000
October	12.4	1.0290	0.028632	0.0008
November	12	0.9677	-0.03279	0.0011
December	12.35	1.0292	0.028749	0.0008
			-0.13959	0.0726
<b>Athi River</b>				
January	151			0.0000
February	155	1.0265	0.026145	0.0007
March	161	1.0387	0.037979	0.0014
April	187	1.1615	0.149704	0.0224
May	196	1.0481	0.047006	0.0022
June	200	1.0204	0.020203	0.0004
July	204	1.0200	0.019803	0.0004
August	206	1.0098	0.009756	0.0001
September	220	1.0680	0.065751	0.0043
October	232	1.0545	0.05311	0.0028
November	219	0.9440	-0.05767	0.0033
December	226	1.0320	0.031463	0.0010
			0.403255	0.0391
<b>Bamburi</b>				
January	135			0.0000
February	145	1.0741	0.071459	0.0051
March	150	1.0345	0.033902	0.0011
April	148	0.9867	-0.01342	0.0002
May	146	0.9865	-0.01361	0.0002
June	165	1.1301	0.122339	0.0150
July	180	1.0909	0.087011	0.0076
August	168	0.9333	-0.06899	0.0048
September	171	1.0179	0.0177	0.0003
October	177	1.0351	0.034486	0.0012
November	176	0.9944	-0.00567	0.0000
December	185	1.0511	0.049872	0.0025
			0.315081	0.0379

Kengen	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
January	8			0.0000
February	7.45	0.9313	-0.07123	0.0051
March	7.25	0.9732	-0.02721	0.0007
April	8.25	1.1379	0.129212	0.0167
May	7.9	0.9576	-0.04335	0.0019
June	8.6	1.0886	0.084899	0.0072
July	8.35	0.9709	-0.0295	0.0009
August	8.35	1.0000	0	0.0000
September	8.8	1.0539	0.05249	0.0028
October	9.15	1.0398	0.039002	0.0015
November	9.95	1.0874	0.083819	0.0070
December	8.8	0.8844	-0.12282	0.0151
			0.09531	0.0589
Kenol Kobil Ltd				
January	8.95			0.0000
February	11.6	1.2961	0.259352	0.0673
March	11.95	1.0302	0.029726	0.0009
April	12.45	1.0418	0.040989	0.0017
May	12.5	1.0040	0.004008	0.0000
June	14.3	1.1440	0.134531	0.0181
July	16.05	1.1224	0.115449	0.0133
August	14.75	0.9190	-0.08447	0.0071
September	15.1	1.0237	0.023452	0.0005
October	14.55	0.9636	-0.0371	0.0014
November	14.85	1.0206	0.020409	0.0004
December	13.55	0.9125	-0.09161	0.0084
			0.414733	0.1191
KPLC				
January	15.5			
February	14.4	0.9290	-0.07361	0.0054
March	14.3	0.9931	-0.00697	0.0000
April	15.4	1.0769	0.074108	0.0055
May	14.55	0.9448	-0.05678	0.0032
June	15.1	1.0378	0.037104	0.0014
July	15.35	1.0166	0.016421	0.0003
August	17.4	1.1336	0.125355	0.0157
September	17.55	1.0086	0.008584	0.0001

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	18.5	1.0541	0.052717	0.0028
November	16.5	0.8919	-0.11441	0.0131
December	17.1	1.0364	0.035718	0.0013
			0.098238	0.0488
B.A.T Kenya Ltd				
January	260			
February	325	1.2500	0.223144	0.0498
March	285	0.8769	-0.13134	0.0172
April	323	1.1333	0.125163	0.0157
May	360	1.1146	0.108452	0.0118
June	372	1.0333	0.03279	0.0011
July	384	1.0323	0.031749	0.0010
August	412	1.0729	0.070381	0.0050
September	430	1.0437	0.042762	0.0018
October	467	1.0860	0.082544	0.0068
November	456	0.9764	-0.02384	0.0006
December	493	1.0811	0.078016	0.0061
			0.639828	0.1168
E.A.B.L				
January	166			
February	190	1.1446	0.135036	0.0182
March	202	1.0632	0.061244	0.0038
April	210	1.0396	0.03884	0.0015
May	218	1.0381	0.037388	0.0014
June	227	1.0413	0.040455	0.0016
July	221	0.9736	-0.02679	0.0007
August	226	1.0226	0.022372	0.0005
September	233	1.0310	0.030503	0.0009
October	240	1.0300	0.0296	0.0009
November	247	1.0292	0.028749	0.0008
December	265	1.0729	0.070341	0.0049
			0.467742	0.0353
CFC Stanbic Holdings Ltd				
January	40			
February	42	1.0500	0.04879	0.0024
March	40.25	0.9583	-0.04256	0.0018
April	41	1.0186	0.018462	0.0003

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
May	44	1.0732	0.070618	0.0050
June	43.5	0.9886	-0.01143	0.0001
July	42.25	0.9713	-0.02916	0.0009
August	48	1.1361	0.127597	0.0163
September	38.75	0.8073	-0.21407	0.0458
October	42	1.0839	0.080539	0.0065
November	42.75	1.0179	0.0177	0.0003
December	42	0.9825	-0.0177	0.0003
			0.04879	0.0797
<b>Safaricom Kenya Ltd</b>				
January	3.2			
February	3.05	0.9531	-0.04801	0.0023
March	3.2	1.0492	0.048009	0.0023
April	3.3	1.0313	0.030772	0.0009
May	3.25	0.9848	-0.01527	0.0002
June	3.45	1.0615	0.059719	0.0036
July	3.8	1.1014	0.096627	0.0093
August	4.1	1.0789	0.075986	0.0058
September	4.4	1.0732	0.070618	0.0050
October	5	1.1364	0.127833	0.0163
November	5.25	1.0500	0.04879	0.0024
December	5.05	0.9619	-0.03884	0.0015
			0.456237	0.0497
<b>Britam</b>				
January	4.65			
February	4.42	0.9505	-0.05073	0.0026
March	4.9	1.1086	0.103096	0.0106
April	5.4	1.1020	0.097164	0.0094
May	5.2	0.9630	-0.03774	0.0014
June	5.85	1.1250	0.117783	0.0139
July	5.8	0.9915	-0.00858	0.0001
August	6.35	1.0948	0.090597	0.0082
September	6.2	0.9764	-0.02391	0.0006
October	6.05	0.9758	-0.02449	0.0006
November	6	0.9917	-0.0083	0.0001
December	6	1.0000	0	0.0000
			0.254892	0.04746157



		2013		
<b>COMPANY</b>				
<b>Sasini</b>	<b>Closing stock</b>	<b>Price relative</b>	<b>Monthly return</b>	
<b>Month</b>	<b>sh</b>	<b>S1/S1-1</b>	<b>U1=ln(S1/S1-1)</b>	<b>U1*U1</b>
January	20			
February	11	0.55	-0.59784	0.3574
March	11.95	1.086364	0.082836	0.0069
April	12.9	1.079498	0.076496	0.0059
May	14.2	1.100775	0.096015	0.0092
June	13.65	0.961268	-0.0395	0.0016
July	14	1.025641	0.025318	0.0006
August	14.1	1.007143	0.007117	0.0001
September	13.3	0.943262	-0.05841	0.0034
October	13.95	1.048872	0.047715	0.0023
November	14.05	1.007168	0.007143	0.0001
December	14.65	1.042705	0.041818	0.0017
			-0.31129	0.3891
<b>Barclays bank ltd</b>				
January	16.15			0.0000
February	16.16	1.000619	0.000619	0.0000
March	17.7	1.095297	0.091026	0.0083
April	17.95	1.014124	0.014025	0.0002
May	15.7	0.874652	-0.13393	0.0179
June	17.4	1.10828	0.102809	0.0106
July	17.05	0.979885	-0.02032	0.0004
August	17.1	1.002933	0.002928	0.0000
September	18.75	1.096491	0.092115	0.0085
October	17.5	0.933333	-0.06899	0.0048
November	17	0.971429	-0.02899	0.0008
December	17.6	1.035294	0.034686	0.0012
			0.085979	0.0527
<b>Equity Bank ltd</b>				
January	26.25			0.0000
February	17	0.647619	-0.43445	0.1887
March	31.25	1.838235	0.608806	0.3706
April	36	1.152	0.1415	0.0200
May	31.25	0.868056	-0.1415	0.0200

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
June	33	1.056	0.054488	0.0030
July	32.75	0.992424	-0.0076	0.0001
August	34	1.038168	0.037458	0.0014
September	35	1.029412	0.028988	0.0008
October	35.5	1.014286	0.014185	0.0002
November	34	0.957746	-0.04317	0.0019
December	30.75	0.904412	-0.10047	0.0101
			0.158224	0.6169
Kenya Commercial Bank				
January	33.5			0.0000
February	38.25	1.141791	0.132598	0.0176
March	41.5	1.084967	0.08155	0.0067
April	42	1.012048	0.011976	0.0001
May	41.5	0.988095	-0.01198	0.0001
June	42	1.012048	0.011976	0.0001
July	41.5	0.988095	-0.01198	0.0001
August	37	0.891566	-0.11478	0.0132
September	42.75	1.155405	0.144451	0.0209
October	42	0.982456	-0.0177	0.0003
November	46.5	1.107143	0.101783	0.0104
December	48.5	1.043011	0.042111	0.0018
			0.370018	0.0713
Stanchart				
January	262			0.0000
February	270	1.030534	0.030077	0.0009
March	301	1.114815	0.108688	0.0118
April	279	0.92691	-0.0759	0.0058
May	300	1.075269	0.072571	0.0053
June	287	0.956667	-0.0443	0.0020
July	304	1.059233	0.057545	0.0033
August	294	0.967105	-0.03345	0.0011
September	302	1.027211	0.026847	0.0007
October	304	1.006623	0.006601	0.0000
November	316	1.039474	0.038715	0.0015
December	304	0.962025	-0.03871	0.0015
			0.148683	0.0339

Co-operative Bank		<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>
January	12.95			0.0000
February	13.75	1.061776	0.059943	0.0036
March	16.4	1.192727	0.176243	0.0311
April	16.25	0.990854	-0.00919	0.0001
May	16.7	1.027692	0.027316	0.0007
June	15.35	0.919162	-0.08429	0.0071
July	16	1.042345	0.041473	0.0017
August	16.05	1.003125	0.00312	0.0000
September	16.2	1.009346	0.009302	0.0001
October	17.45	1.07716	0.074328	0.0055
November	18.4	1.054441	0.053011	0.0028
December	17.75	0.964674	-0.03597	0.0013
			0.31529	0.0540
Kenya Airways ltd				
January	10.55			0.0000
February	10.65	1.009479	0.009434	0.0001
March	10.95	1.028169	0.02778	0.0008
April	10.95	1	0	0.0000
May	11.25	1.027397	0.027029	0.0007
June	9.95	0.884444	-0.1228	0.0151
July	9.4	0.944724	-0.05686	0.0032
August	9.45	1.005319	0.005305	0.0000
September	9.65	1.021164	0.020943	0.0004
October	10.45	1.082902	0.079644	0.0063
November	13.55	1.296651	0.259785	0.0675
December	13.05	0.9631	-0.0376	0.0014
			0.212662	0.0956
Nation Media Group				
January	259			0.0000
February	268	1.034749	0.034159	0.0012
March	355	1.324627	0.281131	0.0790
April	280	0.788732	-0.23733	0.0563
May	320	1.142857	0.133531	0.0178
June	301	0.940625	-0.06121	0.0037
July	311	1.033223	0.032683	0.0011
August	315	1.012862	0.01278	0.0002
September	313	0.993651	-0.00637	0.0000

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	320	1.022364	0.022118	0.0005
November	320	1	0	0.0000
December	314	0.98125	-0.01893	0.0004
			0.192565	0.1602
Scangroup				
January	66.5			0.0000
February	71.5	1.075188	0.072496	0.0053
March	71.5	1	0	0.0000
April	66	0.923077	-0.08004	0.0064
May	67.5	1.022727	0.022473	0.0005
June	60.5	0.896296	-0.10948	0.0120
July	66.5	1.099174	0.094559	0.0089
August	64.5	0.969925	-0.03054	0.0009
September	60.5	0.937984	-0.06402	0.0041
October	58	0.958678	-0.0422	0.0018
November	56.5	0.974138	-0.0262	0.0007
December	48.25	0.853982	-0.15784	0.0249
			-0.32081	0.0655
Centum				
January	13.25			0.0000
February	14.35	1.083019	0.079752	0.0064
March	19.9	1.38676	0.32697	0.1069
April	20.25	1.017588	0.017435	0.0003
May	23	1.135802	0.127339	0.0162
June	21.75	0.945652	-0.05588	0.0031
July	23	1.057471	0.05588	0.0031
August	24.25	1.054348	0.052922	0.0028
September	27	1.113402	0.10742	0.0115
October	28.75	1.064815	0.062801	0.0039
November	31.5	1.095652	0.09135	0.0083
December	33	1.047619	0.04652	0.0022
			0.91251	0.1648
Athi River				
January	52			0.0000
February	62	1.192308	0.175891	0.0309
March	68.5	1.104839	0.099699	0.0099
April	62.5	0.912409	-0.09167	0.0084

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
May	69	1.104	0.09894	0.0098
June	64	0.927536	-0.07522	0.0057
July	67	1.046875	0.04581	0.0021
August	71.5	1.067164	0.065005	0.0042
September	72.5	1.013986	0.013889	0.0002
October	77	1.062069	0.060219	0.0036
November	90	1.168831	0.156004	0.0243
December	90	1	0	0.0000
			0.548566	0.0992
Bamburi				
January	205			0.0000
February	204	0.995122	-0.00489	0.0000
March	217	1.063725	0.061777	0.0038
April	204	0.940092	-0.06178	0.0038
May	221	1.083333	0.080043	0.0064
June	215	0.972851	-0.02752	0.0008
July	213	0.990698	-0.00935	0.0001
August	214	1.004695	0.004684	0.0000
September	210	0.981308	-0.01887	0.0004
October	210	1	0	0.0000
November	210	1	0	0.0000
December	210	1	0	0.0000
			0.024098	0.0153
Kengen				
January	11.85			0.0000
February	12.3	1.037975	0.037271	0.0014
March	14.6	1.186992	0.171422	0.0294
April	14.85	1.017123	0.016978	0.0003
May	15.15	1.020202	0.020001	0.0004
June	15.15	1	0	0.0000
July	16.2	1.069307	0.067011	0.0045
August	16.05	0.990741	-0.0093	0.0001
September	16.5	1.028037	0.027652	0.0008
October	17.05	1.033333	0.03279	0.0011
November	16.3	0.956012	-0.04499	0.0020
December	13.55	0.831288	-0.18478	0.0341
			0.134059	0.0740

Kenol Kobil Ltd		<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>
January	13.65			0.0000
February	13.5	0.989011	-0.01105	0.0001
March	10	0.740741	-0.3001	0.0901
April	9.65	0.965	-0.03563	0.0013
May	10.5	1.088083	0.084417	0.0071
June	8.8	0.838095	-0.17662	0.0312
July	8.8	1	0	0.0000
August	8.45	0.960227	-0.04059	0.0016
September	8	0.946746	-0.05472	0.0030
October	9.1	1.1375	0.128833	0.0166
November	9.4	1.032967	0.032435	0.0011
December	10.1	1.074468	0.071826	0.0052
			-0.3012	0.1572
KPLC				
January	17.65			0.0000
February	17.45	0.988669	-0.0114	0.0001
March	19	1.088825	0.085099	0.0072
April	18.3	0.963158	-0.03754	0.0014
May	16.75	0.915301	-0.0885	0.0078
June	14.5	0.865672	-0.14425	0.0208
July	14.05	0.968966	-0.03153	0.0010
August	13.95	0.992883	-0.00714	0.0001
September	14.35	1.028674	0.02827	0.0008
October	14.25	0.993031	-0.00699	0.0000
November	15	1.052632	0.051293	0.0026
December	14.15	0.943333	-0.05834	0.0034
			-0.22102	0.0453
B.A.T Kenya Ltd				
January	519			0.0000
February	530	1.021195	0.020973	0.0004
March	540	1.018868	0.018692	0.0003
April	549	1.016667	0.016529	0.0003
May	550	1.001821	0.00182	0.0000
June	543	0.987273	-0.01281	0.0002
July	574	1.05709	0.05552	0.0031
August	574	1	0	0.0000
September	575	1.001742	0.001741	0.0000

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	572	0.994783	-0.00523	0.0000
November	579	1.012238	0.012163	0.0001
December	600	1.036269	0.035627	0.0013
			0.145026	0.0058
E.A.B.L				
January	301			0.0000
February	282	0.936877	-0.0652	0.0043
March	311	1.102837	0.097886	0.0096
April	305	0.980707	-0.01948	0.0004
May	367	1.203279	0.18505	0.0342
June	333	0.907357	-0.09722	0.0095
July	335	1.006006	0.005988	0.0000
August	284	0.847761	-0.16516	0.0273
September	329	1.158451	0.147084	0.0216
October	310	0.942249	-0.05949	0.0035
November	325	1.048387	0.047253	0.0022
December	290	0.892308	-0.11394	0.0130
			-0.03723	0.1256
CFC Stanbic Holdings Ltd				
January	42.75			0.0000
February	45	1.052632	0.051293	0.0026
March	25	0.555556	-0.58779	0.3455
April	60	2.4	0.875469	0.7664
May	59.5	0.991667	-0.00837	0.0001
June	62.5	1.05042	0.04919	0.0024
July	63.5	1.016	0.015873	0.0003
August	65.5	1.031496	0.03101	0.0010
September	68.5	1.045802	0.044784	0.0020
October	72.5	1.058394	0.056753	0.0032
November	75	1.034483	0.033902	0.0011
December	87	1.16	0.14842	0.0220
			0.710539	1.1467
Safaricom Kenya Ltd				
January	5.45			0.000000
February	5.75	1.055046	0.053584	0.002871
March	6	1.043478	0.04256	0.001811
April	6.85	1.141667	0.132489	0.017553

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
May	7.25	1.058394	0.056753	0.003221
June	6.55	0.903448	-0.10154	0.010310
July	7.3	1.114504	0.108409	0.011753
August	7.7	1.054795	0.053346	0.002846
September	8.5	1.103896	0.098846	0.009770
October	9	1.058824	0.057158	0.003267
November	10.8	1.2	0.182322	0.033241
December	10.85	1.00463	0.004619	0.000021
			0.688549	0.0967
Britam				
January	6.3			0.0000
February	6.95	1.103175	0.098192	0.0096
March	8.7	1.251799	0.224581	0.0504
April	8.15	0.936782	-0.06531	0.0043
May	8.35	1.02454	0.024244	0.0006
June	8	0.958084	-0.04282	0.0018
July	7.95	0.99375	-0.00627	0.0000
August	8.2	1.031447	0.030962	0.0010
September	8.1	0.987805	-0.01227	0.0002
October	10.1	1.246914	0.220671	0.0487
November	14.25	1.410891	0.344221	0.1185
December	15.15	1.063158	0.061244	0.0038
			0.877451	0.2388481

	<b>2014</b>			
<b>COMPANY</b>	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
	<b>Sh</b>	<b>S1/S1-1</b>	<b>U1=ln(S1/S1-1)</b>	<b>U1*U1</b>
<b>Sasini</b>				
<b>Month</b>				
January	18.95			0
February	16.95	0.8945	-0.1115	0.0124
March	17.15	1.0118	0.0117	0.0001
April	16.85	0.9825	-0.0176	0.0003
May	15.9	0.9436	-0.0580	0.0034
June	15.7	0.9874	-0.0127	0.0002
July	15.95	1.0159	0.0158	0.0002
August	14.5	0.9091	-0.0953	0.0091



	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
September	13.5	0.9310	-0.0715	0.0051
October	13.95	1.0333	0.0328	0.0011
November	12	0.8602	-0.1506	0.0227
December	12.85	1.0708	0.0684	0.0047
			-0.3885	0.0593
<b>Barclays bank ltd</b>				
January	16.95			0.0000
February	16.15	0.9528	-0.0483	0.0023
March	16.1	0.9969	-0.0031	0.0000
April	17	1.0559	0.0544	0.0030
May	16.5	0.9706	-0.0299	0.0009
June	16.7	1.0121	0.0120	0.0001
July	16.95	1.0150	0.0149	0.0002
August	18	1.0619	0.0601	0.0036
September	17.45	0.9694	-0.0310	0.0010
October	16.8	0.9628	-0.0380	0.0014
November	16.8	1.0000	0.0000	0.0000
December	16.7	0.9940	-0.0060	0.0000
			-0.0149	0.0126
<b>Equity Bank Ltd</b>				
January	31			0.0000
February	32.25	1.0403	0.0395	0.0016
March	31.75	0.9845	-0.0156	0.0002
April	38.25	1.2047	0.1863	0.0347
May	41.75	1.0915	0.0876	0.0077
June	46	1.1018	0.0969	0.0094
July	45.25	0.9837	-0.0164	0.0003
August	46.75	1.0331	0.0326	0.0011
September	51.5	1.1016	0.0968	0.0094
October	50.5	0.9806	-0.0196	0.0004
November	46.25	0.9158	-0.0879	0.0077
December	50	1.0811	0.0780	0.0061
			0.4780	0.0784
<b>Kenya Commercial Bank</b>				
January	43.25			0.0000
February	43.75	1.0116	0.0115	0.0001
March	46	1.0514	0.0501	0.0025

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
April	49	1.0652	0.0632	0.0040
May	49	1.0000	0.0000	0.0000
June	51	1.0408	0.0400	0.0016
July	54.5	1.0686	0.0664	0.0044
August	57.5	1.0550	0.0536	0.0029
September	58	1.0087	0.0087	0.0001
October	54.5	0.9397	-0.0622	0.0039
November	57	1.0459	0.0449	0.0020
December	57	1.0000	0.0000	0.0000
			0.2761	0.0215
Stanchart				
January	294			0.0000
February	302	1.0272	0.0268	0.0007
March	312	1.0331	0.0326	0.0011
April	308	0.9872	-0.0129	0.0002
May	312	1.0130	0.0129	0.0002
June	309	0.9904	-0.0097	0.0001
July	309	1.0000	0.0000	0.0000
August	318	1.0291	0.0287	0.0008
September	332	1.0440	0.0431	0.0019
October	336	1.0120	0.0120	0.0001
November	332	0.9881	-0.0120	0.0001
December	335	1.0090	0.0090	0.0001
			0.1306	0.0053
Co-operative Bank				
January	17.4			0.0000
February	18.85	1.0833	0.0800	0.0064
March	20	1.0610	0.0592	0.0035
April	22.75	1.1375	0.1288	0.0166
May	21.5	0.9451	-0.0565	0.0032
June	19.3	0.8977	-0.1079	0.0117
July	19.05	0.9870	-0.0130	0.0002
August	19.15	1.0052	0.0052	0.0000
September	21.75	1.1358	0.1273	0.0162
October	21.25	0.9770	-0.0233	0.0005
November	19	0.8941	-0.1119	0.0125
December	20	1.0526	0.0513	0.0026
			0.1393	0.0735

Kenya Airways Ltd		<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>
January	11.95			0.0000
February	12.1	1.0126	0.0125	0.0002
March	12.5	1.0331	0.0325	0.0011
April	12.5	1.0000	0.0000	0.0000
May	11.55	0.9240	-0.0790	0.0062
June	10.35	0.8961	-0.1097	0.0120
July	10.25	0.9903	-0.0097	0.0001
August	10	0.9756	-0.0247	0.0006
September	9.25	0.9250	-0.0780	0.0061
October	9.1	0.9838	-0.0163	0.0003
November	8.35	0.9176	-0.0860	0.0074
December	8.7	1.0419	0.0411	0.0017
			-0.3174	0.0356
Nation Media Group				
January	316			0.0000
February	314	0.9937	-0.0063	0.0000
March	310	0.9873	-0.0128	0.0002
April	307	0.9903	-0.0097	0.0001
May	314	1.0228	0.0225	0.0005
June	310	0.9873	-0.0128	0.0002
July	308	0.9935	-0.0065	0.0000
August	311	1.0097	0.0097	0.0001
September	314	1.0096	0.0096	0.0001
October	298	0.9490	-0.0523	0.0027
November	298	1.0000	0.0000	0.0000
December	263	0.8826	-0.1249	0.0156
			-0.1836	0.0195
Scangroup				
January	51			0.0000
February	49.5	0.9706	-0.0299	0.0009
March	48	0.9697	-0.0308	0.0009
April	61.5	1.2813	0.2478	0.0614
May	47.75	0.7764	-0.2531	0.0640
June	45.75	0.9581	-0.0428	0.0018
July	46	1.0055	0.0054	0.0000
August	45	0.9783	-0.0220	0.0005
September	40.75	0.9056	-0.0992	0.0098

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	42.75	1.0491	0.0479	0.0023
November	44.25	1.0351	0.0345	0.0012
December	45.25	1.0226	0.0223	0.0005
			-0.1196	0.1435
Centum				
January	35.5			0.0000
February	37.75	1.0634	0.0615	0.0038
March	36.5	0.9669	-0.0337	0.0011
April	39.5	1.0822	0.0790	0.0062
May	38.5	0.9747	-0.0256	0.0007
June	41.25	1.0714	0.0690	0.0048
July	47	1.1394	0.1305	0.0170
August	54	1.1489	0.1388	0.0193
September	67	1.2407	0.2157	0.0465
October	63	0.9403	-0.0616	0.0038
November	62	0.9841	-0.0160	0.0003
December	61	0.9839	-0.0163	0.0003
			0.5413	0.1037
Athi River				
January	86			0.0000
February	85	0.9884	-0.0117	0.0001
March	90	1.0588	0.0572	0.0033
April	85.5	0.9500	-0.0513	0.0026
May	81.5	0.9532	-0.0479	0.0023
June	80	0.9816	-0.0186	0.0003
July	79	0.9875	-0.0126	0.0002
August	90	1.1392	0.1304	0.0170
September	89.5	0.9944	-0.0056	0.0000
October	88	0.9832	-0.0169	0.0003
November	83	0.9432	-0.0585	0.0034
December	86	1.0361	0.0355	0.0013
			0.0000	0.0308
Bamburi				
January	205			0.0000
February	206	1.0049	0.0049	0.0000
March	201	0.9757	-0.0246	0.0006
April	170	0.8458	-0.1675	0.0281

	<i><b>Closing stock</b></i>	<i><b>Price relative</b></i>	<i><b>Monthly return</b></i>	
May	172	1.0118	0.0117	0.0001
June	174	1.0116	0.0116	0.0001
July	175	1.0057	0.0057	0.0000
August	165	0.9429	-0.0588	0.0035
September	146	0.8848	-0.1223	0.0150
October	157	1.0753	0.0726	0.0053
November	155	0.9873	-0.0128	0.0002
December	139	0.8968	-0.1090	0.0119
			-0.3885	0.0647
Kengen				
January	12.05			0.0000
February	10.9	0.9046	-0.1003	0.0101
March	12	1.1009	0.0961	0.0092
April	11.65	0.9708	-0.0296	0.0009
May	10.25	0.8798	-0.1280	0.0164
June	10.85	1.0585	0.0569	0.0032
July	9.2	0.8479	-0.1650	0.0272
August	10.9	1.1848	0.1696	0.0288
September	10.05	0.9220	-0.0812	0.0066
October	10	0.9950	-0.0050	0.0000
November	10.75	1.0750	0.0723	0.0052
December	10.3	0.9581	-0.0428	0.0018
			-0.1569	0.1094
Kenol Kobil Ltd				
January	9.25			0.0000
February	9.6	1.0378	0.0371	0.0014
March	10.1	1.0521	0.0508	0.0026
April	8.9	0.8812	-0.1265	0.0160
May	9	1.0112	0.0112	0.0001
June	8.75	0.9722	-0.0282	0.0008
July	8.25	0.9429	-0.0588	0.0035
August	8.4	1.0182	0.0180	0.0003
September	9.25	1.1012	0.0964	0.0093
October	9.05	0.9784	-0.0219	0.0005
November	9.4	1.0387	0.0379	0.0014
December	8.7	0.9255	-0.0774	0.0060
			-0.0613	0.0419

KPLC	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
January	14.8			0.0000
February	15.05	1.0169	0.0168	0.0003
March	14.5	0.9635	-0.0372	0.0014
April	14.9	1.0276	0.0272	0.0007
May	14.1	0.9463	-0.0552	0.0030
June	13.3	0.9433	-0.0584	0.0034
July	13	0.9774	-0.0228	0.0005
August	15.75	1.2115	0.1919	0.0368
September	14	0.8889	-0.1178	0.0139
October	16.95	1.2107	0.1912	0.0366
November	15.9	0.9381	-0.0639	0.0041
December	14.45	0.9088	-0.0956	0.0091
			-0.0239	0.1099
<b>B.A.T Kenya Ltd</b>				
January	570			0.0000
February	578	1.0140	0.0139	0.0002
March	619	1.0709	0.0685	0.0047
April	579	0.9354	-0.0668	0.0045
May	600	1.0363	0.0356	0.0013
June	649	1.0817	0.0785	0.0062
July	650	1.0015	0.0015	0.0000
August	790	1.2154	0.1951	0.0380
September	860	1.0886	0.0849	0.0072
October	1036	1.2047	0.1862	0.0347
November	910	0.8784	-0.1297	0.0168
December	908	0.9978	-0.0022	0.0000
			0.4656	0.1135
<b>E.A.B.L</b>				
January	259			0.0000
February	264	1.0193	0.0191	0.0004
March	269	1.0189	0.0188	0.0004
April	293	1.0892	0.0855	0.0073
May	283	0.9659	-0.0347	0.0012
June	283	1.0000	0.0000	0.0000
July	292	1.0318	0.0313	0.0010
August	277	0.9486	-0.0527	0.0028
September	276	0.9964	-0.0036	0.0000

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
October	280	1.0145	0.0144	0.0002
November	296	1.0571	0.0556	0.0031
December	308	1.0405	0.0397	0.0016
			0.1733	0.0179
CFC Stanbic Holdings Ltd				
January	86			0.0000
February	106	1.2326	0.2091	0.0437
March	105	0.9906	-0.0095	0.0001
April	129	1.2286	0.2059	0.0424
May	132	1.0233	0.0230	0.0005
June	129	0.9773	-0.0230	0.0005
July	128	0.9922	-0.0078	0.0001
August	126	0.9844	-0.0157	0.0002
September	126	1.0000	0.0000	0.0000
October	124	0.9841	-0.0160	0.0003
November	124	1.0000	0.0000	0.0000
December	124	1.0000	0.0000	0.0000
			0.3659	0.0878
Safaricom Kenya Ltd				
January	11			0.0000
February	11.7	1.0636	0.0617	0.0038
March	12.35	1.0556	0.0541	0.0029
April	13.1	1.0607	0.0590	0.0035
May	12.95	0.9885	-0.0115	0.0001
June	12.45	0.9614	-0.0394	0.0016
July	12.2	0.9799	-0.0203	0.0004
August	12.95	1.0615	0.0597	0.0036
September	12.9	0.9961	-0.0039	0.0000
October	12.15	0.9419	-0.0599	0.0036
November	13.55	1.1152	0.1091	0.0119
December	14.05	1.0369	0.0362	0.0013
			0.2447	0.0327
Britam				
January	18.05			0.0000
February	18.35	1.0166	0.0165	0.0003
March	18.25	0.9946	-0.0055	0.0000

	<i>Closing stock</i>	<i>Price relative</i>	<i>Monthly return</i>	
April	18.1	0.9918	-0.0083	0.0001
May	17.55	0.9696	-0.0309	0.0010
June	19.9	1.1339	0.1257	0.0158
July	23.5	1.1809	0.1663	0.0276
August	24.5	1.0426	0.0417	0.0017
September	35.5	1.4490	0.3709	0.1375
October	26.5	0.7465	-0.2924	0.0855
November	25.75	0.9717	-0.0287	0.0008
December	29.75	1.1553	0.1444	0.0208
			0.499683	0.29120127



### Appendix III: Expected Return

			2011 Expected Returns					
			p1	po	p1-p0	P1-P0/p0	Expected Returns(%)	
Sasini			13.25	12.90	0.35	0.027132	3%	
Barclays bank Ltd			16.85	63	-46.15	-0.73254	-73%	
Equity Bank Ltd			16.85	29	-12.15	-0.41897	-42%	
Kenya Commercial Bank			16.85	23	-6.15	-0.26739	-27%	
Stanchart			160	271	-111.00	-0.40959	-41%	
Co-operative Bank			12.25	20.25	-8.00	-0.39506	-40%	
Kenya Airways Ltd			20.75	45.75	-25.00	-0.54645	-55%	
Nation Media Group			140	171	-31.00	-0.18129	-18%	
Scangroup			41.5	62.5	-21.00	-0.336	-34%	
Centum			13.5	24	-10.50	-0.4375	-44%	
Athi River			158	189	-31.00	-0.16402	-16%	
Bamburi			125	201	-76.00	-0.37811	-38%	
Kengen			8.45	16.6	-8.15	-0.49096	-49%	
Kenol Kobil Ltd			9.95	10	-0.05	-0.005	-1%	
KPLC			17.55	24	-6.45	-0.26875	-27%	
B.A.T Kenya Ltd			246	276	-30.00	-0.1087	-11%	
E.A.B.L			172	184	-12.00	-0.06522	-7%	
CFC Stanbic Holdings Ltd			40	80.5	-40.50	-0.50311	-50%	
Safaricom Kenya Ltd			2.95	4.45	-1.50	-0.33708	-34%	
Britam			Unlisted					
		<b>2012</b>						
Sasini			11.7	12.35	-0.65	-0.05263	-5%	
Barclays bank Ltd			15.75	12.35	3.40	0.275304	28%	
Equity Bank Ltd			23.75	17.7	6.05	0.341808	34%	
Kenya Commercial Bank			29.75	19	10.75	0.565789	57%	
Stanchart			12.6	157	-144.40	-0.91975	-92%	
Co-operative Bank			12.6	12.95	-0.35	-0.02703	-3%	
Kenya Airways Ltd			11.4	19.6	-8.20	-0.41837	-42%	
Nation Media Group			222	141	81.00	0.574468	57%	
Scangroup			68.5	39.5	29.00	0.734177	73%	
Centum			12.35	14.2	-1.85	-0.13028	-13%	
Athi River			226	151	75.00	0.496689	50%	
Bamburi			185	135	50.00	0.37037	37%	
Kengen			8.8	8	0.80	0.1	10%	

			2012 Expected Returns					
			p1	po	p1-p0	P1-P0/p0	Expected Returns(%)	
Kenol Kobil Ltd			13.55	8.95	4.60	0.513966	51%	
KPLC			17.1	15.5	1.60	0.103226	10%	
B.A.T Kenya Ltd			493	260	233.00	0.896154	90%	
E.A.B.L			265	166	99.00	0.596386	60%	
CFC Stanbic Holdings Ltd			42	40	2.00	0.05	5%	
Safaricom Kenya Ltd			5.05	3.2	1.85	0.578125	58%	
Britam			6	4.65	1.35	0.290323	29%	
			<b>2013</b>					
Sasini			14.65	20	-5.35	-0.2675	-27%	
Barclays bank Ltd			17.6	16.15	1.45	0.089783	9%	
Equity Bank Ltd			30.75	26.25	4.50	0.171429	17%	
Kenya Commercial Bank			48.5	33.5	15.00	0.447761	45%	
Stanchart			304	262	42.00	0.160305	16%	
Co-operative Bank			17.75	12.95	4.80	0.370656	37%	
Kenya Airways Ltd			13.05	10.55	2.50	0.236967	24%	
Nation Media Group			314	259	55.00	0.212355	21%	
Scangroup			48.25	66.5	-18.25	-0.27444	-27%	
Centum			33	13.25	19.75	1.490566	149%	
Athi River			90	52	38.00	0.730769	73%	
Bamburi			210	205	5.00	0.02439	2%	
Kengen			13.55	11.85	1.70	0.14346	14%	
Kenol Kobil Ltd			10.1	13.65	-3.55	-0.26007	-26%	
KPLC			14.15	17.65	-3.50	-0.1983	-20%	
B.A.T Kenya Ltd			600	519	81.00	0.156069	16%	
E.A.B.L			290	301	-11.00	-0.03654	-4%	
CFC Stanbic Holdings Ltd			87	42.75	44.25	1.035088	104%	
Safaricom Kenya Ltd			10.85	5.45	5.40	0.990826	99%	
Britam			15.15	6.3	8.85	1.404762	140%	
			<b>2014</b>					
Sasini			12.85	18.95	-6.10	-0.3219	-32%	
Barclays bank Ltd			16.7	16.95	-0.25	-0.01475	-1%	
Equity Bank Ltd			50	31	19.00	0.612903	61%	
Kenya Commercial Bank			57	43.25	13.75	0.317919	32%	
Stanchart			335	294	41.00	0.139456	14%	
Co-operative Bank			20	17.4	2.60	0.149425	15%	
Kenya Airways Ltd			8.7	11.95	-3.25	-0.27197	-27%	
Nation Media Group			263	316	-53.00	-0.16772	-17%	
Scangroup			45.25	51	-5.75	-0.11275	-11%	
Centum			61	35.5	25.50	0.71831	72%	

		2014		Expected Returns				
		p1	po	p1-p0	P1-P0/p0	Expected Returns(%)		
<b>Athi River</b>		86	86	0.00	0	<b>0%</b>		
<b>Bamburi</b>		139	205	-66.00	-0.32195	<b>-32%</b>		
<b>Kengen</b>		10.3	12.05	-1.75	-0.14523	<b>-15%</b>		
<b>Kenol Kobil Ltd</b>		8.7	9.25	-0.55	-0.05946	<b>-6%</b>		
<b>KPLC</b>		14.45	14.8	-0.35	-0.02365	<b>-2%</b>		
<b>B.A.T Kenya Ltd</b>		908	570	338.00	0.592982	<b>59%</b>		
<b>E.A.B.L</b>		308	259	49.00	0.189189	<b>19%</b>		
<b>CFC Stanbic Holdings Ltd</b>		124	86	38.00	0.44186	<b>44%</b>		
<b>Safaricom Kenya Ltd</b>		14.05	11	3.05	0.277273	<b>28%</b>		
<b>Britam</b>		29.75	18.05	11.70	0.648199	<b>65%</b>		

## Appendix IV: Volatilities

			2011 volatility											
			a				b	a-b	c	trading	d	volatility		
	$u1$	$n-1$	$u1/n-1$	$u2$	$u2*u2$	$n(n-1)$	$u2*u2/n(n-1)$		$\sqrt{a-b}$	months	$\sqrt{months}$			
Sasini	0.1793	11	0.016299	0.02677	0.000716646	132	0.0000054	0.0162939	0.127648	12	3.464101615	0.442184	44%	
Barclays bank Ltd	2.0055	11	0.182318	-1.57435	2.478567194	132	0.0187770	0.1635413	0.404402	12	3.464101615	1.400891	140%	
Equity Bank Ltd	0.1096	11	0.00996	-0.54295	0.294789461	132	0.0022333	0.0077266	0.087901	12	3.464101615	0.304499	30%	
Kenya Commercial Bank	0.1305	11	0.011864	-0.31114	0.096810314	132	0.0007334	0.0111306	0.105502	12	3.464101615	0.365469	37%	
Stanchart	0.0538	11	0.004895	-0.52695	0.277671039	132	0.0021036	0.0027914	0.052833	12	3.464101615	0.18302	18%	
Co-operative Bank	0.0787	11	0.007157	-0.50263	0.252635767	132	0.0019139	0.0052430	0.072409	12	3.464101615	0.250831	25%	
Kenya Airways Ltd	0.1765	11	0.016043	-0.79065	0.625120378	132	0.0047358	0.0113075	0.106337	12	3.464101615	0.368361	37%	
Nation Media Group	0.0286	11	0.002598	-0.20002	0.040008454	132	0.0003031	0.0022954	0.04791	12	3.464101615	0.165965	17%	
Scangroup	0.1301	11	0.011827	-0.40947	0.167668244	132	0.0012702	0.0105564	0.102744	12	3.464101615	0.355917	36%	
Centum	3.4667	11	0.315155	-0.57536	0.331043899	132	0.0025079	0.3126474	0.559149	12	3.464101615	1.936948	194%	
Athi River	0.0569	11	0.005177	-0.17915	0.032095433	132	0.0002431	0.0049338	0.070241	12	3.464101615	0.243323	24%	
Bamburi	0.0552	11	0.00502	-0.47499	0.225616612	132	0.0017092	0.0033110	0.057541	12	3.464101615	0.19933	20%	
Kengen	0.1621	11	0.014739	-0.67524	0.455943999	132	0.0034541	0.0112846	0.106229	12	3.464101615	0.367988	37%	
Kenol Kobil Ltd	0.0824	11	0.007491	-0.00501	2.51256E-05	132	0.0000002	0.0074907	0.086549	12	3.464101615	0.299813	30%	
KPLC	0.0427	11	0.003881	-0.313	0.097968925	132	0.0007422	0.0031385	0.056022	12	3.464101615	0.194067	19%	
B.A.T Kenya Ltd	0.0316	11	0.002875	-0.11507	0.013240951	132	0.0001003	0.0027744	0.052672	12	3.464101615	0.182462	18%	
E.A.B.L	0.0456	11	0.004144	-0.06744	0.004548326	132	0.0000345	0.0041100	0.064109	12	3.464101615	0.222081	22%	
CFC Stanbic Holdings Ltd	0.5654	11	0.051403	-0.69938	0.48912921	132	0.0037055	0.0476976	0.218398	12	3.464101615	0.756552	76%	
Safaricom Kenya Ltd	0.1123	11	0.010206	-0.4111	0.169002327	132	0.0012803	0.0089255	0.094475	12	3.464101615	0.32727	33%	

			2012 volatility											
			a				b	a-b	c	trading	d	volatility		
	u1	n-1	u1/n-1	u2	u2*u2	n(n-1)	u2*u2/n(n-1)		sqrt(a-b)	months	sqrt(months)			
Sasini	0.609923874	11	0.055448	-0.05407	0.002923264	132	0.0000221	0.0554255	0.235426	12	3.464101615	0.81554	82%	
Barclays bank Ltd	0.059045637	11	0.005368	0.243184	0.059138605	132	0.0004480	0.0049198	0.070141	12	3.464101615	0.242976	24%	
Equity Bank Ltd	0.018386093	11	0.001671	0.294018	0.08644652	132	0.0006549	0.0010166	0.031884	12	3.464101615	0.110448	11%	
Kenya Commercial Bank	2.23360663	11	0.203055	0.44839	0.201053729	132	0.0015231	0.2015320	0.448923	12	3.464101615	1.555115	156%	
Stanchart	0.042876743	11	0.003898	0.40334	0.162682921	132	0.0012324	0.0026654	0.051628	12	3.464101615	0.178844	18%	
Co-operative Bank	0.054346456	11	0.004941	-0.0274	0.000750704	132	0.0000057	0.0049349	0.070249	12	3.464101615	0.243349	24%	
Kenya Airways Ltd	0.110010845	11	0.010001	-0.54192	0.29367318	132	0.0022248	0.0077762	0.088183	12	3.464101615	0.305474	31%	
Nation Media Group	0.052173393	11	0.004743	0.453917	0.206041089	132	0.0015609	0.0031821	0.05641	12	3.464101615	0.195411	20%	
Scangroup	0.073383258	11	0.006671	0.550533	0.303086665	132	0.0022961	0.0043751	0.066144	12	3.464101615	0.229131	23%	
Centum	0.07261662	11	0.006602	-0.13959	0.019484224	132	0.0001476	0.0064539	0.080336	12	3.464101615	0.278293	28%	
Athi River	0.039101567	11	0.003555	0.403255	0.162614726	132	0.0012319	0.0023228	0.048195	12	3.464101615	0.166952	17%	
Bamburi	0.037940652	11	0.003449	0.315081	0.099276066	132	0.0007521	0.0026971	0.051933	12	3.464101615	0.179902	18%	
Kengen	0.058853932	11	0.00535	0.09531	0.00908403	132	0.0000688	0.0052815	0.072674	12	3.464101615	0.251751	25%	
Kenol Kobil Ltd	0.119140832	11	0.010831	0.414733	0.172003474	132	0.0013031	0.0095279	0.097611	12	3.464101615	0.338135	34%	
KPLC	0.048761213	11	0.004433	0.098238	0.009650791	132	0.0000731	0.0043597	0.066028	12	3.464101615	0.228728	23%	
B.A.T Kenya Ltd	0.11680321	11	0.010618	0.639828	0.409379285	132	0.0031014	0.0075171	0.086701	12	3.464101615	0.300342	30%	
E.A.B.L	0.035327726	11	0.003212	0.467742	0.218782614	132	0.0016574	0.0015542	0.039423	12	3.464101615	0.136565	14%	
CFC Stanbic Holdings Ltd	0.07972025	11	0.007247	0.04879	0.00238048	132	0.0000180	0.0072293	0.085025	12	3.464101615	0.294535	29%	
Safaricom Kenya Ltd	0.049683976	11	0.004517	0.456237	0.208152596	132	0.0015769	0.0029398	0.05422	12	3.464101615	0.187824	19%	
Britam	0.047461568	11	0.004315	0.254892	0.064970059	132	0.0004922	0.0038225	0.061826	12	3.464101615	0.214173	21%	
			2013 volatility											
Sasini	0.389081777	11	0.035371	-0.31129	0.096902671	132	0.0007341	0.0346370	0.18611	12	3.464101615	0.644704	64%	
Barclays bank Ltd	0.052699717	11	0.004791	0.085979	0.007392363	132	0.0000560	0.0047349	0.06881	12	3.464101615	0.238366	24%	

			2013 volatility																
			a				b								a-b	c	trading	d	volatility
			u1	n-1	u1/n-1	u2	u2*u2								n(n-1)	u2*u2/n(n-1)		sqrt(a-b)	months
Equity Bank Ltd	0.616867644	11	0.056079	0.158224	0.025034836	132	0.0001897	0.0558892	0.236409	12	3.464101615	0.818945	82%						
Kenya Commercial Bank	0.07129232	11	0.006481	0.370018	0.136913586	132	0.0010372	0.0054439	0.073783	12	3.464101615	0.255591	26%						
Stanchart	0.033899617	11	0.003082	0.148683	0.022106693	132	0.0001675	0.0029143	0.053984	12	3.464101615	0.187007	19%						
Co-operative Bank	0.054035194	11	0.004912	0.31529	0.099407612	132	0.0007531	0.0041592	0.064492	12	3.464101615	0.223406	22%						
Kenya Airways Ltd	0.095614993	11	0.008692	0.212662	0.045225243	132	0.0003426	0.0083497	0.091376	12	3.464101615	0.316537	32%						
Nation Media Group	0.160222932	11	0.014566	0.192565	0.03708125	132	0.0002809	0.0142848	0.119519	12	3.464101615	0.414026	41%						
Scangroup	0.065509293	11	0.005955	-0.32081	0.102916567	132	0.0007797	0.0051757	0.071942	12	3.464101615	0.249216	25%						
Centum	0.164826986	11	0.014984	0.91251	0.832674517	132	0.0063081	0.0086761	0.093146	12	3.464101615	0.322666	32%						
Athi River	0.099208724	11	0.009019	0.548566	0.300924603	132	0.0022797	0.0067392	0.082093	12	3.464101615	0.284378	28%						
Bamburi	0.015286542	11	0.00139	0.024098	0.000580692	132	0.0000044	0.0013853	0.037219	12	3.464101615	0.128932	13%						
Kengen	0.074046566	11	0.006732	0.134059	0.01797173	132	0.0001361	0.0065954	0.081212	12	3.464101615	0.281326	28%						
Kenol Kobil Ltd	0.157227194	11	0.014293	-0.3012	0.090723909	132	0.0006873	0.0136061	0.116645	12	3.464101615	0.40407	40%						
KPLC	0.045348646	11	0.004123	-0.22102	0.048850353	132	0.0003701	0.0037525	0.061258	12	3.464101615	0.212203	21%						
B.A.T Kenya Ltd	0.005759986	11	0.000524	0.145026	0.021032475	132	0.0001593	0.0003643	0.019087	12	3.464101615	0.066118	7%						
E.A.B.L	0.125608408	11	0.011419	-0.03723	0.001386024	132	0.0000105	0.0114084	0.10681	12	3.464101615	0.370002	37%						
CFC Stanbic Holdings Ltd	1.146677248	11	0.104243	0.710539	0.504865561	132	0.0038247	0.1004186	0.316889	12	3.464101615	1.097736	110%						
Safaricom Kenya Ltd	0.09666494	11	0.008788	0.688549	0.474100374	132	0.0035917	0.0051961	0.072084	12	3.464101615	0.249705	25%						
Britam	0.238848108	11	0.021713	0.877451	0.769920079	132	0.0058327	0.0158807	0.126019	12	3.464101615	0.436542	44%						
			2014 Volatility																
Sasini	0.05928823	11	0.00539	-0.38846	0.150901265	132	0.0011432	0.0042466	0.065166	12	3.464101615	0.225743	23%						
Barclays bank Ltd	0.012615129	11	0.001147	-0.01486	0.000220793	132	0.0000017	0.0011452	0.03384	12	3.464101615	0.117226	12%						
Equity Bank Ltd	0.078448684	11	0.007132	0.478036	0.228518227	132	0.0017312	0.0054005	0.073488	12	3.464101615	0.25457	25%						
Kenya Commercial Bank	0.021476684	11	0.001952	0.276054	0.07620583	132	0.0005773	0.0013751	0.037082	12	3.464101615	0.128457	13%						

			2014 volatility											
			a				b	a-b	c	trading	d	volatility		
	$u1$	$n-1$	$u1/n-1$	$u2$	$u2*u2$	$n(n-1)$	$u2*u2/n(n-1)$		$\sqrt{a-b}$	months	$\sqrt{months}$			
Stanchart	0.005256574	11	0.000478	0.130551	0.017043502	132	0.0001291	0.0003488	0.018675	12	3.464101615	0.064692	6%	
Co-operative Bank	0.073461048	11	0.006678	0.139262	0.019393923	132	0.0001469	0.0065314	0.080817	12	3.464101615	0.279958	28%	
Kenya Airways Ltd	0.035628587	11	0.003239	-0.31741	0.100747999	132	0.0007632	0.0024757	0.049757	12	3.464101615	0.172362	17%	
Nation Media Group	0.019545024	11	0.001777	-0.18359	0.03370462	132	0.0002553	0.0015215	0.039006	12	3.464101615	0.135121	14%	
Scangroup	0.143469133	11	0.013043	-0.11962	0.014309653	132	0.0001084	0.0129342	0.113729	12	3.464101615	0.393968	39%	
Centum	0.103711919	11	0.009428	0.541341	0.29305026	132	0.0022201	0.0072083	0.084902	12	3.464101615	0.294108	29%	
Athi River	0.030827324	11	0.002802	1.04E-16	1.08334E-32	132	0.0000000	0.0028025	0.052938	12	3.464101615	0.183384	18%	
Bamburi	0.064729316	11	0.005884	-0.38854	0.150960259	132	0.0011436	0.0047408	0.068854	12	3.464101615	0.238517	24%	
Kengen	0.109446016	11	0.00995	-0.15692	0.024624126	132	0.0001865	0.0097631	0.098808	12	3.464101615	0.342282	34%	
Kenol Kobil Ltd	0.041858435	11	0.003805	-0.0613	0.003757754	132	0.0000285	0.0037768	0.061456	12	3.464101615	0.21289	21%	
KPLC	0.109874985	11	0.009989	-0.02393	0.000572777	132	0.0000043	0.0099843	0.099921	12	3.464101615	0.346138	35%	
B.A.T Kenya Ltd	0.113532272	11	0.010321	0.465608	0.216790826	132	0.0016424	0.0086788	0.09316	12	3.464101615	0.322715	32%	
E.A.B.L	0.017875791	11	0.001625	0.173272	0.030023089	132	0.0002274	0.0013976	0.037385	12	3.464101615	0.129505	13%	
CFC Stanbic Holdings Ltd	0.087805914	11	0.007982	0.365934	0.133907889	132	0.0010145	0.0069679	0.083474	12	3.464101615	0.289162	29%	
Safaricom Kenya Ltd	0.032668287	11	0.00297	0.244727	0.059891365	132	0.0004537	0.0025161	0.050161	12	3.464101615	0.173763	17%	
Britam	0.291201271	11	0.026473	0.499683	0.249683547	132	0.0018915	0.0245813	0.156784	12	3.464101615	0.543117	54%	

## Appendix V: Exercise Price Ranges

Exercise price estimation January-June 2011										
			a	b	c	d	e	f	g	
Sasini			$\ln(P_0) + \text{Exp.Ret} - V/2 * 0.5$		$V * \text{SQRT}(0.5)$	b*c	a-d		a+d	
Barclays bank Ltd			2.6197	2	0.3127	0.625343	1.9943	<b>7.347295</b>	3.2450	<b>25.66216</b>
Equity Bank Ltd			4.2675	2	0.9906	1.981159	2.2863	<b>9.83876</b>	6.2486	<b>517.3129</b>
Kenya Commercial Bank			3.1810	2	0.2153	0.430626	2.7504	<b>15.64837</b>	3.6116	<b>37.02595</b>
Stanchart			3.0352	2	0.2584	0.516852	2.5183	<b>12.40797</b>	3.5520	<b>34.88448</b>
Co-operative Bank			5.4057	2	0.1294	0.258829	5.1469	<b>171.8921</b>	5.6645	<b>288.4509</b>
Kenya Airways Ltd			2.8264	2	0.1774	0.354728	2.4716	<b>11.84167</b>	3.1811	<b>24.07277</b>
Nation Media Group			3.5839	2	0.2605	0.520942	3.0629	<b>21.39053</b>	4.1048	<b>60.63256</b>
Scangroup			5.0579	2	0.1174	0.23471	4.8232	<b>124.362</b>	5.2926	<b>198.8631</b>
Centum			3.9988	2	0.2517	0.503343	3.4955	<b>32.96653</b>	4.5022	<b>90.21346</b>
Athi River			3.8972	2	1.3696	2.739259	1.1580	<b>3.18352</b>	6.6365	<b>762.4254</b>
Bamburi			5.1745	2	0.1721	0.344111	4.8304	<b>125.2645</b>	5.5186	<b>249.2979</b>
Kengen			5.1242	2	0.1409	0.281895	4.8423	<b>126.7591</b>	5.4061	<b>222.7562</b>
Kenol Kobil Ltd			2.5978	2	0.2602	0.520414	2.0774	<b>7.983369</b>	3.1182	<b>22.6054</b>
KPLC			2.3226	2	0.2120	0.424	1.8986	<b>6.676256</b>	2.7466	<b>15.58886</b>
B.A.T Kenya Ltd			3.0531	2	0.1372	0.274452	2.7786	<b>16.09715</b>	3.3275	<b>27.86988</b>
E.A.B.L			5.5744	2	0.1290	0.258041	5.3163	<b>203.6362</b>	5.8324	<b>341.1823</b>
CFC Stanbic Holdings Ltd			5.1947	2	0.1570	0.31407	4.8806	<b>131.708</b>	5.5087	<b>246.8366</b>
Safaricom Kenya Ltd			4.2798	2	0.5350	1.069927	3.2099	<b>24.77588</b>	5.3497	<b>210.5502</b>
Britam			1.3511	2	0.2314	0.46283	0.8883	<b>2.431021</b>	1.8140	<b>6.13476</b>
Sasini			2.4872503	2	0.312671339	0.625343	1.8619	<b>6.436003</b>	3.1126	<b>22.47926</b>
Barclays bank Ltd			2.969263455	2	0.99057954	1.981159	0.9881	<b>2.686138</b>	4.9504	<b>141.2346</b>
Equity Bank Ltd			3.062131724	2	0.215313055	0.430626	2.6315	<b>13.89467</b>	3.4928	<b>32.87649</b>
Kenya Commercial Bank			3.077750128	2	0.258425811	0.516852	2.5609	<b>12.94745</b>	3.5946	<b>36.4012</b>
Stanchart			5.258898129	2	0.129414544	0.258829	5.0001	<b>148.4234</b>	5.5177	<b>249.0683</b>
Co-operative Bank			2.612426054	2	0.177364153	0.354728	2.2577	<b>9.561052</b>	2.9672	<b>19.43653</b>
Kenya Airways Ltd			3.398284657	2	0.260470886	0.520942	2.8773	<b>17.767</b>	3.9192	<b>50.36147</b>
Nation Media Group			5.034236639	2	0.117355031	0.23471	4.7995	<b>121.4529</b>	5.2689	<b>194.2113</b>
Scangroup			3.824482424	2	0.251671429	0.503343	3.3211	<b>27.69189</b>	4.3278	<b>75.77931</b>
Centum			3.810234688	2	1.369629318	2.739259	1.0710	<b>2.918226</b>	6.5495	<b>698.89</b>
Athi River			5.136797614	2	0.172055278	0.344111	4.7927	<b>120.6251</b>	5.4809	<b>240.0646</b>
Bamburi			5.008264152	2	0.140947312	0.281895	4.7264	<b>112.885</b>	5.2902	<b>198.3749</b>
Kengen			2.39475847	2	0.260207035	0.520414	1.8743	<b>6.516545</b>	2.9152	<b>18.452</b>
Kenol Kobil Ltd			2.462319008	2	0.211999873	0.424	2.0383	<b>7.677694</b>	2.8863	<b>17.92719</b>
KPLC			2.943093436	2	0.137226095	0.274452	2.6686	<b>14.42036</b>	3.2175	<b>24.96677</b>



Exercise price estimation July – December 2011											
			a	b	c	d		e	f	g	
			$\ln(P0)+Exp.Ret-V2/2*0.5$		$V*SQRT(0.5)$	$b*c$	$a-d$		$a+d$		
B.A.T Kenya Ltd			5.529924413	2	0.129020432	0.258041	5.2719	<b>194.7825</b>	5.7880	<b>326.3483</b>	
E.A.B.L			5.183727965	2	0.15703486	0.31407	4.8697	<b>130.2764</b>	5.4978	<b>244.1536</b>	
CFC Stanbic Holdings Ltd			3.813513419	2	0.534963322	1.069927	2.7436	<b>15.54263</b>	4.8834	<b>132.0843</b>	
Safaricom Kenya Ltd			0.973378688	2	0.231414879	0.46283	0.5105	<b>1.666206</b>	1.4362	<b>4.204723</b>	
Britam											
			2012January – June								
Sasini			2.653616711	2	0.576673975	1.153348	1.5003	<b>4.482894</b>	3.8070	<b>45.0136</b>	
Barclays bank Ltd			2.666067181	2	0.171809758	0.34362	2.3224	<b>10.20061</b>	3.0097	<b>20.28104</b>	
Equity Bank Ltd			3.04751829	2	0.078098597	0.156197	2.8913	<b>18.0171</b>	3.2037	<b>24.62385</b>	
Kenya Commercial Bank			3.831929757	2	1.099632704	2.199265	1.6327	<b>5.117491</b>	6.0312	<b>416.2122</b>	
Stanchart			4.604369512	2	0.126461994	0.252924	4.3514	<b>77.59054</b>	4.8573	<b>128.6755</b>	
Co-operative Bank			2.562386974	2	0.172073818	0.344148	2.2182	<b>9.191134</b>	2.9065	<b>18.2933</b>	
Kenya Airways Ltd			2.78967446	2	0.216002627	0.432005	2.3577	<b>10.56629</b>	3.2217	<b>25.0702</b>	
Nation Media Group			5.245540288	2	0.138176375	0.276353	4.9692	<b>143.9099</b>	5.5219	<b>250.1081</b>	
Scangroup			4.056514562	2	0.162020262	0.324041	3.7325	<b>41.78235</b>	4.3806	<b>79.88236</b>	
Centum			2.607462829	2	0.196782669	0.393565	2.2139	<b>9.151314</b>	3.0010	<b>20.1062</b>	
Athi River			5.272592482	2	0.118053162	0.236106	5.0365	<b>153.9282</b>	5.5087	<b>246.8297</b>	
Bamburi			5.09855114	2	0.127209877	0.25442	4.8441	<b>126.9929</b>	5.3530	<b>211.2349</b>	
Kengen			2.145286159	2	0.178014703	0.356029	1.7893	<b>5.985002</b>	2.5013	<b>12.19853</b>	
Kenol Kobil Ltd			2.477220557	2	0.239097405	0.478195	1.9990	<b>7.381861</b>	2.9554	<b>19.2097</b>	
KPLC			2.805532104	2	0.161735442	0.323471	2.4821	<b>11.9659</b>	3.1290	<b>22.85119</b>	
B.A.T Kenya Ltd			6.0313099	2	0.212373945	0.424748	5.6066	<b>272.2068</b>	6.4561	<b>636.5467</b>	
E.A.B.L			5.414843062	2	0.096566061	0.193132	5.2217	<b>185.2509</b>	5.6080	<b>272.5917</b>	
CFC Stanbic Holdings Ltd			3.735567239	2	0.208268023	0.416536	3.3190	<b>27.63357</b>	4.1521	<b>63.56756</b>	
Safaricom Kenya Ltd			1.461032744	2	0.132811403	0.265623	1.1954	<b>3.304912</b>	1.7267	<b>5.621821</b>	
Britam			1.693495982	2	0.151442872	0.302886	1.3906	<b>4.017301</b>	1.9964	<b>7.362369</b>	
Sasini			2.620691926	2	0.576673975	1.153348	1.4673	<b>4.337699</b>	3.7740	<b>43.55567</b>	
Barclays bank Ltd			2.721199252	2	0.171809758	0.34362	2.3776	<b>10.77878</b>	3.0648	<b>21.43058</b>	
Equity Bank Ltd			3.230310546	2	0.078098597	0.156197	3.0741	<b>21.63069</b>	3.3865	<b>29.56253</b>	
Kenya Commercial Bank			4.022984994	2	1.099632704	2.199265	1.8237	<b>6.194858</b>	6.2223	<b>503.8358</b>	
Stanchart			4.851428615	2	0.126461994	0.252924	4.5985	<b>99.33566</b>	5.1044	<b>164.7374</b>	
Co-operative Bank			2.417204964	2	0.172073818	0.344148	2.0731	<b>7.949089</b>	2.7614	<b>15.82123</b>	
Kenya Airways Ltd			2.386757124	2	0.216002627	0.432005	1.9548	<b>7.062166</b>	2.8188	<b>16.7561</b>	
Nation Media Group			5.467264393	2	0.138176375	0.276353	5.1909	<b>179.6322</b>	5.7436	<b>312.1916</b>	
Scangroup			4.378414592	2	0.162020262	0.324041	4.0544	<b>57.64907</b>	4.7025	<b>110.2174</b>	
Centum			2.499752136	2	0.196782669	0.393565	2.1062	<b>8.216849</b>	2.8933	<b>18.0531</b>	
Athi River			5.553630012	2	0.118053162	0.236106	5.3175	<b>203.8784</b>	5.7897	<b>326.9268</b>	

Exercise price estimation July – December 2012										
			a	b	c	d		e	f	g
			$\ln(P0)+Exp.Ret-V2/2*0.5$		$V*SQRT(0.5)$	$b*c$	$a-d$		$a+d$	
Bamburi			5.299221835	2	0.127209877	0.25442	5.0448	<b>155.2136</b>	5.5536	<b>258.176</b>
Kengen			2.21760682	2	0.178014703	0.356029	1.8616	<b>6.433878</b>	2.5736	<b>13.11342</b>
Kenol Kobil Ltd			2.945826562	2	0.239097405	0.478195	2.4676	<b>11.79448</b>	3.4240	<b>30.69259</b>
KPLC			2.779386824	2	0.161735442	0.323471	2.4559	<b>11.65711</b>	3.1029	<b>22.26148</b>
B.A.T Kenya Ltd			6.389522124	2	0.212373945	0.424748	5.9648	<b>389.4651</b>	6.8143	<b>910.7514</b>
E.A.B.L			5.727805291	2	0.096566061	0.193132	5.5347	<b>253.325</b>	5.9209	<b>372.761</b>
CFC Stanbic Holdings Ltd			3.819448723	2	0.208268023	0.416536	3.4029	<b>30.0515</b>	4.2360	<b>69.12972</b>
Safaricom Kenya Ltd			1.536256165	2	0.132811403	0.265623	1.2706	<b>3.563109</b>	1.8019	<b>6.061025</b>
Britam			1.923070423	2	0.151442872	0.302886	1.6202	<b>5.054024</b>	2.2260	<b>9.262335</b>
<b>2013 January – June</b>										
Sasini			2.965893152	2	0.455874716	0.911749	2.0541	<b>7.800156</b>	3.8776	<b>48.31019</b>
Barclays bank Ltd			2.841016332	2	0.168550537	0.337101	2.5039	<b>12.23029</b>	3.1781	<b>24.00153</b>
Equity Bank Ltd			3.521047931	2	0.579081439	1.158163	2.3629	<b>10.62155</b>	4.6792	<b>107.6851</b>
Kenya Commercial Bank			3.751757723	2	0.180730117	0.36146	3.3903	<b>29.67478</b>	4.1132	<b>61.14316</b>
Stanchart			5.657240101	2	0.132234075	0.264468	5.3928	<b>219.8118</b>	5.9217	<b>373.0484</b>
Co-operative Bank			2.758901581	2	0.157972195	0.315944	2.4430	<b>11.50702</b>	3.0748	<b>21.64655</b>
Kenya Airways Ltd			2.499658242	2	0.22382569	0.447651	2.0520	<b>7.783506</b>	2.9473	<b>19.05462</b>
Nation Media Group			5.705860075	2	0.292760679	0.585521	5.1203	<b>167.3921</b>	6.2914	<b>539.8986</b>
Scangroup			4.075511061	2	0.176222348	0.352445	3.7231	<b>41.39112</b>	4.4280	<b>83.76002</b>
Centum			3.355308965	2	0.228159564	0.456319	2.8990	<b>18.1558</b>	3.8116	<b>45.22401</b>
Athi River			4.336846063	2	0.2010857	0.402171	3.9347	<b>51.14551</b>	4.7390	<b>114.3218</b>
Bamburi			5.339360961	2	0.091168629	0.182337	5.1570	<b>173.6469</b>	5.5217	<b>250.0593</b>
Kengen			2.563843895	2	0.198927472	0.397855	2.1660	<b>8.723224</b>	2.9617	<b>19.33078</b>
Kenol Kobil Ltd			2.524521128	2	0.285720971	0.571442	1.9531	<b>7.050364</b>	3.0960	<b>22.10852</b>
KPLC			2.782843219	2	0.150050506	0.300101	2.4827	<b>11.97405</b>	3.0829	<b>21.82256</b>
B.A.T Kenya Ltd			6.33103146	2	0.04675242	0.093505	6.2375	<b>511.5916</b>	6.4245	<b>616.7947</b>
E.A.B.L			5.723063177	2	0.261630801	0.523262	5.1998	<b>181.2363</b>	6.2463	<b>516.1125</b>
CFC Stanbic Holdings Ltd			4.574168996	2	0.776216389	1.552433	3.0217	<b>20.5269</b>	6.1266	<b>457.8775</b>
Safaricom Kenya Ltd			2.20661661	2	0.176568157	0.353136	1.8535	<b>6.381992</b>	2.5598	<b>12.93262</b>
Britam			2.590572795	2	0.308681744	0.617363	1.9732	<b>7.193726</b>	3.2079	<b>24.728</b>
<b>2013 July – December</b>										
Sasini			2.5839004	2	0.455874716	0.911749	1.6722	<b>5.323606</b>	3.4956	<b>32.97171</b>
Barclays bank Ltd			2.915566489	2	0.168550537	0.337101	2.5785	<b>13.1769</b>	3.2527	<b>25.85923</b>
Equity Bank Ltd			3.749889504	2	0.579081439	1.158163	2.5917	<b>13.35281</b>	4.9081	<b>135.3755</b>
Kenya Commercial Bank			3.977881903	2	0.180730117	0.36146	3.6164	<b>37.2042</b>	4.3393	<b>76.65709</b>
Stanchart			5.748377813	2	0.132234075	0.264468	5.4839	<b>240.7863</b>	6.0128	<b>408.6447</b>
Co-operative Bank			2.928921266	2	0.157972195	0.315944	2.6130	<b>13.63959</b>	3.2449	<b>25.65826</b>
Kenya Airways Ltd			2.441104933	2	0.22382569	0.447651	1.9935	<b>7.340842</b>	2.8888	<b>17.97095</b>

Exercise price estimation July – December 2013										
			a	b	c	d		e	f	g
			$\ln(P0)+Exp.Ret-V2/2*0.5$		$V*SQRT(0.5)$	$b*c$	$a-d$		$a+d$	
Nation Media Group			5.856142278	2	0.292760679	0.585521	5.2706	<b>194.5367</b>	6.4417	<b>627.4498</b>
Scangroup			3.980952478	2	0.176222348	0.352445	3.6285	<b>37.65658</b>	4.3334	<b>76.20272</b>
Centum			3.85092517	2	0.228159564	0.456319	3.3946	<b>29.80291</b>	4.3072	<b>74.23564</b>
Athi River			4.544485428	2	0.2010857	0.402171	4.1423	<b>62.94832</b>	4.9467	<b>140.7038</b>
Bamburi			5.38698901	2	0.091168629	0.182337	5.2047	<b>182.1174</b>	5.5693	<b>262.2573</b>
Kengen			2.809516559	2	0.198927472	0.397855	2.4117	<b>11.15248</b>	3.2074	<b>24.71404</b>
Kenol Kobil Ltd			2.085533328	2	0.285720971	0.571442	1.5141	<b>4.545289</b>	2.6570	<b>14.25311</b>
KPLC			2.586256085	2	0.150050506	0.300101	2.2862	<b>9.837042</b>	2.8864	<b>17.92788</b>
B.A.T Kenya Ltd			6.376236896	2	0.04675242	0.093505	6.2827	<b>535.249</b>	6.4697	<b>645.317</b>
E.A.B.L			5.824095403	2	0.261630801	0.523262	5.3008	<b>200.5039</b>	6.3474	<b>570.9816</b>
CFC Stanbic Holdings Ltd			4.953966358	2	0.776216389	1.552433	3.4015	<b>30.01009</b>	6.5064	<b>669.4116</b>
Safaricom Kenya Ltd			2.390466051	2	0.176568157	0.353136	2.0373	<b>7.670101</b>	2.7436	<b>15.54288</b>
Britam			2.829464704	2	0.308681744	0.617363	2.2121	<b>9.134891</b>	3.4468	<b>31.40064</b>
2014 January – June										
Sasini			2.793594007	2	0.159624203	0.319248	2.4743	<b>11.87393</b>	3.1128	<b>22.48486</b>
Barclays bank Ltd			2.826328674	2	0.082891154	0.165782	2.6605	<b>14.3041</b>	2.9921	<b>19.92771</b>
Equity Bank Ltd			3.756640317	2	0.18000833	0.360017	3.3966	<b>29.8631</b>	4.1167	<b>61.35379</b>
Kenya Commercial Bank			3.930082098	2	0.090833107	0.181666	3.7484	<b>42.45378</b>	4.1117	<b>61.05336</b>
Stanchart			5.754353917	2	0.045744044	0.091488	5.6629	<b>287.9727</b>	5.8458	<b>345.7936</b>
Co-operative Bank			2.95077691	2	0.197959897	0.39592	2.5549	<b>12.86946</b>	3.3467	<b>28.40874</b>
Kenya Airways Ltd			2.352175175	2	0.121878301	0.243757	2.1084	<b>8.235208</b>	2.5959	<b>13.40908</b>
Nation Media Group			5.676445901	2	0.095545246	0.19109	5.4854	<b>241.1346</b>	5.8675	<b>353.3773</b>
Scangroup			3.91425581	2	0.278577551	0.557155	3.3571	<b>28.70584</b>	4.4714	<b>87.48006</b>
Centum			3.950312462	2	0.207965553	0.415931	3.5344	<b>34.2738</b>	4.3662	<b>78.74727</b>
Athi River			4.462754748	2	0.129672294	0.259345	4.2034	<b>66.91413</b>	4.7221	<b>112.404</b>
Bamburi			5.176256904	2	0.168656662	0.337313	4.8389	<b>126.3358</b>	5.5136	<b>248.0351</b>
Kengen			2.445739826	2	0.242030057	0.48406	1.9617	<b>7.111262</b>	2.9298	<b>18.72388</b>
Kenol Kobil Ltd			2.206224355	2	0.150535931	0.301072	1.9052	<b>6.720432</b>	2.5073	<b>12.27171</b>
KPLC			2.712755744	2	0.244756562	0.489513	2.2232	<b>9.237235</b>	3.2023	<b>24.58825</b>
B.A.T Kenya Ltd			6.668163871	2	0.228194139	0.456388	6.2118	<b>498.5858</b>	7.1246	<b>1242.092</b>
E.A.B.L			5.655615529	2	0.091573717	0.183147	5.4725	<b>238.047</b>	5.8388	<b>343.3543</b>
CFC Stanbic Holdings Ltd			4.696181235	2	0.20446861	0.408937	4.2872	<b>72.76565</b>	5.1051	<b>164.8636</b>
Safaricom Kenya Ltd			2.544080002	2	0.122868755	0.245738	2.2983	<b>9.957664</b>	2.7898	<b>16.27805</b>
Britam			3.29098931	2	0.38404141	0.768083	2.5229	<b>12.46477</b>	4.0591	<b>57.92054</b>
2014 July – December										
Sasini			2.605450787	2	0.159624203	0.319248	2.2862	<b>9.837508</b>	2.9247	<b>18.62862</b>
Barclays bank Ltd			2.81146956	2	0.082891154	0.165782	2.6457	<b>14.09313</b>	2.9773	<b>19.63379</b>
Equity Bank Ltd			4.151294509	2	0.18000833	0.360017	3.7913	<b>44.31299</b>	4.5113	<b>91.04111</b>

Exercise price estimation July – December 2014										
			a	b	c	d		e	f	g
			$\ln(P_0) + \text{Exp.Ret} - V/2 * 0.5$		$V * \text{SQRT}(0.5)$	$b * c$	$a - d$		$a + d$	
Kenya Commercial Bank			4.094910497	2	0.090833107	0.181666	3.9132	<b>50.0611</b>	4.2766	<b>71.99356</b>
Stanchart			5.804115427	2	0.045744044	0.091488	5.7126	<b>302.6652</b>	5.8956	<b>363.4361</b>
Co-operative Bank			3.0544118	2	0.197959897	0.39592	2.6585	<b>14.27475</b>	3.4503	<b>31.51084</b>
Kenya Airways Ltd			2.208430416	2	0.121878301	0.243757	1.9647	<b>7.132586</b>	2.4522	<b>11.61372</b>
Nation Media Group			5.657275985	2	0.095545246	0.19109	5.4662	<b>236.5561</b>	5.8484	<b>346.6676</b>
Scangroup			3.805621969	2	0.278577551	0.557155	3.2485	<b>25.75083</b>	4.3628	<b>78.47476</b>
Centum			4.100430878	2	0.207965553	0.415931	3.6845	<b>39.8252</b>	4.5164	<b>91.50211</b>
Athi River			4.390434087	2	0.129672294	0.259345	4.1311	<b>62.2457</b>	4.6498	<b>104.5618</b>
Bamburi			3.572898038	2	0.168656662	0.337313	3.2356	<b>25.42123</b>	3.9102	<b>49.9095</b>
Kengen			2.340840246	2	0.242030057	0.48406	1.8568	<b>6.403086</b>	2.8249	<b>16.85927</b>
Kenol Kobil Ltd			2.150654504	2	0.150535931	0.301072	1.8496	<b>6.357166</b>	2.4517	<b>11.60837</b>
KPLC			2.605892598	2	0.244756562	0.489513	2.1164	<b>8.301029</b>	3.0954	<b>22.0962</b>
B.A.T Kenya Ltd			6.797960227	2	0.228194139	0.456388	6.3416	<b>567.688</b>	7.2543	<b>1414.241</b>
E.A.B.L			5.744234365	2	0.091573717	0.183147	5.5611	<b>260.1054</b>	5.9274	<b>375.171</b>
CFC Stanbic Holdings Ltd			5.101646343	2	0.20446861	0.408937	4.6927	<b>109.1485</b>	5.5106	<b>247.2954</b>
Safaricom Kenya Ltd			2.667905352	2	0.122868755	0.245738	2.4222	<b>11.27026</b>	2.9136	<b>18.42379</b>
Britam			3.388563357	2	0.38404141	0.768083	2.6205	<b>13.74233</b>	4.1566	<b>63.857</b>

## Appendix vi: Black and Scholes Simulation

Company name		2011 Jan-Jun					Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		Stock price (S)	Exercise price (X)	Rf	V	t					
<b>Sasini</b>		12.90	7	11.5%	44%	0.5	5.989206	0.025948	11.30	-7.59	-3.9787
		12.90	17	11.5%	44%	0.5	0.639732	3.789804	11.30	-2.24	1.9102
		12.90	11	11.5%	44%	0.5	3.033892	0.519232	11.30	-4.63	-0.8192
		12.90	12	11.5%	44%	0.5	2.416934	0.846397	11.30	-4.02	-0.1464
		12.90	<b>13</b>	11.5%	44%	0.5	1.896493	1.270078	11.30	-3.50	<b>0.4299</b>
<b>Barclays bank ltd</b>		63	10	11.5%	14%	0.5	53.93222	0.22121	17.2	-99.73	-7.5825
		63	20	11.5%	14%	0.5	45.82384	1.706273	17.2	-91.62	1.0937
		63	15	11.5%	14%	0.5	49.61964	0.781468	17.2	-95.42	-2.9815
		63	16	11.5%	14%	0.5	48.8303	0.936248	17.2	-94.63	-2.1362
		63	17	11.5%	14%	0.5	48.05614	1.10621	17.2	-93.86	-1.3062
		63	18	11.5%	14%	0.5	47.29709	1.291285	17.2	-93.10	-0.4913
		63	<b>19</b>	11.5%	14%	0.5	46.55304	1.491358	17.2	-92.35	<b>0.3086</b>
<b>Equity Bank Ltd</b>		29	16	11.5%	30%	0.5	14.22708	0.001054	25.75	-17.48	-10.1027
		29	26	11.5%	30%	0.5	5.172885	0.720054	25.75	-8.42	-0.4701
		29	<b>27</b>	11.5%	30%	0.5	4.494776	0.986067	25.75	-7.74	<b>0.2639</b>
<b>Kenya Commercial Bank</b>		23	12	11.5%	37%	0.5	11.29133	0.005961	24	-10.29	-11.5980
		23	22	11.5%	37%	0.5	3.536425	1.307106	24	-2.54	-3.3071
		23	32	11.5%	37%	0.5	0.50743	7.719331	24	0.49	0.2807
		23	30	11.5%	37%	0.5	0.781134	6.104791	24	0.22	-0.1048
		23	<b>31</b>	11.5%	37%	0.5	0.630885	6.898663	24	0.37	<b>0.1013</b>

Company name	2011		Jan-Jun			t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
	Stock price (\$)	Exercise price (X)	Rf	V							
<b>Stanchart</b>	271	172	11.5%	18%	0.5	108.7 132	0.000 229	234	-145.71	-62.1082	
	271	182	11.5%	18%	0.5	99.17 132	0.001 502	234	-136.17	-52.0015	
	271	192	11.5%	18%	0.5	89.73 605	0.007 453	234	-126.74	-42.0075	
	271	202	11.5%	18%	0.5	80.31 703	0.029 648	234	-117.32	-32.0296	
	271	212	11.5%	18%	0.5	70.94 363	0.097 474	234	-107.94	-22.0975	
	271	222	11.5%	18%	0.5	61.67 679	0.271 846	234	-98.68	-12.2718	
	271	232	11.5%	18%	0.5	52.62 129	0.657 569	234	-89.62	-2.6576	
	271	234	11.5%	18%	0.5	50.84 816	0.772 679	234	-87.85	-0.7727	
	271	<b>235</b>	11.5%	18%	0.5	49.96 743	0.836 075	234	-86.97	<b>0.1639</b>	
<b>Co-operative Bank</b>	20.25	12	11.5%	25%	0.5	9.070 301	0.000 28	16.35	-12.97	-4.5086	
	20.25	22	11.5%	25%	0.5	1.203 814	1.724 495	16.35	-5.10	3.9255	
	20.25	15	11.5%	25%	0.5	6.112 512	0.024 34	16.35	-10.01	-1.3743	
	20.25	16	11.5%	25%	0.5	5.207 523	0.063 473	16.35	-9.11	-0.4135	
	20.25	<b>17</b>	11.5%	25%	0.5	4.341 888	0.141 961	16.35	-8.24	<b>0.5080</b>	
<b>Kenya Airways Ltd</b>	45.75	21	11.5%	37%	0.5	25.55 655	0.001 819	38	-33.31	-16.6113	
	45.75	31	11.5%	37%	0.5	16.64 919	0.166 969	38	-24.40	-7.1670	
	45.75	41	11.5%	37%	0.5	8.759 899	1.718 897	38	-16.51	1.2811	
	45.75	37	11.5%	37%	0.5	11.62 323	0.805 736	38	-19.37	-1.8057	
	45.75	38	11.5%	37%	0.5	10.86 476	0.991 388	38	-18.61	-0.9914	
	45.75	39	11.5%	37%	0.5	10.13 383	1.204 583	38	-17.88	-0.2046	
	45.75	<b>40</b>	11.5%	37%	0.5	9.431 834	1.446 709	38	-17.18	<b>0.5533</b>	

Company name	2011		Jan-Jun			t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
	Stock price (S)	Exercise price (X)	Rf	V							
<b>Nation Media Group</b>	171	124	11.5%	17%	0.5	53.59019	0.003034	167	-57.59	-42.6411	
	171	134	11.5%	17%	0.5	44.51563	0.027959	167	-48.52	-33.0280	
	171	144	11.5%	17%	0.5	35.21778	0.171328	167	-39.22	-23.1713	
	171	154	11.5%	17%	0.5	26.3099	0.70467	167	-30.31	-13.7047	
	171	164	11.5%	17%	0.5	18.27647	2.112464	167	-22.28	-5.1125	
	171	170	11.5%	17%	0.5	14.10739	3.608115	167	-18.11	-0.6081	
	171	<b>171</b>	11.5%	17%	0.5	13.46928	3.914124	167	-17.47	<b>0.0859</b>	
<b>Scangroup</b>	62.5	33	11.5%	36%	0.5	31.38484	0.009272	52.5	-41.38	-19.5427	
	62.5	43	11.5%	36%	0.5	22.12525	0.222493	52.5	-32.13	-9.7225	
	62.5	53	11.5%	36%	0.5	13.91104	1.4495	52.5	-23.91	-0.9495	
	62.5	63	11.5%	36%	0.5	7.734816	4.714495	52.5	-17.73	5.7855	
	62.5	54	11.5%	36%	0.5	13.18941	1.671991	52.5	-23.19	-0.1720	
	62.5	<b>55</b>	11.5%	36%	0.5	12.48971	1.916414	52.5	-22.49	<b>0.5836</b>	
<b>Centum</b>	24	3	11.5%	19%	0.5	21.27133	0.276957	22	-23.27	-19.0934	
	24	13	11.5%	19%	0.5	15.93028	4.203867	22	-17.93	-13.2039	
	24	23	11.5%	19%	0.5	12.74709	10.46189	22	-14.75	-9.4619	
	24	33	11.5%	19%	0.5	10.6055	17.76152	22	-12.61	-6.7615	
	24	43	11.5%	19%	0.5	9.049114	25.64636	22	-11.05	-4.6464	
	24	53	11.5%	19%	0.5	7.861426	33.89989	22	-9.86	-2.8999	
	24	63	11.5%	19%	0.5	6.923546	42.40323	22	-8.92	-1.4032	
	24	73	11.5%	19%	0.5	6.163772	51.08467	22	-8.16	-0.0847	
	24	<b>74</b>	11.5%	19%	0.5	6.095658	51.96068	22	-8.10	<b>0.0393</b>	

Company name	2011		Jan-Jun				Call Price	Put price	stock price at expiration	value of european call option	value of european put option
	Stock price (S)	Exercise price (X)	Rf	V	t						
<b>Athi River</b>	189	125	11.5%	24%	0.05	70.76011	0.025058	182	-77.76	-56.7606	
	189	135	11.5%	24%	0.05	61.64398	0.100437	182	-68.64	-47.1004	
	189	145	11.5%	24%	0.05	52.42822	0.32589	182	-59.43	-37.3259	
	189	155	11.5%	24%	0.05	43.52283	0.861726	182	-50.52	-27.8617	
	189	165	11.5%	24%	0.05	35.1487	1.928811	182	-42.15	-18.9288	
	189	175	11.5%	24%	0.05	27.54597	3.767306	182	-34.55	-10.7673	
	189	185	11.5%	24%	0.05	20.91817	6.580724	182	-27.92	-3.5807	
	189	195	11.5%	24%	0.05	15.38544	10.4892	182	-22.39	2.5108	
	189	190	11.5%	24%	0.05	18.01143	8.394585	182	-25.01	-0.3946	
	189	<b>191</b>	11.5%	24%	0.05	17.46371	8.790995	182	-24.46	<b>0.2090</b>	
<b>Bamburi</b>	201	127	11.5%	20%	0.05	81.32455	0.000617	179	-103.32	-52.2415	
	201	137	11.5%	20%	0.05	71.66078	0.005483	179	-93.66	-42.0055	
	201	147	11.5%	20%	0.05	62.24555	0.031472	179	-84.25	-32.0315	
	201	157	11.5%	20%	0.05	52.90543	0.132572	179	-74.91	-22.1326	
	201	167	11.5%	20%	0.05	43.76491	0.433265	179	-65.76	-12.4333	
	201	177	11.5%	20%	0.05	35.03949	1.14906	179	-57.04	-3.1491	
	201	187	11.5%	20%	0.05	27.0147	2.565493	179	-49.01	5.4345	
	201	180	11.5%	20%	0.05	32.54466	1.486597	179	-54.54	-0.4866	
	201	<b>181</b>	11.5%	20%	0.05	31.72849	1.61455	179	-53.73	<b>0.3854</b>	
<b>Kengen</b>	16.6	8	11.5%	37%	0.05	9.063704	0.000978	13.55	-12.11	-5.5676	
	16.6	18	11.5%	37%	0.05	1.54869	1.942884	13.55	-4.60	2.5071	
	16.6	13	11.5%	37%	0.05	4.551001	0.224586	13.55	-7.60	-0.7746	
	16.6	<b>14</b>	11.5%	37%	0.05	3.78491	0.402616	13.55	-6.83	<b>0.0474</b>	



Company name	2011		Jan-Jun			t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
	Stock price (\$)	Exercise price (X)	Rf	V	t						
<b>Kenol Kobil Ltd</b>	10	7	11.5%	30%	0.5	3.70554	0.00874	11.5	-2.21	-4.8325	
	10	17	11.5%	30%	0.5	0.011933	6.062005	11.5	1.49	-0.5620	
	10	<b>27</b>	11.5%	30%	0.5	3.55E-06	15.49129	11.5	1.50	<b>0.0087</b>	
	10	26	11.5%	30%	0.5	8.09E-06	14.54718	11.5	1.50	-0.0472	
<b>KPLC</b>	24	16	11.5%	19%	0.5	8.802627	0.000297	21.5	-11.30	-5.4031	
	24	26	11.5%	19%	0.5	1.072085	1.619254	21.5	-3.57	2.8807	
	24	20	11.5%	19%	0.5	5.165003	0.04744	21.5	-7.67	-1.5474	
	24	21	11.5%	19%	0.5	4.284943	0.111503	21.5	-6.78	-0.6115	
	24	<b>22</b>	11.5%	19%	0.5	3.459454	0.230136	21.5	-5.96	<b>0.2699</b>	
<b>B.A.T Kenya Ltd</b>	276	204	11.5%	18%	0.5	83.76496	0.022399	264	-95.76	-60.3861	
	276	214	11.5%	18%	0.5	74.03636	0.078449	264	-86.04	-50.0784	
	276	224	11.5%	18%	0.5	64.73912	0.222419	264	-76.74	-40.2224	
	276	234	11.5%	18%	0.5	55.62248	0.547	264	-67.62	-30.5470	
	276	244	11.5%	18%	0.5	46.82331	1.189049	264	-58.82	-21.1890	
	276	254	11.5%	18%	0.5	38.51528	2.322242	264	-50.52	-12.3222	
	276	264	11.5%	18%	0.5	30.8853	4.133484	264	-42.89	-4.1335	
	276	274	11.5%	18%	0.5	24.10077	6.79017	264	-36.10	3.2098	
	276	269	11.5%	18%	0.5	27.37857	5.34736	264	-39.38	-0.3474	
	276	<b>270</b>	11.5%	18%	0.5	26.70423	5.617138	264	-38.70	<b>0.3829</b>	
<b>E.A.B.L</b>	184	132	11.5%	22%	0.5	59.69978	0.04818	182	-61.70	-50.3402	
	184	142	11.5%	22%	0.5	50.13472	0.200028	182	-52.13	-40.2000	

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		184	152	11.5%	22%	0.5	41.10963	0.616153	182	-43.11	-30.6162	
		184	162	11.5%	22%	0.5	32.5979	1.545651	182	-34.60	-21.5457	
		184	172	11.5%	22%	0.5	24.89327	3.282232	182	-26.89	-13.2822	
		184	182	11.5%	22%	0.5	18.25754	6.087728	182	-20.26	-6.0877	
		184	192	11.5%	22%	0.5	12.84587	10.11727	182	-14.85	-0.1173	
		184	202	11.5%	22%	0.5	8.672371	15.38499	182	-10.67	4.6150	
		184	<b>193</b>	11.5%	22%	0.5	12.37378	10.58931	182	-14.37	<b>0.4107</b>	
<b>CFC Stanbic Holdings Ltd</b>		80.5	25	11.5%	76%	0.5	57.18866	0.080115	50.5	-87.19	-25.8042	
		80.5	35	11.5%	76%	0.5	47.99125	0.535516	50.5	-77.99	-16.0355	
		80.5	45	11.5%	76%	0.5	39.7469	1.732382	50.5	-69.75	-7.2324	
		80.5	55	11.5%	76%	0.5	32.50528	3.931983	50.5	-62.51	0.5680	
		80.5	54	11.5%	76%	0.5	33.18067	3.663253	50.5	-63.18	-0.1633	
<b>Safaricom Kenya Ltd</b>		4.45	2	11.5%	33%	0.5	2.155275	0.000455	3.05	-3.56	-0.6194	
		4.45	12	11.5%	33%	0.5	9.84E-06	6.879473	3.05	-1.40	2.0705	
		4.45	3	11.5%	33%	0.5	1.625512	0.007878	3.05	-3.03	-0.0579	
		4.45	<b>4</b>	11.5%	33%	0.5	0.806462	0.13295	3.05	-2.21	<b>0.8171</b>	
<b>Britam</b>		Unlisted							Unlisted			
		<b>July-Dec,2011</b>										
<b>Sasini</b>		11.3	6	11.5%	44%	0.5	5.246359	0.02273	13.25	-3.30	-6.8367	
		11.3	16	11.5%	44%	0.5	0.386412	4.192362	13.25	1.56	-1.4424	
		11.3	26	11.5%	44%	0.5	0.01095	13.25812	13.25	1.94	-0.5081	

		2011 Jan – Jun										
Company name	Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option		
	11.3	36	11.5%	44%	0.5	0.000325	22.68871	13.25	1.95	0.0613		
	11.3	<b>35</b>	11.5%	44%	0.5	0.000457	21.74472	13.25	1.95	<b>0.0053</b>		
	11.3	34	11.5%	44%	0.5	0.000646	20.80079	13.25	1.95	-0.0508		
<b>Barclays bank ltd</b>	17.2	3	11.5%	14.0%	0.5	14.72435	0.060394	13.05	-18.87	-10.4243		
	17.2	13	11.5%	14.0%	0.5	8.349963	3.423548	13.05	-12.50	-3.4735		
	17.2	<b>23</b>	11.5%	14.0%	0.5	5.315089	9.829892	13.05	-9.47	<b>0.1201</b>		
	17.2	21	11.5%	14.0%	0.5	5.780789	8.407349	13.05	-9.93	-0.4573		
	17.2	22	11.5%	14.0%	0.5	5.541104	9.111785	13.05	-9.69	-0.1618		
<b>Equity Bank ltd</b>	25.75	14	11.5%	30%	0.5	12.63267	0.000936	16.85	-21.53	-2.9563		
	25.75	24	11.5%	30%	0.5	3.974265	0.88319	16.85	-12.87	6.2668		
	25.75	16	11.5%	30%	0.5	10.65314	0.009091	16.85	-19.55	-0.8591		
	25.75	<b>17</b>	11.5%	30%	0.5	9.721493	0.021566	16.85	-18.62	<b>0.1284</b>		
<b>Kenya Commercial Bank</b>	24	13	11.5%	37%	0.5	11.78225	0.00622	16.85	-18.93	-3.9088		
	24	23	11.5%	37%	0.5	3.665422	1.380225	16.85	-10.82	4.7698		
	24	15	11.5%	37%	0.5	9.874131	0.035959	16.85	-17.02	-1.8860		
	24	16	11.5%	37%	0.5	8.965359	0.071309	16.85	-16.12	-0.9213		
	24	<b>17</b>	11.5%	37%	0.5	8.079535	0.129607	16.85	-15.23	<b>0.0204</b>		
<b>Stanchart</b>	234	148	11.5%	18%	0.5	93.87041	0.000198	160	-167.87	-11.5768		
	234	158	11.5%	18%	0.5	84.83028	0.001534	160	-158.83	-2.0015		
	234	168	11.5%	18%	0.5	75.39688	0.009353	160	-149.40	7.9906		

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		234	160	11.5%	18%	0.5	82.94 276	0.002 259	160	-156.94	-0.0023
		234	<b>161</b>	11.5%	18%	0.5	81.99 91	0.002 728	160	-156.00	<b>0.9973</b>
<b>Co-operative Bank</b>		16.35	10	11.5%	25%	0.5	7.323 428	0.000 226	12.25	-11.42	-2.6892
		16.35	20	11.5%	25%	0.5	0.365 959	2.898 396	12.25	-4.47	4.8516
		16.35	12	11.5%	25%	0.5	5.037 526	0.016 988	12.25	-9.14	-0.2670
		16.35	<b>13</b>	11.5%	25%	0.5	4.132 362	0.055 947	12.25	-8.23	<b>0.6941</b>
<b>Kenya Airways Ltd</b>		38	18	11.5%	37%	0.5	21.22 73	0.001 511	20.75	-38.48	-2.9845
		38	28	11.5%	37%	0.5	11.87 004	0.305 457	20.75	-29.12	6.9445
		38	20	11.5%	37%	0.5	19.12 528	0.007 713	20.75	-36.38	-0.7577
		38	<b>21</b>	11.5%	37%	0.5	18.18 777	0.014 332	20.75	-35.44	<b>0.2357</b>
<b>Nation Media Group</b>		167	121	11.5%	17%	0.5	52.33 662	0.002 963	140	-79.34	-18.5501
		167	131	11.5%	17%	0.5	43.34 812	0.028 083	140	-70.35	-9.0281
		167	<b>141</b>	11.5%	17%	0.5	34.05 648	0.177 669	140	-61.06	<b>0.8223</b>
		167	139	11.5%	17%	0.5	35.89 445	0.127 395	140	-62.89	-1.1274
<b>Scangroup</b>		52.5	28	11.5%	36%	0.5	26.36 327	0.007 788	41.5	-37.36	-13.8159
		52.5	38	11.5%	36%	0.5	16.93 247	0.309 102	41.5	-27.93	-3.8091
		52.5	48	11.5%	36%	0.5	9.296 315	2.114 165	41.5	-20.30	4.3858
		52.5	40	11.5%	36%	0.5	15.23 291	0.497 789	41.5	-26.23	-1.9978

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		52.5	41	11.5%	36%	0.5	14.41013	0.619124	41.5	-25.41	-1.1191	
		52.5	42	11.5%	36%	0.5	13.60759	0.760712	41.5	-24.61	-0.2607	
		52.5	<b>43</b>	11.5%	36%	0.5	12.82689	0.924134	41.5	-23.83	<b>0.5759</b>	
<b>Centum</b>		22	3	11.5%	19.4%	0.5	19.49872	0.253877	13.5	-28.00	-10.8357	
		22	13	11.5%	19.4%	0.5	14.18334	4.456929	13.5	-22.68	-4.9569	
		22	23	11.5%	19.4%	0.5	11.21466	10.92946	13.5	-19.71	-1.4295	
		22	33	11.5%	19.4%	0.5	9.24893	18.40495	13.5	-17.75	1.0950	
		22	28	11.5%	19.4%	0.5	10.14314	14.57856	13.5	-18.64	-0.0786	
<b>Athi River</b>		182	121	11.5%	24%	0.5	68.13937	0.02413	158	-92.14	-37.3991	
		182	131	11.5%	24%	0.5	58.43052	0.110483	158	-82.43	-27.1105	
		182	141	11.5%	24%	0.5	49.24338	0.364566	158	-73.24	-17.3646	
		182	151	11.5%	24%	0.5	40.40848	0.970889	158	-64.41	-7.9709	
		182	<b>161</b>	11.5%	24%	0.5	32.17057	2.17419	158	-56.17	<b>0.8258</b>	
		182	159	11.5%	24%	0.5	33.75775	1.873134	158	-57.76	-0.8731	
		182	160	11.5%	24%	0.5	32.96	2.0195	158	-56.96	-0.0195	
<b>Bamburi</b>		179	113	11.5%	20%	0.5	72.42336	0.00055	125	-126.42	-12.1156	
		179	123	11.5%	20%	0.5	62.87905	0.00604	125	-116.88	-2.0060	
		179	133	11.5%	20%	0.5	53.47208	0.040291	125	-107.47	7.9597	
		179	125	11.5%	20%	0.5	60.9939	0.009133	125	-114.99	-0.0091	
		179	<b>126</b>	11.5%	20%	0.5	60.0518	0.011156	125	-114.05	<b>0.9888</b>	
<b>Kengen</b>		13.55	7	11.5%	37%	0.5	7.398385	0.000798	8.45	-12.50	-1.9343	

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		13.55	17	11.5%	37%	0.5	0.592706	3.092779	8.45	-5.69	5.4572
		13.55	8	11.5%	37%	0.5	6.008222	0.011197	8.45	-11.11	-0.4612
		13.55	9	11.5%	37%	0.5	5.093165	0.040262	8.45	-10.19	<b>0.5097</b>
<b>Kenol Kobil Ltd</b>		11.5	8	11.5%	30%	0.5	4.261372	0.010051	9.95	-5.81	-2.2824
		11.5	18	11.5%	30%	0.5	0.037864	5.532058	9.95	-1.59	2.5179
		11.5	10	11.5%	30%	0.5	2.267783	0.209002	9.95	-3.82	-0.1590
		11.5	11	11.5%	30%	0.5	1.585385	0.470726	9.95	-3.14	<b>0.5793</b>
<b>KPLC</b>		21.5	14	11.5%	19%	0.5	7.885687	0.000266	17.55	-11.84	-3.1299
		21.5	24	11.5%	19%	0.5	0.715506	1.874431	17.55	-4.67	4.5756
		21.5	15	11.5%	19%	0.5	7.338957	0.000785	17.55	-11.29	-2.5508
		21.5	16	11.5%	19%	0.5	6.397997	0.003947	17.55	-10.35	-1.5539
		21.5	17	11.5%	19%	0.5	5.465056	0.015129	17.55	-9.42	-0.5651
		21.5	18	11.5%	19%	0.5	4.552101	0.046295	17.55	-8.50	<b>0.4037</b>
<b>B.A.T Kenya Ltd</b>		264	195	11.5%	18%	0.5	80.123	0.021425	246	-98.12	-51.2389
		264	205	11.5%	18%	0.5	70.53277	0.077754	246	-88.53	-41.0778
		264	215	11.5%	18%	0.5	61.24296	0.229169	246	-79.24	-31.2292
		264	225	11.5%	18%	0.5	52.15174	0.579162	246	-70.15	-21.5792
		264	235	11.5%	18%	0.5	43.41327	1.281917	246	-61.41	-12.2819
		264	245	11.5%	18%	0.5	35.22111	2.530974	246	-53.22	-3.5310
		264	255	11.5%	18%	0.5	27.77791	4.528997	246	-45.78	4.4710
		264	248	11.5%	18%	0.5	32.90073	3.042959	246	-50.90	-1.0430

		Stock price (S)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		264	249	11.5%	18%	0.5	32.1432	3.229552	246	-50.14	-0.2296	
		264	<b>250</b>	11.5%	18%	0.5	31.39395	3.424421	246	-49.39	<b>0.5756</b>	
<b>E.A.B.L</b>		182	130	11.5%	22%	0.5	59.05087	0.047656	172	-69.05	-41.7713	
		182	140	11.5%	22%	0.5	50.00971	0.186773	172	-60.01	-32.1868	
		182	150	11.5%	22%	0.5	40.96972	0.588008	172	-50.97	-22.5880	
		182	160	11.5%	22%	0.5	32.43888	1.498383	172	-42.44	-13.4984	
		182	170	11.5%	22%	0.5	24.71678	3.217505	172	-34.72	-5.2175	
		182	180	11.5%	22%	0.5	18.07222	6.014162	172	-28.07	1.9858	
		182	175	11.5%	22%	0.5	21.24659	4.46792	172	-31.25	-1.4679	
		182	176	11.5%	22%	0.5	20.58741	4.752862	172	-30.59	-0.7529	
		182	177	11.5%	22%	0.5	19.94025	5.049822	172	-29.94	-0.0498	
		182	<b>178</b>	11.5%	22%	0.5	19.30525	5.358943	172	-29.31	<b>0.6411</b>	
<b>CFC Stanbic Holdings Ltd</b>		50.5	16	11.5%	76%	0.5	35.87612	0.050259	40	-46.38	-24.5076	
		50.5	26	11.5%	76%	0.5	26.70664	0.753805	40	-37.21	-14.7538	
		50.5	36	11.5%	76%	0.5	19.40837	2.896761	40	-29.91	-6.8968	
		50.5	46	11.5%	76%	0.5	13.82112	6.750727	40	-24.32	-0.7507	
		50.5	40	11.5%	76%	0.5	16.97252	4.2374	40	-27.47	-4.2374	
		50.5	41	11.5%	76%	0.5	16.40635	4.615349	40	-26.91	-3.6153	
		50.5	42	11.5%	76%	0.5	15.8569	5.010021	40	-26.36	-3.0100	
		50.5	43	11.5%	76%	0.5	15.32393	5.421172	40	-25.82	-2.4212	
		50.5	44	11.5%	76%	0.5	14.80717	5.848534	40	-25.31	-1.8485	
		50.5	45	11.5%	76%	0.5	14.30633	6.29182	40	-24.81	-1.2918	
		50.5	47	11.5%	76%	0.5	13.35121	7.224937	40	-23.85	-0.2249	

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		50.5	48	11.5%	76%	0.5	12.89627	7.714121	40	-23.40	0.2859
<b>Safaricom Kenya Ltd</b>		3.05	2	11.5%	33%	0.5	1.477211	0.000312	2.95	-1.58	-1.2841
		3.05	12	11.5%	33%	0.5	1.6E-09	8.279463	2.95	-0.10	0.7705
		3.05	3	11.5%	33%	0.5	0.393423	0.175788	2.95	-0.49	-0.1258
		3.05	4	11.5%	33%	0.5	0.075261	0.801749	2.95	-0.18	0.2483
<b>Britam</b>		Unlisted							Unlisted		
		<b>2012 Jan-Jun</b>									
<b>Sasini</b>		12.35	4	11.5%	82%	0.5	8.167476	0.049874	11.95	-8.57	-7.5170
		12.35	14	11.5%	82%	0.5	2.486472	3.354178	11.95	-2.89	-1.3042
		12.35	24	11.5%	82%	0.5	0.707454	11.01638	11.95	-1.11	1.0336
		12.35	15	11.5%	82%	0.5	2.183885	3.995713	11.95	-2.58	-0.9457
		12.35	16	11.5%	82%	0.5	1.919256	4.675207	11.95	-2.32	-0.6252
		12.35	17	11.5%	82%	0.5	1.687978	5.38805	11.95	-2.09	-0.3381
		12.35	18	11.5%	82%	0.5	1.485896	6.13009	11.95	-1.89	-0.0801
		12.35	19	11.5%	82%	0.5	1.309307	6.897623	11.95	-1.71	0.1524
<b>Barclays bank Ltd</b>		12.35	10	11.5%	24%	0.5	2.781034	0.061654	13.05	-2.08	-2.9110
		12.35	20	11.5%	24%	0.5	0.005729	6.538167	13.05	0.69	0.4118
		12.35	15	11.5%	24%	0.5	0.27409	2.085918	13.05	0.43	-0.1359
		12.35	16	11.5%	24%	0.5	0.138935	2.894886	13.05	0.56	0.0551
<b>Equity Bank Ltd</b>		17.7	18	11.5%	11%	0.5	0.953907	0.264242	21.25	2.60	-3.4971
		17.7	28	11.5%	11%	0.5	4.31E-08	8.735413	21.25	3.55	-1.9854



		Stock price (S)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		17.7	19	11.5%	11%	0.5	0.444004	0.68232	21.25	3.11	-2.9323
		17.7	20	11.5%	11%	0.5	0.163238	1.345676	21.25	3.39	-2.5957
		17.7	21	11.5%	11%	0.5	0.047685	2.174245	21.25	3.50	-2.4242
		17.7	<b>22</b>	11.5%	11%	0.5	0.01115	3.081832	21.25	<b>3.54</b>	-2.3318
		17.7	23	11.5%	11%	0.5	0.002118	4.016921	21.25	3.55	-2.2669
		17.7	60	11.5%	11%	0.5	2.92E-51	38.94731	21.25	3.55	-0.1973
		17.7	61	11.5%	11%	0.5	1.2E-52	39.89144	21.25	3.55	-0.1414
		17.7	62	11.5%	11%	0.5	4.95E-54	40.83556	21.25	3.55	-0.0856
		17.7	63	11.5%	11%	0.5	2.06E-55	41.77968	21.25	3.55	-0.0297
		17.7	64	11.5%	11%	0.5	8.69E-57	42.7238	21.25	3.55	<b>0.0262</b>
	<b>Kenya Commercial Bank</b>	19	5	11.5%	15.6%	0.5	14.65431	0.485846	23	-10.65	-18.3684
		19	15	11.5%	15.6%	0.5	9.562564	4.724392	23	-5.56	-12.7244
		19	25	11.5%	15.6%	0.5	6.7481	11.35115	23	-2.75	-9.3511
		19	35	11.5%	15.6%	0.5	5.023247	19.06751	23	-1.02	-7.0675
		19	45	11.5%	15.6%	0.5	3.880092	27.36558	23	0.12	-5.3656
		19	40	11.5%	15.6%	0.5	4.397579	23.16245	23	-0.40	-6.1625
		19	41	11.5%	15.6%	0.5	4.286307	23.9953	23	-0.29	-5.9953
		19	42	11.5%	15.6%	0.5	4.179118	24.83224	23	-0.18	-5.8322
		19	43	11.5%	15.6%	0.5	4.075809	25.67305	23	-0.08	-5.6731
		19	<b>44</b>	11.5%	15.6%	0.5	3.976193	26.51756	23	<b>0.02</b>	-5.5176
		19	105	11.5%	15.6%	0.5	1.247587	81.38039	23	2.75	0.6196
		19	96	11.5%	15.6%	0.5	1.435699	73.0714	23	2.56	-0.0714
		19	97	11.5%	15.6%	0.5	1.412933	73.99276	23	2.59	0.0072

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
<b>Stanchart</b>		157	78	11.5%	18%	0.5	83.74 507	1.77E -09	201	-39.75	-123.4095
		157	118	11.5%	18%	0.5	45.61 059	0.016 976	201	-1.61	-83.0170
		157	119	11.5%	18%	0.5	44.67 067	0.021 18	201	-0.67	-82.0212
		157	<b>120</b>	11.5%	18%	0.5	43.73 165	0.026 277	201	<b>0.27</b>	-81.0263
		157	787	11.5%	18%	0.5	1.73E -34	586.0 239	201	44.00	-0.0239
		157	789	11.5%	18%	0.5	1.35E -34	587.9 122	201	44.00	<b>0.0878</b>
<b>Co-operative Bank</b>		12.95	9	11.5%	24%	0.5	4.278 606	0.006 157	11.2	-6.03	-2.0150
		12.95	19	11.5%	24%	0.5	0.029 391	5.017 707	11.2	-1.78	2.7823
		12.95	10	11.5%	24%	0.5	3.533 476	0.024 695	11.2	-5.28	-1.2247
		12.95	11	11.5%	24%	0.5	2.658 687	0.094 028	11.2	-4.41	-0.2940
		12.95	<b>12</b>	11.5%	24%	0.5	1.880 867	0.260 33	11.2	-3.63	<b>0.5397</b>
<b>Kenya Airways Ltd</b>		19.6	11	11.5%	31%	0.5	9.624 859	0.000 729	13.1	-16.12	-2.5344
		19.6	21	11.5%	31%	0.5	1.584 558	1.811 117	13.1	-8.08	6.0889
		19.6	12	11.5%	31%	0.5	8.276 248	0.005 711	13.1	-14.78	-1.1057
		19.6	13	11.5%	31%	0.5	7.344 307	0.017 891	13.1	-13.84	-0.1179
		19.6	<b>14</b>	11.5%	31%	0.5	6.428 806	0.046 512	13.1	-12.93	<b>0.8535</b>
<b>Nation Media Group</b>		141	144	11.5%	20%	0.5	10.46 312	5.331 622	176	24.54	-37.4217
		141	224	11.5%	20%	0.5	0.011 474	70.49 478	176	34.99	-22.4948
		141	225	11.5%	20%	0.5	0.010 276	71.43 77	176	34.99	-22.4377
		141	<b>232</b>	11.5%	20%	0.5	0.004 697	78.04 098	176	<b>35.00</b>	<b>-22.0410</b>
<b>Scangroup</b>		39.5	42	11.5%	23%	0.5	2.574 939	2.522 572	54.5	12.43	-15.2402

		39.5	52	11.5%	23%	0.5	0.296159	9.890498	54.5	14.70	-12.3905
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		39.5	62	11.5%	23%	0.5	0.019439	19.055	54.5	14.98	-11.5550
		39.5	65	11.5%	23%	0.5	0.007915	21.87584	54.5	14.99	-11.3758
		39.5	66	11.5%	23%	0.5	0.005829	22.81787	54.5	14.99	-11.3179
		39.5	<b>67</b>	11.5%	23%	0.5	0.004279	23.76045	54.5	<b>15.00</b>	-11.2604
		39.5	268	11.5%	23%	0.5	1.41E-30	213.5247	54.5	15.00	-0.0247
		39.5	269	11.5%	23%	0.5	1.08E-30	214.4688	54.5	15.00	<b>0.0312</b>
<b>Centum</b>		14.2	9	11.5%	28%	0.5	5.564071	0.004027	12.75	-7.01	-3.6027
		14.2	19	11.5%	28%	0.5	0.180145	3.918461	12.75	-1.63	2.3315
		14.2	10	11.5%	28%	0.5	4.774545	0.015763	12.75	-6.22	-2.7658
		14.2	11	11.5%	28%	0.5	3.871346	0.056687	12.75	-5.32	-1.8067
		14.2	12	11.5%	28%	0.5	3.025784	0.155246	12.75	-4.48	-0.9052
		14.2	13	11.5%	28%	0.5	2.271608	0.345193	12.75	-3.72	-0.0952
		14.2	<b>14</b>	11.5%	28%	0.5	1.635875	0.653582	12.75	-3.09	<b>0.5964</b>
<b>Athi River</b>		151	154	11.5%	17%	0.5	10.17367	4.500638	200	38.83	-50.5725
		151	224	11.5%	17%	0.5	0.013379	60.49668	200	48.99	-36.4967
		151	225	11.5%	17%	0.5	0.011785	61.43921	200	48.99	-36.4392
		151	<b>232</b>	11.5%	17%	0.5	0.004762	68.04104	200	49.00	<b>-36.0410</b>
<b>Bamburi</b>		135	127	11.5%	18%	0.5	16.63167	1.528468	165	13.37	-39.5355
		135	207	11.5%	18%	0.5	0.010864	60.4441	165	29.99	-18.4441
		135	210	11.5%	18%	0.5	0.007364	63.27296	165	29.99	-18.2730
		135	212	11.5%	18%	0.5	0.005665	65.15951	165	29.99	-18.1595
		135	<b>213</b>	11.5%	18%	0.5	0.004964	66.10293	165	<b>30.00</b>	-18.1029

		135	537	11.5%	18%	0.5	3.81E-25	371.9935	165	30.00	0.0065
		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
<b>Kengen</b>		8	6	11.5%	25%	0.5	2.360904	0.011476	8.6	-1.76	-2.6265
		8	16	11.5%	25%	0.5	8.59E-05	7.106036	8.6	0.60	0.2940
		8	7	11.5%	25%	0.5	1.484549	0.093402	8.6	-0.88	-1.6934
		8	8	11.5%	25%	0.5	0.803491	0.356466	8.6	-0.20	-0.9565
		8	9	11.5%	25%	0.5	0.369598	0.866695	8.6	0.23	-0.4667
		8	10	11.5%	25%	0.5	0.146519	1.587738	8.6	0.45	-0.1877
		8	11	11.5%	25%	0.5	0.051227	2.436568	8.6	0.55	-0.0366
		8	<b>12</b>	11.5%	25%	0.5	0.016183	3.345646	8.6	0.58	<b>0.0544</b>
<b>Kenol Kobil Ltd</b>		8.95	7	11.5%	34%	0.5	2.123949	0.143325	14.3	3.23	-7.0615
		8.95	<b>17</b>	11.5%	34%	0.5	0.006808	7.10688	14.3	<b>5.34</b>	-4.4069
		8.95	27	11.5%	34%	0.5	4.5E-06	16.5413	14.3	5.35	-3.8413
		8.95	18	11.5%	34%	0.5	0.003297	8.047491	14.3	5.35	-4.3475
		8.95	57	11.5%	34%	0.5	2.1E-14	44.86495	14.3	5.35	-2.1649
		8.95	67	11.5%	34%	0.5	9.62E-17	54.30617	14.3	5.35	-1.6062
		8.95	77	11.5%	34%	0.5	6.54E-19	63.74739	14.3	5.35	-1.0474
		8.95	94	11.5%	34%	0.5	2.87E-22	79.79746	14.3	5.35	-0.0975
		8.95	95	11.5%	34%	0.5	1.87E-22	80.74158	14.3	5.35	-0.0416
		8.95	96	11.5%	34%	0.5	1.22E-22	81.6857	14.3	5.35	0.0143
<b>KPLC</b>		15.5	12	11.5%	23%	0.5	4.223131	0.020403	15.1	-4.62	-3.1545
		15.5	22	11.5%	23%	0.5	0.04032	5.311001	15.1	-0.44	1.5890
		15.5	15	11.5%	23%	0.5	1.769743	0.431571	15.1	-2.17	-0.5316
		15.5	<b>16</b>	11.5%	23%	0.5	1.195793	0.801743	15.1	-1.60	<b>0.0983</b>

		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
<b>B.A.T Kenya Ltd</b>		260	272	11.5%	30%	0.5	23.39455	20.39094	372	88.61	-120.1842	
		260	282	11.5%	30%	0.5	19.2681	25.51047	372	92.73	-115.5105	
		260	292	11.5%	30%	0.5	15.66101	31.34461	372	96.34	-111.3446	
		260	302	11.5%	30%	0.5	12.61793	37.74274	372	99.38	-107.7427	
		260	572	11.5%	30%	0.5	0.005827	280.0435	372	111.99	-80.0435	
		260	575	11.5%	30%	0.5	0.005302	282.8754	372	111.99	-79.8754	
		260	576	11.5%	30%	0.5	0.005138	283.8193	372	111.99	-79.8193	
		260	<b>577</b>	11.5%	30%	0.5	0.004979	284.7633	372	<b>112.00</b>	-79.7633	
<b>E.A.B.L</b>		166	185	11.5%	14%	0.5	3.050346	11.94974	227	57.95	-53.6989	
		166	195	11.5%	14%	0.5	1.223229	19.327	227	59.78	-51.3270	
		166	205	11.5%	14%	0.5	0.4117	27.95669	227	60.59	-49.9567	
		166	215	11.5%	14%	0.5	0.120033	37.10624	227	60.88	-49.1062	
		166	220	11.5%	14%	0.5	0.06165	41.76847	227	60.94	-48.7685	
		166	225	11.5%	14%	0.5	0.030692	46.45812	227	60.97	-48.4581	
		166	230	11.5%	14%	0.5	0.014834	51.16287	227	60.99	-48.1629	
		166	231	11.5%	14%	0.5	0.012783	52.10494	227	60.99	-48.1049	
		166	232	11.5%	14%	0.5	0.011004	53.04728	227	60.99	-48.0473	
		166	233	11.5%	14%	0.5	0.009461	53.98986	227	60.99	-47.9899	
		166	237	11.5%	14%	0.5	0.005116	57.762	227	60.99	-47.7620	
		166	<b>238</b>	11.5%	14%	0.5	0.004376	58.70539	227	<b>61.00</b>	-47.7054	
<b>CFC Stanbic Holdings Ltd</b>		40	28	11.5%	29%	0.5	13.95998	0.049439	43.5	-10.46	-15.9159	
		40	38	11.5%	29%	0.5	5.625938	1.50257	43.5	-2.13	-7.0026	
		40	48	11.5%	29%	0.5	1.492922	6.810772	43.5	2.01	-2.3108	
		40	58	11.5%	29%	0.5	0.279405	15.03848	43.5	3.22	-0.5385	

				11.5%	29%	0.5	0.041782	24.24207				0.2579
		40	68						43.5	3.46		
		Stock price (S)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		40	59	11.5%	29%	0.5	0.232968	15.93616	43.5	3.27	-0.4362	
		40	60	11.5%	29%	0.5	0.193841	16.84115	43.5	3.31	-0.3412	
		40	61	11.5%	29%	0.5	0.160964	17.7524	43.5	3.34	-0.2524	
		40	62	11.5%	29%	0.5	0.133411	18.66897	43.5	3.37	-0.1690	
		40	63	11.5%	29%	0.5	0.110375	19.59005	43.5	3.39	-0.0901	
		40	64	11.5%	29%	0.5	0.091163	20.51496	43.5	3.41	-0.0150	
		40	<b>65</b>	11.5%	29%	0.5	0.075173	21.4431	43.5	3.42	<b>0.0569</b>	
	<b>Safaricom Kenya Ltd</b>	3.2	3	11.5%	19%	0.5	0.210201	0.130441	3.45	0.04	-0.2755	
		3.2	13	11.5%	19%	0.5	1.78E-25	9.073585	3.45	0.25	0.4764	
		3.2	4	11.5%	19%	0.5	0.023457	0.599944	3.45	0.23	-0.0499	
		3.2	<b>5</b>	11.5%	19%	0.5	0.000254	1.520863	3.45	0.25	<b>0.0291</b>	
	<b>Britam</b>	4.65	4	11.5%	21%	0.5	0.883394	0.026216	5.85	0.32	-1.8589	
		4.65	14	11.5%	21%	0.5	4.35E-13	8.567706	5.85	1.20	-0.4177	
		4.65	5	11.5%	21%	0.5	0.248893	0.319503	5.85	0.95	-1.1695	
		4.65	6	11.5%	21%	0.5	0.035062	1.049793	5.85	1.16	-0.8998	
		4.65	<b>7</b>	11.5%	21%	0.5	0.002881	1.961734	5.85	<b>1.20</b>	-0.8117	
		4.65	17	11.5%	21%	0.5	2.2E-17	11.40007	5.85	1.20	-0.2501	
		4.65	18	11.5%	21%	0.5	8.8E-19	12.34419	5.85	1.20	-0.1942	
		4.65	19	11.5%	21%	0.5	3.69E-20	13.28832	5.85	1.20	-0.1383	
		4.65	20	11.5%	21%	0.5	1.63E-21	14.23244	5.85	1.20	-0.0824	
		4.65	21	11.5%	21%	0.5	7.51E-23	15.17656	5.85	1.20	-0.0266	
		4.65	<b>22</b>	11.5%	21%	0.5	3.64E-24	16.12068	5.85	1.20	<b>0.0293</b>	
		<b>2012 July-Dec</b>										

				11.5%	82%	0.5	7.902942	0.048259			
<b>Sasini</b>		11.95	4	11.5%	82%	0.5	7.902942	0.048259	11.7	-8.15	-7.4106
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		11.95	14	11.5%	82%	0.5	2.263859	3.531566	11.7	-2.51	-1.2316
		11.95	24	11.5%	82%	0.5	0.621823	11.33075	11.7	-0.87	0.9693
		11.95	18	11.5%	82%	0.5	1.332077	6.376271	11.7	-1.58	-0.0763
		11.95	<b>19</b>	11.5%	82%	0.5	1.169601	7.157917	11.7	-1.42	<b>0.1421</b>
<b>Barclays bank ltd</b>		13.05	11	11.5%	24%	0.5	2.938663	0.065149	15.75	-0.24	-5.0364
		13.05	21	11.5%	24%	0.5	0.006756	6.783316	15.75	2.69	-1.5333
		13.05	<b>12</b>	11.5%	24%	0.5	1.961157	0.240619	15.75	<b>0.74</b>	-3.9906
<b>Equity Bank Ltd</b>		21.25	22	11.5%	11%	0.5	1.145228	0.31724	23.75	1.35	-2.4365
		21.25	32	11.5%	11%	0.5	1.34E-06	8.961902	23.75	2.50	-0.7119
		21.25	42	11.5%	11%	0.5	1.9E-16	18.40312	23.75	2.50	-0.1531
		21.25	24	11.5%	11%	0.5	0.198045	1.606971	23.75	2.30	-1.3570
		21.25	25	11.5%	11%	0.5	0.072319	2.425366	23.75	2.43	-1.1754
		21.25	26	11.5%	11%	0.5	0.022595	3.319765	23.75	2.48	-1.0698
		21.25	27	11.5%	11%	0.5	0.006087	4.247378	23.75	2.49	-0.9974
		21.25	<b>28</b>	11.5%	11%	0.5	0.001428	5.186841	23.75	<b>2.50</b>	-0.9368
<b>Kenya Commercial Bank</b>		23	6	11.5%	15.6%	0.5	17.73943	0.58813	29.75	-10.99	-24.1433
		23	16	11.5%	15.6%	0.5	12.41217	4.518116	29.75	-5.66	-18.2681
		23	26	11.5%	15.6%	0.5	9.168889	10.71606	29.75	-2.42	-14.4661
		23	36	11.5%	15.6%	0.5	7.063885	18.05227	29.75	-0.31	-11.8023
		23	<b>46</b>	11.5%	15.6%	0.5	5.608665	26.03827	29.75	1.14	-9.7883
		23	37	11.5%	15.6%	0.5	6.894458	18.82697	29.75	-0.14	-11.5770
		23	<b>38</b>	11.5%	15.6%	0.5	6.731042	19.60767	29.75	<b>0.02</b>	-11.3577

Stanchart		201	99	11.5%	18%	0.5	107.215	2.27E-09		235	-73.22	-135.6643
		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		201	109	11.5%	18%	0.5	98.09071	1.93E-07	235	-64.09	-126.0000	
		201	119	11.5%	18%	0.5	88.6495	8.05E-06	235	-54.65	-116.0000	
		201	129	11.5%	18%	0.5	79.20844	0.000167	235	-45.21	-106.0002	
		201	139	11.5%	18%	0.5	69.76904	0.001986	235	-35.77	-96.0020	
		201	179	11.5%	18%	0.5	32.911	0.908819	235	1.09	-56.9088	
		201	175	11.5%	18%	0.5	36.37981	0.601145	235	-2.38	-60.6011	
		201	177	11.5%	18%	0.5	34.63272	0.742294	235	-0.63	-58.7423	
		201	<b>178</b>	11.5%	18%	0.5	33.76851	0.822204	235	<b>0.23</b>	-57.8222	
<b>Co-operative Bank</b>												
		11.2	8	11.5%	24%	0.5	3.700416	0.005325	12.6	-2.30	-4.6562	
		11.2	18	11.5%	24%	0.5	0.006004	5.800198	12.6	1.39	-0.4002	
		11.2	9	11.5%	24%	0.5	2.74135	0.038447	12.6	-1.34	-3.6384	
		11.2	10	11.5%	24%	0.5	1.907896	0.149115	12.6	-0.51	-2.7491	
		11.2	<b>11</b>	11.5%	24%	0.5	1.217233	0.402574	12.6	<b>0.18</b>	-2.0026	
<b>Kenya Airways Ltd</b>												
		13.1	7	11.5%	31%	0.5	6.432941	0.000487	11.4	-8.13	-4.3383	
		13.1	17	11.5%	31%	0.5	0.290953	3.241025	11.4	-1.99	2.3590	
		13.1	10	11.5%	31%	0.5	3.726319	0.067538	11.4	-5.43	-1.4675	
		13.1	11	11.5%	31%	0.5	2.89555	0.180891	11.4	-4.60	-0.5809	
		13.1	<b>12</b>	11.5%	31%	0.5	2.163236	0.392698	11.4	-3.86	<b>0.2073</b>	
<b>Nation Media Group</b>												
		176	180	11.5%	20%	0.5	13.06035	6.655074	222	32.94	-49.0228	
		176	190	11.5%	20%	0.5	8.188396	11.57156	222	37.81	-43.5716	
		176	200	11.5%	20%	0.5	4.906709	17.73109	222	41.09	-39.7311	
		176	300	11.5%	20%	0.5	0.002252	107.2388	222	46.00	-29.2388	
		176	400	11.5%	20%	0.5	9.97E-08	201.6488	222	46.00	-23.6488	



		176	290	11.5%	20%	0.5	0.005648	97.801		222	45.99	-29.8010
		Stock price (S)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option	
		176	291	11.5%	20%	0.5	0.005157	98.74463	222	45.99	-29.7446	
		176	<b>292</b>	11.5%	20%	0.5	0.004707	99.6883	222	<b>46.00</b>	-29.6883	
<b>Scangroup</b>		54.5	58	11.5%	23%	0.5	3.552765	3.480511	68.5	10.45	-14.3314	
		54.5	68	11.5%	23%	0.5	0.780216	10.4805	68.5	13.22	-10.9805	
		54.5	78	11.5%	23%	0.5	0.126187	19.26769	68.5	13.87	-9.7677	
		54.5	88	11.5%	23%	0.5	0.015796	28.59852	68.5	13.98	-9.0985	
		54.5	98	11.5%	23%	0.5	0.001656	38.0256	68.5	14.00	-8.5256	
		54.5	108	11.5%	23%	0.5	0.000154	47.46532	68.5	14.00	-7.9653	
		54.5	90	11.5%	23%	0.5	0.010183	30.48115	68.5	13.99	-8.9812	
		54.5	93	11.5%	23%	0.5	0.005208	33.30854	68.5	13.99	-8.8085	
		54.5	<b>94</b>	11.5%	23%	0.5	0.004153	34.25161	68.5	<b>14.00</b>	-8.7516	
<b>Centum</b>		12.75	8	11.5%	28%	0.5	4.995909	0.003616	12.35	-5.40	-4.1368	
		12.75	18	11.5%	28%	0.5	0.092576	4.33677	12.35	-0.49	1.3132	
		12.75	10	11.5%	28%	0.5	3.368081	0.059299	12.35	-3.77	-2.4093	
		12.75	11	11.5%	28%	0.5	2.538014	0.173355	12.35	-2.94	-1.5234	
		12.75	12	11.5%	28%	0.5	1.818243	0.397706	12.35	-2.22	-0.7477	
		12.75	13	11.5%	28%	0.5	1.237107	0.760692	12.35	-1.64	-0.1107	
		12.75	14	11.5%	28%	0.5	0.800751	1.268457	12.35	-1.20	<b>0.3815</b>	
<b>Athi River</b>		200	204	11.5%	17%	0.5	13.47506	5.96111	226	12.52	-28.0827	
		200	214	11.5%	17%	0.5	8.475799	10.51788	226	17.52	-22.5179	
		200	224	11.5%	17%	0.5	5.003995	16.4873	226	21.00	-18.4873	
		200	300	11.5%	17%	0.5	0.012889	83.24946	226	25.99	-9.2495	
		200	305	11.5%	17%	0.5	0.007908	87.96508	226	25.99	-8.9651	

				11.5%	17%	0.5	0.006488	89.85191			
		200	307						226	25.99	-8.8519
		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		200	308	11.5%	17%	0.5	0.005873	90.79542	226	25.99	-8.7954
		200	309	11.5%	17%	0.5	0.005315	91.73898	226	25.99	-8.7390
		200	<b>310</b>	11.5%	17%	0.5	0.004809	92.68259	226	<b>26.00</b>	-8.6826
<b>Bamburi</b>		165	155	11.5%	18%	0.5	20.32759	1.868127	185	-0.33	-31.6546
		165	165	11.5%	18%	0.5	13.55987	4.339983	185	6.44	-24.3400
		165	<b>156</b>	11.5%	18%	0.5	19.73206	2.01507	185	<b>0.27</b>	-31.0151
<b>Kengen</b>		8.6	6	11.5%	25%	0.5	2.537972	0.012337	8.8	-2.34	-2.3785
		8.6	16	11.5%	25%	0.5	0.000427	6.506377	8.8	0.20	0.6936
		8.6	7	11.5%	25%	0.5	2.032246	0.041099	8.8	-1.83	-1.8411
		8.6	8	11.5%	25%	0.5	1.241603	0.194579	8.8	-1.04	-0.9946
		8.6	9	11.5%	25%	0.5	0.65913	0.556227	8.8	-0.46	-0.3562
		8.6	10	11.5%	25%	0.5	0.304819	1.146038	8.8	-0.10	0.0540
		8.6	<b>11</b>	11.5%	25%	0.5	0.124634	1.909975	8.8	<b>0.08</b>	0.2900
<b>Kenol Kobil Ltd</b>		14.3	12	11.5%	34%	0.5	3.393572	0.229	13.55	-4.14	-1.9845
		14.3	22	11.5%	34%	0.5	0.104334	6.575016	13.55	-0.85	1.8750
		14.3	14	11.5%	34%	0.5	1.920347	0.838053	13.55	-2.67	-0.3881
		14.3	<b>15</b>	11.5%	34%	0.5	1.424401	1.28623	13.55	-2.17	<b>0.1638</b>
<b>KPLC</b>		15.1	12	11.5%	23%	0.5	4.114147	0.019876	17.1	-2.11	-5.4628
		15.1	22	11.5%	23%	0.5	0.02618	5.696861	17.1	1.97	-0.7969
		15.1	14	11.5%	23%	0.5	2.145401	0.263107	17.1	-0.15	-3.3631
		15.1	<b>15</b>	11.5%	23%	0.5	1.485106	0.546934	17.1	<b>0.51</b>	-2.6469
<b>B.A.T Kenya Ltd</b>		372	389	11.5%	30%	0.5	33.47221	29.17472	493	87.53	-132.7096

		372	399	11.5%	30%	0.5	29.36036	34.065	493	91.64	-128.0650
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		372	409	11.5%	30%	0.5	25.47555	39.6214	493	95.52	-123.6214
		372	809	11.5%	30%	0.5	0.010249	391.8049	493	120.99	-75.8049
		372	909	11.5%	30%	0.5	0.00113	486.2079	493	121.00	-70.2079
		372	841	11.5%	30%	0.5	0.00507	422.0116	493	120.99	-74.0116
		372	<b>842</b>	11.5%	30%	0.5	0.00496	422.9556	493	<b>121.00</b>	-73.9556
		372	843	11.5%	30%	0.5	0.004852	423.8996	493	121.00	-73.8996
		372	844	11.5%	30%	0.5	0.004746	424.8436	493	121.00	-73.8436
		372	845	11.5%	30%	0.5	0.004642	425.7876	493	121.00	-73.7876
<b>E.A.B.L</b>		227	253	11.5%	14%	0.5	4.171256	16.34091	265	33.83	-28.0159
		227	263	11.5%	14%	0.5	2.181329	23.48539	265	35.82	-25.4854
		227	273	11.5%	14%	0.5	1.028282	31.77356	265	36.97	-23.7736
		227	373	11.5%	14%	0.5	1.5E-05	125.1575	265	38.00	-17.1575
		227	473	11.5%	14%	0.5	5.14E-12	219.5697	265	38.00	-11.5697
		227	573	11.5%	14%	0.5	4.41E-19	313.9818	265	38.00	-5.9818
		227	300	11.5%	14%	0.5	0.091684	56.32825	265	37.91	-21.3283
		227	320	11.5%	14%	0.5	0.011098	75.1301	265	37.99	-20.1301
		227	325	11.5%	14%	0.5	0.006306	79.84592	265	37.99	-19.8459
		227	327	11.5%	14%	0.5	0.005011	81.73287	265	37.99	-19.7329
		227	<b>328</b>	11.5%	14%	0.5	0.004463	82.67644	265	<b>38.00</b>	-19.6764
<b>CFC Stanbic Holdings Ltd</b>		43.5	30	11.5%	29%	0.5	15.18148	0.053765	42	-16.68	-12.0023
		43.5	40	11.5%	29%	0.5	6.981235	1.246111	42	-8.48	-3.2461
		43.5	50	11.5%	29%	0.5	2.193358	5.899452	42	-3.69	2.1005
		43.5	45	11.5%	29%	0.5	4.095728	3.081213	42	-5.60	-0.0812
		43.5	<b>46</b>	11.5%	29%	0.5	3.640	3.569	42	-5.14	<b>0.4302</b>

				5%	%	5	146	752			
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
<b>Safaricom Kenya Ltd</b>		3.45	4	11.5%	19%	0.5	0.226623	0.140632	5.05	1.37	-1.6275
		3.45	14	11.5%	19%	0.5	2.09E-25	9.767706	5.05	1.60	-0.8177
		3.45	5	11.5%	19%	0.5	0.001636	1.272245	5.05	<b>1.60</b>	-1.3222
<b>Britam</b>		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		5.85	15	11.5%	21%	0.5	5.9E-10	8.311828	6	0.15	0.6882
		5.85	6	11.5%	21%	0.5	0.447946	0.262677	6	-0.30	-0.2627
		5.85	7	11.5%	21%	0.5	0.111935	0.870788	6	<b>0.04</b>	0.1292
		5.85	8	11.5%	21%	0.5	0.018955	1.721931	6	0.13	0.2781
		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		5.85	5	11.5%	21%	0.5	1.111367	0.032982	6	-0.96	-0.9790
		<b>2013</b>	<b>Jan-Jun</b>								
<b>Sasini</b>		20	8	11.5%	64%	0.5	12.66282	0.027119	13.65	-19.01	-5.8770
		20	18	11.5%	64%	0.5	5.044422	2.038616	13.65	-11.39	2.3114
		20	10	11.5%	64%	0.5	10.68662	0.127839	13.65	-17.04	-3.7778
		20	11	11.5%	64%	0.5	9.832267	0.217608	13.65	-16.18	-2.8676
		20	13	11.5%	64%	0.5	8.236528	0.510113	13.65	-14.59	-1.1601
		20	14	11.5%	64%	0.5	7.503529	0.721235	13.65	-13.85	-0.3712
		20	15	11.5%	64%	0.5	6.817244	0.979072	13.65	-13.17	<b>0.3709</b>
<b>Barclays bank ltd</b>		16.15	12	11.5%	24%	0.5	4.623109	0.019989	17.4	-3.37	-5.1897
		16.15	22	11.5%	24%	0.5	0.091	4.712	17.4	1.16	-0.1124

				5%	%	5	718	4			
		16.15	32	11.5%	24%	0.05	9E-05	14.06199	17.4	1.25	0.5380
		Stock price (S)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		16.15	23	11.5%	24%	0.05	0.050089	5.614892	17.4	1.20	-0.0149
		16.15	<b>24</b>	11.5%	24%	0.05	0.026642	6.535568	17.4	1.22	<b>0.0644</b>
<b>Equity Bank Ltd</b>		26.25	11	11.5%	82%	0.05	16.40467	0.182705	33	-9.65	-22.5612
		26.25	21	11.5%	82%	0.05	9.043723	2.620282	33	-2.29	-14.6203
		26.25	31	11.5%	82%	0.05	4.923617	7.941395	33	1.83	-9.9414
		26.25	25	11.5%	82%	0.05	7.095198	4.448245	33	-0.35	-12.4482
		26.25	<b>26</b>	11.5%	82%	0.05	6.675715	4.972884	33	<b>0.07</b>	-11.9729
<b>Kenya Commercial Bank</b>		33.5	30	11.5%	26%	0.05	5.953196	0.469804	42	2.55	-12.7950
		33.5	40	11.5%	26%	0.05	0.975106	5.239982	42	7.52	-7.2400
		33.5	50	11.5%	26%	0.05	0.079665	13.78576	42	8.42	-5.7858
		33.5	<b>60</b>	11.5%	26%	0.05	0.004155	23.15147	42	<b>8.50</b>	-5.1515
		33.5	70	11.5%	26%	0.05	0.000171	32.5887	42	8.50	-4.5887
		33.5	80	11.5%	26%	0.05	6.34E-06	42.02976	42	8.50	-4.0298
		33.5	55	11.5%	26%	0.05	0.018944	18.44565	42	8.48	-5.4456
		33.5	58	11.5%	26%	0.05	0.007685	21.26675	42	8.49	-5.2668
		33.5	59	11.5%	26%	0.05	0.005658	22.20885	42	8.49	-5.2088
<b>Stanchart</b>		262	220	11.5%	19%	0.05	54.9534	0.482582	287	-29.95	-67.6707
		262	230	11.5%	19%	0.05	45.95691	1.104949	287	-20.96	-58.1049
		262	240	11.5%	19%	0.05	37.62677	2.216027	287	-12.63	-49.2160
		262	250	11.5%	19%	0.05	29.99168	4.022156	287	-4.99	-41.0222
		262	260	11.5%	19%	0.05	23.22889	6.700579	287	1.77	-33.7006
		262	257	11.5%	19%	0.05	25.15754	5.796869	287	-0.16	-35.7969

		262	<b>258</b>	11.5%	19%	0.5	24.50481	6.088259	287	<b>0.50</b>	-35.0883
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
<b>Co-operative Bank</b>		12.95	12	11.5%	22%	0.5	2.211311	0.125339	15.35	0.19	-3.9683
		12.95	22	11.5%	22%	0.5	0.00102	7.821702	15.35	2.40	-1.1717
		12.95	32	11.5%	22%	0.5	2.24E-08	17.2619	15.35	2.40	-0.6119
		12.95	42	11.5%	22%	0.5	3.4E-13	26.70312	15.35	2.40	-0.0531
		12.95	52	11.5%	22%	0.5	7.53E-18	36.14434	15.35	2.40	0.5057
		12.95	<b>43</b>	11.5%	22%	0.5	1.14E-13	27.64724	15.35	2.40	<b>0.0028</b>
<b>Kenya Airways ltd</b>		10.55	8	11.5%	32%	0.5	3.245361	0.04394	9.95	-3.85	-2.2104
		10.55	18	11.5%	32%	0.5	0.017749	6.461943	9.95	-0.62	1.5881
		10.55	10	11.5%	32%	0.5	1.551903	0.443122	9.95	-2.15	-0.3931
		10.55	<b>11</b>	11.5%	32%	0.5	1.01737	0.852711	9.95	-1.62	<b>0.1973</b>
<b>Nation Media Group</b>		259	167	11.5%	41%	0.5	102.0696	1.108107	301	-60.07	-134.7160
		259	177	11.5%	41%	0.5	93.67496	1.78453	301	-51.67	-125.7845
		259	187	11.5%	41%	0.5	85.22472	2.775509	301	-43.22	-116.7755
		259	257	11.5%	41%	0.5	38.08704	21.72637	301	3.91	-65.7264
		259	247	11.5%	41%	0.5	43.34715	17.54525	301	-1.35	-71.5453
		259	248	11.5%	41%	0.5	42.79835	17.94058	301	-0.80	-70.9406
		259	249	11.5%	41%	0.5	42.25464	18.34099	301	-0.25	-70.3410
		259	<b>250</b>	11.5%	41%	0.5	41.71601	18.74648	301	<b>0.28</b>	-69.7465
<b>Scangroup</b>		66.5	41	11.5%	25%	0.5	27.42496	0.003223	60.5	-33.42	-19.1121
		66.5	51	11.5%	25%	0.5	18.48061	0.130822	60.5	-24.48	-9.6308
		66.5	61	11.5%	25%	0.5	10.17961	1.271046	60.5	-16.18	-0.7710
		66.5	71	11.5%	25%	0.5	4.42624	4.958894	60.5	-10.43	5.5411

		66.5	60	11.5%	25%	0.5	10.91668	1.063997	60.5	-16.92	-1.5640
		66.5	61	11.5%	25%	0.5	10.17961	1.271046	60.5	-16.18	-0.7710
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		66.5	62	11.5%	25%	0.5	9.469403	1.50496	60.5	-15.47	-0.0050
		66.5	<b>63</b>	11.5%	25%	0.5	8.787343	1.767023	60.5	-14.79	<b>0.7330</b>
<b>Centum</b>		13.25	18	11.5%	32%	0.5	0.22197	4.113255	21.75	8.28	-7.7075
		13.25	28	11.5%	32%	0.5	0.001473	13.18689	21.75	8.50	-6.9369
		13.25	38	11.5%	32%	0.5	6.57E-06	22.62664	21.75	8.50	-6.3766
		13.25	20	11.5%	32%	0.5	0.093274	5.725712	21.75	8.41	-7.4757
		13.25	21	11.5%	32%	0.5	0.057139	6.633698	21.75	8.44	-7.3837
		13.25	22	11.5%	32%	0.5	0.03461	7.555291	21.75	8.47	-7.3053
		13.25	25	11.5%	32%	0.5	0.007312	10.36036	21.75	8.49	-7.1104
		13.25	<b>26</b>	11.5%	32%	0.5	0.004303	11.30147	21.75	<b>8.50</b>	-7.0515
		13.25	27	11.5%	32%	0.5	0.002522	12.24381	21.75	8.50	-6.9938
<b>Athi River</b>		52	51	11.5%	28%	0.5	6.140385	2.427978	64	5.86	-15.2825
		52	101	11.5%	28%	0.5	0.0051	43.36141	64	11.99	-6.3614
		52	201	11.5%	28%	0.5	1.79E-10	137.7685	64	12.00	-0.7685
		52	<b>102</b>	11.5%	28%	0.5	0.004303	44.30474	64	<b>12.00</b>	-6.3047
<b>Bamburi</b>		205	174	11.5%	13%	0.5	41.09507	0.038873	215	-31.10	-41.3920
		205	184	11.5%	13%	0.5	31.51719	0.235622	215	-21.52	-31.2356
		205	204	11.5%	13%	0.5	15.05528	2.656145	215	-5.06	-13.6561
		205	209	11.5%	13%	0.5	11.78462	4.106098	215	-1.78	-10.1061
		205	210	11.5%	13%	0.5	11.18447	4.450068	215	-1.18	-9.4501
		205	211	11.5%	13%	0.5	10.603	4.81272	215	-0.60	-8.8127
		205	212	11.5%	13%	0.5	10.04041	5.194253	215	-0.04	-8.1943

		205	213	11.5%	13%	0.5	9.496855	5.594818	215	0.50	-7.5948
		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
Kengen		11.85	9	11.5%	28%	0.5	3.640185	0.025972	15.15	-0.34	-6.4527
		11.85	19	11.5%	28%	0.5	0.019516	6.107832	15.15	3.28	-2.2578
		11.85	10	11.5%	28%	0.5	2.541048	0.132267	15.15	0.76	-5.2823
Kenol Kobil Ltd		13.65	7	11.5%	40%	0.5	6.998787	0.00519	8.8	-11.85	-1.7548
		13.65	17	11.5%	40%	0.5	0.748455	3.148527	8.8	-5.60	5.0515
		13.65	8	11.5%	40%	0.5	6.117171	0.020146	8.8	-10.97	-0.8201
		13.65	9	11.5%	40%	0.5	5.214575	0.061672	8.8	-10.06	0.1383
KPLC		17.65	12	11.5%	21%	0.5	6.345934	0.000901	14.5	-9.50	-2.5268
		17.65	22	11.5%	21%	0.5	0.202684	3.323365	14.5	-3.35	4.1766
		17.65	13	11.5%	21%	0.5	5.382039	0.005624	14.5	-8.53	-1.5056
		17.65	14	11.5%	21%	0.5	4.455841	0.023547	14.5	-7.61	-0.5235
		17.65	15	11.5%	21%	0.5	3.562876	0.074704	14.5	-6.71	0.4253
B.A.T Kenya Ltd		519	512	11.5%	7%	0.5	36.62466	0.629478	543	-12.62	-32.0379
		519	522	11.5%	7%	0.5	27.76952	1.601149	543	-3.77	-22.6011
		519	532	11.5%	7%	0.5	20.13304	3.405884	543	3.87	-14.4059
		519	523	11.5%	7%	0.5	26.96132	1.737068	543	-2.96	-21.7371
		519	524	11.5%	7%	0.5	26.16207	1.881936	543	-2.16	-20.8819
		519	525	11.5%	7%	0.5	25.37212	2.036116	543	-1.37	-20.0361
		519	526	11.5%	7%	0.5	24.59185	2.199969	543	-0.59	-19.2000
		519	527	11.5%	7%	0.5	23.82162	2.373853	543	0.18	-18.3739
E.A.B.L		301	181	11.5%	37%	0.5	130.2147	0.323793	333	-98.21	-152.0875
		301	281	11.5%	37%	0.5	50.66	14.96	333	-18.66	-66.9605



				5%	%	5	228	053			
		301	300	11.5%	37%	0.5	40.09805	22.33462	333	-8.10	-55.3346
		Stock price (\$)	Exercise price (X)	Rf	V	t	Call Price	Put price	stock price at expiration	value of european call option	value of european put option
		301	310	11.5%	37%	0.5	35.23191	26.9097	333	-3.23	-49.9097
		301	311	11.5%	37%	0.5	34.77108	27.39299	333	-2.77	-49.3930
		301	312	11.5%	37%	0.5	34.31487	27.8809	333	-2.31	-48.8809
		301	313	11.5%	37%	0.5	33.86327	28.37342	333	-1.86	-48.3734
		301	314	11.5%	37%	0.5	33.41626	28.87053	333	-1.42	-47.8705
		301	315	11.5%	37%	0.5	32.97382	29.37222	333	-0.97	-47.3722
		301	316	11.5%	37%	0.5	32.53594	29.87845	333	-0.54	-46.8785
		301	317	11.5%	37%	0.5	32.10259	30.38923	333	-0.10	-46.3892
		301	<b>318</b>	11.5%	37%	0.5	31.67375	30.90451	333	<b>0.33</b>	-45.9045
	<b>CFC Stanbic Holdings Ltd</b>	42.75	21	11.5%	11.0%	0.5	25.0804	1.710296	62.5	-5.33	-43.6834
		42.75	31	11.5%	11.0%	0.5	18.80844	5.326214	62.5	0.94	-36.8262
		42.75	22	11.5%	11.0%	0.5	24.07767	2.098353	62.5	-4.33	-42.5984
		42.75	23	11.5%	11.0%	0.5	23.42057	2.385374	62.5	-3.67	-41.8854
		42.75	24	11.5%	11.0%	0.5	22.78223	2.691153	62.5	-3.03	-41.1912
		42.75	25	11.5%	11.0%	0.5	22.16232	3.015363	62.5	-2.41	-40.5154
		42.75	26	11.5%	11.0%	0.5	21.56048	3.357649	62.5	-1.81	-39.8576
		42.75	27	11.5%	11.0%	0.5	20.97634	3.717627	62.5	-1.23	-39.2176
		42.75	28	11.5%	11.0%	0.5	20.40948	4.094894	62.5	-0.66	-38.5949
		42.75	29	11.5%	11.0%	0.5	19.8595	4.489033	62.5	-0.11	-37.9890
		42.75	<b>30</b>	11.5%	11.0%	0.5	19.32596	4.899618	62.5	<b>0.42</b>	-37.3996
	<b>Safaricom Kenya Ltd</b>	5.45	6	11.5%	25%	0.5	0.179229	0.754607	6.55	0.92	-0.9226
		5.45	16	11.5%	25%	0.5	1.01E-09	9.65595	6.55	1.10	-0.2060
		5.45	26	11.5%	25%	0.5	1.8E-18	19.09717	6.55	1.10	0.3528

		5.45	7	11.5%	25%	0.5	0.073699	1.232552	6.55	1.03	-0.7826
		5.45	8	11.5%	25%	0.5	0.01427	2.117245	6.55	1.09	-0.6672
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		5.45	<b>9</b>	11.5%	25%	0.5	0.002289	3.049386	6.55	<b>1.10</b>	-0.5994
<b>Britam</b>		6.3	7	11.5%	44%	0.5	0.580516	1.072271	8	1.12	-1.8785
		6.3	17	11.5%	44%	0.5	0.001057	9.751129	8	1.70	-0.7511
		6.3	27	11.5%	44%	0.5	2.34E-06	19.19129	8	1.70	-0.1913
		6.3	8	11.5%	44%	0.5	0.364107	1.617082	8	1.34	-1.6171
		6.3	9	11.5%	44%	0.5	0.197978	2.395075	8	1.50	-1.3951
		6.3	10	11.5%	44%	0.5	0.105112	3.246331	8	1.59	-1.2463
		6.3	11	11.5%	44%	0.5	0.054957	4.140297	8	1.65	-1.1403
		6.3	12	11.5%	44%	0.5	0.028477	5.057939	8	1.67	-1.0579
		6.3	13	11.5%	44%	0.5	0.014693	5.988278	8	1.69	-0.9883
		6.3	14	11.5%	44%	0.5	0.007575	6.925282	8	1.69	-0.9253
		6.3	<b>15</b>	11.5%	44%	0.5	0.003913	7.865741	8	<b>1.70</b>	-0.8657
		<b>July-Dec,2013</b>									
<b>Sasini</b>		13.65	5	11.5%	64%	0.5	8.642375	0.018508	14.65	-7.64	-9.3449
		13.65	15	11.5%	64%	0.5	2.25942	2.771249	14.65	-1.26	-2.4212
		13.65	25	11.5%	64%	0.5	0.449918	10.40297	14.65	0.55	-0.0530
		13.65	20	11.5%	64%	0.5	1.00997	6.242408	14.65	-0.01	-0.8924
		13.65	<b>21</b>	11.5%	64%	0.5	0.858624	7.035184	14.65	<b>0.14</b>	-0.6852
<b>Barclays bank ltd</b>		17.4	13	11.5%	24%	0.5	4.980935	0.021536	17.6	-4.78	-4.4446
		17.4	23	11.5%	24%	0.5	0.144332	4.459136	17.6	0.06	0.9409
		17.4	18	11.5%	24%	0.5	1.369176	0.96337	17.6	-1.17	-0.5634
		17.4	19	11.5%	24%	0.5	0.936835	1.475151	17.6	-0.74	-0.0752
		17.4	<b>20</b>	11.5%	24%	0.5	0.6172099	2.099	17.6	-0.42	<b>0.3002</b>

				5%	%	5	366	804				
<b>Equity Bank Ltd</b>		33	13	11.5%	82%	0.5	20.62 301	0.229 686	30.75	-22.87	-17.6269	
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>	
		33	23	11.5%	82%	0.5	13.36 579	2.080 597	30.75	-15.62	-9.8306	
		33	33	11.5%	82%	0.5	8.265 391	6.421 413	30.75	-10.52	-4.1714	
		33	43	11.5%	82%	0.5	5.099 319	12.69 656	30.75	-7.35	-0.4466	
		33	53	11.5%	82%	0.5	3.179 322	20.21 778	30.75	-5.43	2.0322	
		33	44	11.5%	82%	0.5	4.861 101	13.40 246	30.75	-7.11	-0.1525	
		33	<b>45</b>	11.5%	82%	0.5	4.634 561	14.12 005	30.75	-6.88	<b>0.1300</b>	
<b>Kenya Commercial Bank</b>		42	37	11.5%	26%	0.5	7.463 708	0.589 008	48.5	-0.96	-11.8848	
		42	47	11.5%	26%	0.5	2.065 058	4.438 787	48.5	4.43	-5.9388	
		42	38	11.5%	26%	0.5	6.863 104	0.739 736	48.5	-0.36	-11.2397	
		42	<b>39</b>	11.5%	26%	0.5	6.144 845	0.965 599	48.5	<b>0.36</b>	-10.4656	
<b>Stanchart</b>		287	241	11.5%	19%	0.5	60.19 705	0.528 629	304	-43.20	-63.7424	
		287	251	11.5%	19%	0.5	51.15 924	1.133 836	304	-34.16	-54.1338	
		287	271	11.5%	19%	0.5	34.94 826	3.805 29	304	-17.95	-36.8053	
		287	281	11.5%	19%	0.5	27.90 314	6.201 395	304	-10.90	-29.2014	
		287	291	11.5%	19%	0.5	21.73 483	9.474 305	304	-4.73	-22.4743	
		287	295	11.5%	19%	0.5	19.52 925	11.04 521	304	-2.53	-20.0452	
		287	296	11.5%	19%	0.5	19.00 165	11.46 173	304	-2.00	-19.4617	
		287	299	11.5%	19%	0.5	17.47 604	12.76 848	304	-0.48	-17.7685	
		287	<b>300</b>	11.5%	19%	0.5	16.98 654	13.22 31	304	<b>0.01</b>	-17.2231	
<b>Co-operative Bank</b>		15.35	14	11.5%	22%	0.5	2.621 129	0.148 568	17.75	-0.22	-4.2590	
		15.35	24	11.5%	22%	0.5	0.006 556	7.315 481	17.75	2.39	-1.0655	
		15.35	<b>15</b>	11.5%	22%	0.5	1.640	0.452	17.75	<b>0.76</b>	-3.2028	

				5%	%	5	999	827				
<b>Kenya Airways Ltd</b>	9.95	7	11.5%	32%	0.5	3.060791	0.041441	13.05	0.04	-5.7506		
	<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>		
	9.95	17	11.5%	32%	0.5	0.016462	6.116535	13.05	3.08	-2.1665		
	9.95	27	11.5%	32%	0.5	1.01E-05	15.5413	13.05	3.10	-1.5913		
	9.95	37	11.5%	32%	0.5	7.03E-09	24.98251	13.05	3.10	-1.0325		
	9.95	47	11.5%	32%	0.5	8.04E-12	34.42373	13.05	3.10	-0.4737		
	9.95	18	11.5%	32%	0.5	0.008079	7.052273	13.05	3.09	-2.1023		
	9.95	<b>19</b>	11.5%	32%	0.5	0.003916	7.992232	13.05	<b>3.10</b>	-2.0422		
<b>Nation Media Group</b>	301	195	11.5%	41%	0.5	118.6214	1.2878	314	-105.62	-120.7511		
	301	205	11.5%	41%	0.5	109.4709	2.015847	314	-96.47	-111.0158		
	301	215	11.5%	41%	0.5	100.9786	2.964832	314	-87.98	-101.9648		
	301	235	11.5%	41%	0.5	84.90775	5.776396	314	-71.91	-84.7764		
	301	255	11.5%	41%	0.5	70.29506	10.04614	314	-57.30	-69.0461		
	301	295	11.5%	41%	0.5	46.13338	23.64933	314	-33.13	-42.6493		
	301	425	11.5%	41%	0.5	8.712946	108.9647	314	4.29	2.0353		
	301	400	11.5%	41%	0.5	12.32218	88.97093	314	0.68	-2.9709		
	301	396	11.5%	41%	0.5	13.01318	85.88545	314	-0.01	-3.8855		
	301	<b>397</b>	11.5%	41%	0.5	12.8372	86.65359	314	<b>0.16</b>	-3.6536		
<b>Scangroup</b>	60.5	38	11.5%	25%	0.5	24.95053	0.002933	48.25	-37.20	-10.5963		
	60.5	48	11.5%	25%	0.5	15.37679	0.194638	48.25	-27.63	-0.4446		
	60.5	58	11.5%	25%	0.5	7.5453	1.804369	48.25	-19.80	7.9456		
	60.5	<b>49</b>	11.5%	25%	0.5	14.49673	0.258699	48.25	-26.75	<b>0.4913</b>		
<b>Centum</b>	21.75	30	11.5%	32%	0.5	0.364367	6.751946	33	10.89	-9.9490		
	21.75	40	11.5%	32%	0.5	0.016	16.03	33	11.23	-9.0316		

				5%	%	5	74	162			
		21.75	50	11.5%	32%	0.5	0.000639	25.45673	33	11.25	-8.4567
		21.75	60	11.5%	32%	0.5	2.35E-05	34.89734	33	11.25	-7.8973
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		21.75	70	11.5%	32%	0.5	9.1E-07	44.33853	33	11.25	-7.3385
		21.75	41	11.5%	32%	0.5	0.01215	16.97115	33	11.24	-8.9711
		21.75	42	11.5%	32%	0.5	0.008801	17.91192	33	11.24	-8.9119
		21.75	43	11.5%	32%	0.5	0.006365	18.85361	33	11.24	-8.8536
		21.75	<b>44</b>	11.5%	32%	0.5	0.004596	19.79596	33	<b>11.25</b>	-8.7960
<b>Athi River</b>		64	63	11.5%	28%	0.5	7.557397	2.988281	90	18.44	-30.0400
		64	73	11.5%	28%	0.5	3.217863	8.138761	90	22.78	-25.1388
		64	83	11.5%	28%	0.5	1.167359	15.52948	90	24.83	-22.5295
		64	133	11.5%	28%	0.5	0.001875	61.57009	90	26.00	-18.5701
		64	183	11.5%	28%	0.5	1.56E-06	108.7743	90	26.00	-15.7743
		64	103	11.5%	28%	0.5	0.107857	33.35241	90	25.89	-20.3524
		64	104	11.5%	28%	0.5	0.094891	34.28357	90	25.91	-20.2836
		64	124	11.5%	28%	0.5	0.006548	53.07766	90	25.99	-19.0777
		64	125	11.5%	28%	0.5	0.005705	54.02094	90	25.99	-19.0209
		64	<b>126</b>	11.5%	28%	0.5	0.004969	54.96433	90	<b>26.00</b>	-18.9643
<b>Bamburi</b>		215	182	11.5%	13%	0.5	43.09971	0.040769	210	-48.10	-27.9233
		215	192	11.5%	13%	0.5	33.94248	0.213881	210	-38.94	-18.2139
		215	202	11.5%	13%	0.5	25.10114	0.813765	210	-30.10	-8.8138
		215	212	11.5%	13%	0.5	17.17956	2.333405	210	-22.18	-0.3334
		215	222	11.5%	13%	0.5	10.72011	5.315167	210	-15.72	6.6848
		215	<b>213</b>	11.5%	13%	0.5	16.45997	2.557935	210	-21.46	<b>0.4421</b>

Kengen		15.15	11	11.5%	28%	0.5	4.653907	0.033205	13.55	-6.25	-2.4307
		15.15	12	11.5%	28%	0.5	3.90371	0.083173	13.55	-5.50	-1.6332
		15.15	22	11.5%	28%	0.5	0.084411	5.705093	13.55	-1.68	2.7449
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		15.15	13	11.5%	28%	0.5	3.077724	0.201309	13.55	-4.68	-0.7513
		15.15	<b>14</b>	11.5%	28%	0.5	2.343053	0.41076	13.55	-3.94	<b>0.0392</b>
<b>Kenol Kobil Ltd</b>		8.8	5	11.5%	40%	0.5	4.512039	0.003346	10.1	-3.21	-5.5581
		8.8	15	11.5%	40%	0.5	0.062974	5.424802	10.1	1.24	-0.5248
		8.8	6	11.5%	40%	0.5	3.188596	0.053327	10.1	-1.89	-4.1533
		8.8	7	11.5%	40%	0.5	2.370769	0.179623	10.1	-1.07	-3.2796
		8.8	8	11.5%	40%	0.5	1.68093	0.433905	10.1	-0.38	-2.5339
		8.8	<b>9</b>	11.5%	40%	0.5	1.141246	0.838343	10.1	<b>0.16</b>	-1.9383
<b>KPLC</b>		14.5	10	11.5%	21%	0.5	5.213374	0.00074	14.15	-5.56	-4.3137
		14.5	20	11.5%	21%	0.5	0.039093	4.421531	14.15	-0.39	1.4285
		14.5	11	11.5%	21%	0.5	4.123036	0.008377	14.15	-4.47	-3.1584
		14.5	12	11.5%	21%	0.5	3.210679	0.040142	14.15	-3.56	-2.1901
		14.5	13	11.5%	21%	0.5	2.360577	0.134161	14.15	-2.71	-1.2842
		14.5	14	11.5%	21%	0.5	1.622534	0.340241	14.15	-1.97	-0.4902
		14.5	<b>15</b>	11.5%	21%	0.5	1.036709	0.698537	14.15	-1.39	<b>0.1515</b>
<b>B.A.T Kenya Ltd</b>		543	535	11.5%	7%	0.5	243.8781	89.9987	600	-186.88	25.2477
		543	<b>545</b>	11.5%	7%	0.5	209.7079	55.5138	600	-152.71	<b>0.5138</b>
<b>E.A.B.L</b>		333	201	11.5%	37%	0.5	144.0581	0.358216	290	-187.06	-89.8543
		333	211	11.5%	37%	0.5	134.4162	0.625924	290	-177.42	-79.6259

		333	300	11.5%	37%	0.5	62.84 879	13.08 536	290	-105.85	-3.0854
		333	301	11.5%	37%	0.5	62.20 215	13.38 284	290	-105.20	-2.3828
		333	302	11.5%	37%	0.5	61.55 979	13.68 46	290	-104.56	-1.6846
		<b>Stock price (\$)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
		333	303	11.5%	37%	0.5	60.92 17	13.99 063	290	-103.92	-0.9906
		333	304	11.5%	37%	0.5	60.28 791	14.30 097	290	-103.29	-0.3010
		333	<b>305</b>	11.5%	37%	0.5	59.65 843	14.61 56	290	-102.66	<b>0.3844</b>
<b>CFC Stanbic Holdings Ltd</b>		62.5	30	11.5%	11.0%	0.5	36.66 725	2.500 433	87	-12.17	-59.4903
		62.5	40	11.5%	11.0%	0.5	30.36 593	5.630 808	87	-5.87	-52.6308
		62.5	50	11.5%	11.0%	0.5	25.22 641	9.932 502	87	-0.73	-46.9325
		62.5	51	11.5%	11.0%	0.5	24.76 916	10.41 938	87	-0.27	-46.4194
		62.5	<b>52</b>	11.5%	11.0%	0.5	24.32 142	10.91 576	87	<b>0.18</b>	-45.9158
<b>Safaricom Kenya Ltd</b>		6.55	8	11.5%	25%	0.5	0.215 403	0.906 913	10.85	4.08	-4.0868
		6.55	18	11.5%	25%	0.5	1.08E -08	10.44 419	10.85	4.30	-3.2942
		6.55	28	11.5%	25%	0.5	3.9E- 16	19.88 541	10.85	4.30	-2.7354
		6.55	9	11.5%	25%	0.5	0.040 837	1.987 934	10.85	4.26	-3.8379
		6.55	10	11.5%	25%	0.5	0.009 705	2.900 924	10.85	4.29	-3.7509
		6.55	<b>11</b>	11.5%	25%	0.5	0.002 055	3.837 396	10.85	<b>4.30</b>	-3.6874
<b>Britam</b>		8	9	11.5%	44%	0.5	0.737 163	1.361 613	15.15	6.41	-7.3767
		8	19	11.5%	44%	0.5	0.005 093	9.943 409	15.15	7.14	-6.0934
		8	29	11.5%	44%	0.5	3.44E -05	19.37 957	15.15	7.15	-5.5296
		8	39	11.5%	44%	0.5	3.74E -07	28.82 075	15.15	7.15	-4.9708
		8	<b>20</b>	11.5%	44%	0.5	0.003 035	10.88 547	15.15	<b>7.15</b>	-6.0355
		<b>2014</b>	<b>Jan-Jun</b>								

<b>Sasini</b>		18.95	12	11.5%	23%	0.5	7.739 867	0.000 308	15.7	-10.99	-3.8264
		18.95	22	11.5%	23%	0.5	0.555 521	2.376 202	15.7	-3.81	3.9238
		18.95	15	11.5%	23%	0.5	4.823 164	0.034 993	15.7	-8.07	-0.7350
		<b>Stock price (S)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
		18.95	<b>16</b>	11.5%	23%	0.5	3.938 519	0.094 47	15.7	-7.19	<b>0.2055</b>
<b>Barclays bank ltd</b>		16.95	14	11.5%	12%	0.5	3.446 344	0.001 16	16.7	-3.70	-2.3971
		16.95	24	11.5%	12%	0.5	9.42E -05	5.709 02	16.7	-0.25	1.5910
		16.95	16	11.5%	12%	0.5	1.893 789	0.049 739	16.7	-2.14	-0.7497
		16.95	<b>17</b>	11.5%	12%	0.5	1.109 396	0.209 468	16.7	-1.36	<b>0.0905</b>
<b>Equity Bank Ltd</b>		31	30	11.5%	25%	0.5	3.812 458	1.006 866	46	11.19	-17.1438
		31	40	11.5%	25%	0.5	0.424 38	7.189 256	46	14.58	-13.1893
		31	50	11.5%	25%	0.5	0.022 59	16.22 868	46	14.98	-12.2287
		31	60	11.5%	25%	0.5	0.000 793	25.64 811	46	15.00	-11.6481
		31	70	11.5%	25%	0.5	2.29E -05	35.08 856	46	15.00	-11.0886
		31	51	11.5%	25%	0.5	0.016 39	17.16 661	46	14.98	-12.1666
		31	52	11.5%	25%	0.5	0.011 847	18.10 619	46	14.99	-12.1062
		31	53	11.5%	25%	0.5	0.008 534	19.04 699	46	14.99	-12.0470
		31	54	11.5%	25%	0.5	0.006 127	19.98 871	46	14.99	-11.9887
		31	<b>55</b>	11.5%	25%	0.5	0.004 385	20.93 109	46	<b>15.00</b>	-11.9311
<b>Kenya Commercial Bank</b>		43.25	42	11.5%	13%	0.5	3.593 453	0.424 993	51	4.16	-8.9712
		43.25	52	11.5%	13%	0.5	0.154 933	5.999 271	51	7.60	-4.9993
		43.25	62	11.5%	13%	0.5	0.000 515	15.28 607	51	7.75	-4.2861
		43.25	72	11.5%	13%	0.5	2.96E -07	24.72 678	51	7.75	-3.7268
		43.25	83	11.5%	13%	0.5	2.33E -11	35.11 212	51	7.75	-3.1121
		43.25	55	11.5%	13%	0.5	0.035 278	8.711 982	51	7.71	-4.7120



		43.25	56	11.5%	13%	0.5	0.02054	9.641366	51	7.73	-4.6414
		43.25	57	11.5%	13%	0.5	0.011694	10.57664	51	7.74	-4.5766
		43.25	58	11.5%	13%	0.5	0.006515	11.51559	51	7.74	-4.5156
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		43.25	<b>59</b>	11.5%	13%	0.5	0.003556	12.45675	51	<b>7.75</b>	-4.4567
<b>Stanchart</b>		294	288	11.5%	6%	0.5	22.3495	0.23087	309	-7.35	-21.2581
		294	298	11.5%	6%	0.5	13.83019	1.178509	309	1.17	-12.1785
		294	295	11.5%	6%	0.5	16.24462	0.760578	309	-1.24	-14.7606
		294	296	11.5%	6%	0.5	15.42399	0.884068	309	-0.42	-13.8841
		294	<b>297</b>	11.5%	6%	0.5	14.61878	1.022984	309	<b>0.38</b>	-13.0230
<b>Co-operative Bank</b>		17.4	13	11.5%	28%	0.5	5.28917	0.039509	19.3	-3.39	-6.4700
		17.4	23	11.5%	28%	0.5	0.25344	4.568243	19.3	1.65	-0.8682
		17.4	15	11.5%	28%	0.5	3.477096	0.238924	19.3	-1.58	-4.5389
		17.4	16	11.5%	28%	0.5	2.740443	0.446393	19.3	-0.84	-3.7464
		17.4	17	11.5%	28%	0.5	2.101469	0.751541	19.3	-0.20	-3.0515
		17.4	<b>18</b>	11.5%	28%	0.5	1.568413	1.162607	19.3	<b>0.33</b>	-2.4626
<b>Kenya Airways Ltd</b>		11.95	8	11.5%	17%	0.5	4.175022	6.17E-05	10.35	-5.78	-2.1149
		11.95	18	11.5%	17%	0.5	0.000975	5.045169	10.35	-1.60	2.6048
		11.95	28	11.5%	17%	0.5	1.16E-11	14.48541	10.35	-1.60	3.1646
		11.95	10	11.5%	17%	0.5	2.521876	0.013094	10.35	-4.12	-0.3631
		11.95	<b>11</b>	11.5%	17%	0.5	1.648632	0.083973	10.35	-3.25	<b>0.5660</b>
<b>Nation Media Group</b>		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
		316	251	11.5%	14%	0.5	79.03497	0.009565	310	-85.03	-59.0096
		316	291	11.5%	14%	0.5	42.15411	0.893575	310	-48.15	-19.8936

		316	301	11.5%	14%	0.5	33.74098	1.921664	310	-39.74	-10.9217
		316	321	11.5%	14%	0.5	19.37238	6.435511	310	-25.37	4.5645
		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
		<b>Stock price (S)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
		316	241	11.5%	14%	0.5	88.34148	0.00196	310	-94.34	-68.8673
<b>Scangr oup</b>		51	29	11.5%	39%	0.5	23.93931	0.041127	45.75	-29.19	-17.0853
		51	39	11.5%	39%	0.5	14.8955	0.716252	45.75	-20.15	-7.4663
		51	49	11.5%	39%	0.5	8.080494	3.342466	45.75	-13.33	-0.0925
		51	59	11.5%	39%	0.5	3.850307	8.553499	45.75	-9.10	4.6965
		51	<b>50</b>	11.5%	39%	0.5	7.543113	3.749207	45.75	-12.79	<b>0.5008</b>
<b>Centu m</b>		35.5	34	11.5%	29%	0.5	4.653705	1.512355	41.25	1.10	-8.4886
		35.5	44	11.5%	29%	0.5	1.034042	7.075406	41.25	4.72	-4.3254
		35.5	54	11.5%	29%	0.5	0.145922	15.6285	41.25	5.60	-2.8785
		35.5	64	11.5%	29%	0.5	0.016063	24.93986	41.25	5.73	-2.1899
		35.5	74	11.5%	29%	0.5	0.001552	34.36657	41.25	5.75	-1.6166
		35.5	65	11.5%	29%	0.5	0.012771	25.88069	41.25	5.74	-2.1307
		35.5	66	11.5%	29%	0.5	0.010142	26.82219	41.25	5.74	-2.0722
		35.5	67	11.5%	29%	0.5	0.008045	27.76421	41.25	5.74	-2.0142
		35.5	68	11.5%	29%	0.5	0.006376	28.70666	41.25	5.74	-1.9567
		35.5	69	11.5%	29%	0.5	0.005048	29.64946	41.25	5.74	-1.8995
		35.5	<b>70</b>	11.5%	29%	0.5	0.003993	30.59253	41.25	<b>5.75</b>	-1.8425
<b>Athi River</b>		86	67	11.5%	18%	0.5	22.85259	0.027682	80	-28.85	-13.1136

		86	77	11.5%	18%	0.5	13.77282	0.470208	80	-19.77	-3.4702
		86	87	11.5%	18%	0.5	6.546181	2.684786	80	-12.55	4.3152
		86	78	11.5%	18%	0.5	12.94092	0.582425	80	-18.94	-2.5824
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		86	79	11.5%	18%	0.5	12.12864	0.714271	80	-18.13	-1.7143
		86	80	11.5%	18%	0.5	11.33792	0.867671	80	-17.34	-0.8677
		86	81	11.5%	18%	0.5	10.57061	1.044485	80	-16.57	-0.0445
		86	<b>82</b>	11.5%	18%	0.5	9.828481	1.246476	80	-15.83	<b>0.7535</b>
<b>Bamburi</b>		205	126	11.5%	24%	0.5	85.72826	0.004674	41.25	-249.48	85.0811
		205	136	11.5%	24%	0.5	76.62207	0.022649	41.25	-240.37	94.7274
		205	146	11.5%	24%	0.5	67.24664	0.088436	41.25	-231.00	104.6616
		205	200	11.5%	24%	0.5	22.85756	6.681939	41.25	-186.61	152.0681
		205	126	11.5%	24%	0.5	85.72826	0.004674	41.25	-249.48	85.0811
		205	126	11.5%	24%	0.5	85.72826	0.004674	41.25	-249.48	85.0811
		205	126	11.5%	24%	0.5	85.72826	0.004674	41.25	-249.48	85.0811
		205	126	11.5%	24%	0.5	85.72826	0.004674	41.25	-249.48	85.0811
<b>Kengen</b>		12.05	7	11.5%	34%	0.5	5.341701	0.005599	10.85	-6.54	-3.7443
		12.05	17	11.5%	34%	0.5	0.194021	4.194094	10.85	-1.39	1.9559
		12.05	8	11.5%	34%	0.5	4.520491	0.023467	10.85	-5.72	-2.8735
		12.05	9	11.5%	34%	0.5	3.634039	0.081136	10.85	-4.83	-1.9311
		12.05	10	11.5%	34%	0.5	2.819599	0.210818	10.85	-4.02	-1.0608
		12.05	11	11.5%	34%	0.5	2.10908	0.444421	10.85	-3.31	-0.2944
		12.05	<b>12</b>	11.5%	34%	0.5	1.522383	0.801846	10.85	-2.72	<b>0.3482</b>
<b>Kenol Kobil Ltd</b>		9.25	7	11.5%	21%	0.5	2.907369	0.002276	8.75	-3.41	-2.0318
		9.25	<b>17</b>	11.5%	21%	0.5	5.58E-05	6.800128	8.75	-0.50	<b>1.4499</b>

<b>KPLC</b>		14.8	9	11.5%	35%	0.5	6.094013	0.015089	13.3	-7.59	-4.0779	
		14.8	19	11.5%	35%	0.5	0.489411	3.627727	13.3	-1.99	2.0723	
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>	
		14.8	10	11.5%	35%	0.5	5.396204	0.037423	13.3	-6.90	-3.3374	
		14.8	11	11.5%	35%	0.5	4.514301	0.099642	13.3	-6.01	-2.3996	
		14.8	12	11.5%	35%	0.5	3.690495	0.219958	13.3	-5.19	-1.5200	
		14.8	13	11.5%	35%	0.5	2.946352	0.419937	13.3	-4.45	-0.7199	
		14.8	14	11.5%	35%	0.5	2.297779	0.715486	13.3	-3.80	-0.0155	
		14.8	<b>15</b>	11.5%	35%	0.5	1.752226	1.114054	13.3	-3.25	<b>0.5859</b>	
<b>B.A.T Kenya Ltd</b>		570	499	11.5%	32%	0.5	112.4904	13.21608	649	-33.49	-163.6303	
		570	409	11.5%	32%	0.5	185.7716	1.91748	649	-106.77	-241.9175	
		570	519	11.5%	32%	0.5	98.27925	18.27851	649	-19.28	-148.2785	
		570	529	11.5%	32%	0.5	91.7293	21.16978	649	-12.73	-141.1698	
		570	539	11.5%	32%	0.5	85.45922	24.34092	649	-6.46	-134.3409	
		570	549	11.5%	32%	0.5	79.47357	27.79648	649	-0.47	-127.7965	
		570	559	11.5%	32%	0.5	73.77497	31.53911	649	5.23	-121.5391	
		570	<b>550</b>	11.5%	32%	0.5	78.89076	28.1578	649	<b>0.11</b>	-127.1578	
<b>E.A.B. L</b>		259	238	11.5%	13%	0.5	34.83252	0.577897	283	-10.83	-45.5309	
		259	248	11.5%	13%	0.5	26.39852	1.540749	283	-2.40	-36.5407	
		259	258	11.5%	13%	0.5	18.87021	3.453661	283	5.13	-28.4537	
		259	250	11.5%	13%	0.5	24.80449	1.834965	283	-0.80	-34.8350	
		259	251	11.5%	13%	0.5	24.02272	1.997315	283	-0.02	-33.9973	
		259	<b>252</b>	11.5%	13%	0.5	23.25163	2.170351	283	<b>0.75</b>	-33.1704	
<b>CFC Stanbic Holdings Ltd</b>		86	73	11.5%	29%	0.5	18.37837	1.078018	129	24.62	-57.3124	

		86	83	11.5%	29%	0.5	11.18852	3.550638	129	31.81	-49.5506
		86	93	11.5%	29%	0.5	6.210961	8.014297	129	36.79	-44.0143
		86	103	11.5%	29%	0.5	3.140062	14.38462	129	39.86	-40.3846
		<b>Stock price (\$)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
		86	113	11.5%	29%	0.5	1.465364	22.15114	129	41.53	-38.1511
		86	173	11.5%	29%	0.5	0.005632	77.33872	129	42.99	-33.3387
		86	213	11.5%	29%	0.5	9.54E-05	115.0981	129	43.00	-31.0981
		86	174	11.5%	29%	0.5	0.005094	78.2823	129	42.99	-33.2823
		86	<b>175</b>	11.5%	29%	0.5	0.004607	79.22594	129	<b>43.00</b>	-33.2259
		86	180	11.5%	29%	0.5	0.002781	83.94472	129	43.00	-32.9447
<b>Safaricom Kenya Ltd</b>		11	10	11.5%	17%	0.5	1.658247	0.059495	12.45	-0.21	-2.5518
		11	20	11.5%	17%	0.5	2.02E-06	7.88244	12.45	1.45	-0.3324
		11	<b>11</b>	11.5%	17%	0.5	0.887371	0.272712	12.45	<b>0.56</b>	-1.7227
<b>Britam</b>		18.05	12	11.5%	54%	0.5	6.650962	0.369227	19.9	-4.80	-7.8045
		18.05	22	11.5%	54%	0.5	1.787904	4.508586	19.9	0.06	-2.4086
		18.05	15	11.5%	54%	0.5	4.861638	0.973466	19.9	-3.01	-5.8735
		18.05	16	11.5%	54%	0.5	4.258861	1.314811	19.9	-2.41	-5.2148
		18.05	17	11.5%	54%	0.5	3.715039	1.715111	19.9	-1.87	-4.6151
		18.05	18	11.5%	54%	0.5	3.228444	2.172638	19.9	-1.38	-4.0726
		18.05	19	11.5%	54%	0.5	2.796238	2.684554	19.9	-0.95	-3.5846
		18.05	20	11.5%	54%	0.5	2.414822	3.247259	19.9	-0.56	-3.1473
		18.05	21	11.5%	54%	0.5	2.080134	3.856693	19.9	-0.23	-2.7567
		18.05	<b>22</b>	11.5%	54%	0.5	1.787904	4.508586	19.9	<b>0.06</b>	-2.4086
		<b>July-Dec,2014</b>									
<b>Sasini</b>		15.7	10	11.5%	23%	0.5	6.412449	0.000255	12.85	-9.26	-3.0127

		15.7	20	11.5%	23%	0.5	0.168 177	3.350 615	12.85	-3.02	3.7994
		15.7	12	11.5%	23%	0.5	4.386 555	0.016 017	12.85	-7.24	-0.8660
		15.7	<b>13</b>	11.5%	23%	0.5	3.485 187	0.058 772	12.85	-6.34	<b>0.0912</b>
		<b>Stock price (\$)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
<b>Barclays bank ltd</b>		16.7	14	11.5%	12%	0.5	3.395 513	0.001 143	16.7	-3.40	-2.6080
		16.7	24	11.5%	12%	0.5	- 33	0.033 594	16.7	5.93	7.2664
		16.7	15	11.5%	12%	0.5	2.542 285	0.004 114	16.7	-2.54	-1.7041
		16.7	16	11.5%	12%	0.5	1.601 439	0.007 389	16.7	-1.60	-0.7074
		16.7	17	11.5%	12%	0.5	0.660 593	0.010 665	16.7	-0.66	0.2893
		16.7	<b>18</b>	11.5%	12%	0.5	- 25	0.013 941	16.7	<b>0.28</b>	1.2861
<b>Equity Bank ltd</b>		46	44	11.5%	25%	0.5	5.657 195	1.494 059	50	-1.66	-7.1811
		46	64	11.5%	25%	0.5	0.267 867	14.69 167	50	3.73	-0.6917
		46	45	11.5%	25%	0.5	5.233 503	1.718 988	50	-1.23	-6.7190
		46	46	11.5%	25%	0.5	4.653 699	2.083 306	50	-0.65	-6.0833
		46	47	11.5%	25%	0.5	4.118 147	2.491 876	50	-0.12	-5.4919
		46	<b>48</b>	11.5%	25%	0.5	3.626 796	2.944 647	50	<b>0.37</b>	-4.9446
<b>Kenya Commercial Bank</b>		51	50	11.5%	13%	0.5	4.237 367	0.501 148	57	1.76	-7.4400
		51	60	11.5%	13%	0.5	0.299 247	5.946 561	57	5.70	-2.9466
		51	70	11.5%	13%	0.5	0.003 349	15.09 188	57	6.00	-2.0919
		51	120	11.5%	13%	0.5	5.87E -19	62.29 463	57	6.00	0.7054
		51	65	11.5%	13%	0.5	0.038 98	10.40 69	57	5.96	-2.4069
		51	66	11.5%	13%	0.5	0.024 617	11.33 666	57	5.98	-2.3367
		51	67	11.5%	13%	0.5	0.015 298	12.27 146	57	5.98	-2.2715
		51	69	11.5%	13%	0.5	0.005 64	14.15 005	57	5.99	-2.1501
		51	70	11.5%	13%	0.5	0.003	15.09	57	<b>6.00</b>	-2.0919

				5%	%	5	349	188				
<b>Stanchart</b>		309	303	11.5%	6%	0.5	23.18857	0.257499		335	2.81	-32.2575
		<b>Stock price (\$)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>	
		309	313	11.5%	6%	0.5	14.69532	1.205473	335	11.30	-23.2055	
		309	323	11.5%	6%	0.5	7.85708	3.80845	335	18.14	-15.8085	
		309	353	11.5%	6%	0.5	0.300526	24.57555	335	25.70	-6.5756	
		309	363	11.5%	6%	0.5	0.060533	33.77678	335	25.94	-5.7768	
		309	373	11.5%	6%	0.5	0.009436	43.1669	335	25.99	-5.1669	
		309	375	11.5%	6%	0.5	0.006315	45.05202	335	25.99	-5.0520	
		309	376	11.5%	6%	0.5	0.005147	45.99498	335	25.99	-4.9950	
		309	<b>377</b>	11.5%	6%	0.5	0.004184	46.93814	335	<b>26.00</b>	-4.9381	
<b>Co-operative Bank</b>		19.3	14	11.5%	28%	0.5	5.866723	0.043823	20	-5.17	-5.7691	
		19.3	24	11.5%	28%	0.5	0.487062	3.845987	20	0.21	0.1540	
		19.3	15	11.5%	28%	0.5	5.22069	0.082518	20	-4.52	-5.0825	
		19.3	16	11.5%	28%	0.5	4.368892	0.174842	20	-3.67	-4.1748	
		19.3	17	11.5%	28%	0.5	3.579121	0.329193	20	-2.88	-3.3292	
		19.3	18	11.5%	28%	0.5	2.868079	0.562273	20	-2.17	-2.5623	
		19.3	19	11.5%	28%	0.5	2.247651	0.885967	20	-1.55	-1.8860	
		19.3	22	11.5%	28%	0.5	0.951421	2.422102	20	-0.25	-0.4221	
		19.3	<b>23</b>	11.5%	28%	0.5	0.686747	3.10155	20	<b>0.01</b>	-0.1016	
<b>Kenya Airways Ltd</b>		10.35	7	11.5%	17%	0.5	3.616023	5.34E-05	8.7	-5.27	-1.5675	
		10.35	17	11.5%	17%	0.5	6.14E-05	5.700134	8.7	-1.65	2.5999	
		10.35	8	11.5%	17%	0.5	2.798677	0.001652	8.7	-4.45	-0.7017	
		10.35	<b>9</b>	11.5%	17%	0.5	1.878295	0.025392	8.7	-3.53	<b>0.2746</b>	





		41.25	73	11.5%	29%	0.5	14.439	13.23185	61	34.19	-1.2319
		41.25	74	11.5%	29%	0.5	15.0373	13.57774	61	34.79	-0.5777
		<b>Stock price (S)</b>	<b>Exercise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expiration</b>	<b>value of european call option</b>	<b>value of european put option</b>
		41.25	<b>75</b>	11.5%	29%	0.5	15.6355	13.92362	61	35.39	<b>0.0764</b>
<b>Athi River</b>		80	62	11.5%	18%	0.5	21.25822	0.02575	86	-15.26	-23.7800
		80	72	11.5%	18%	0.5	12.50031	0.477082	86	-6.50	-14.4771
		80	82	11.5%	18%	0.5	5.489246	2.907241	86	0.51	-6.9072
		80	78	11.5%	18%	0.5	7.932378	1.573886	86	-1.93	-9.5739
		80	79	11.5%	18%	0.5	7.271494	1.857123	86	-1.27	-8.8571
		80	80	11.5%	18%	0.5	6.643421	2.173172	86	-0.64	-8.1732
		80	81	11.5%	18%	0.5	6.049119	2.522992	86	-0.05	-7.5230
		80	<b>82</b>	11.5%	18%	0.5	5.489246	2.907241	86	<b>0.51</b>	-6.9072
<b>Bamburi</b>		41.25	25	11.5%	24%	0.5	17.2502	0.000941	139	80.50	-113.5797
		41.25	35	11.5%	24%	0.5	8.47956	0.273826	139	89.27	-104.2738
		41.25	145	11.5%	24%	0.5	9.75E-13	95.64767	139	97.75	-89.6477
		41.25	245	11.5%	24%	0.5	1.24E-24	190.0599	139	97.75	-84.0599
		41.25	65	11.5%	24%	0.5	0.026315	20.14424	139	97.72	-94.1442
		41.25	71	11.5%	24%	0.5	0.005151	25.78781	139	97.74	-93.7878
		41.25	<b>72</b>	11.5%	24%	0.5	0.003893	26.73067	139	<b>97.75</b>	-93.7307
<b>Kengen</b>		10.85	6	11.5%	34%	0.5	4.809747	0.005042	10.3	-5.36	-3.9020
		10.85	16	11.5%	34%	0.5	0.121431	4.377381	10.3	-0.67	1.3226
		10.85	10	11.5%	34%	0.5	1.837595	0.428814	10.3	-2.39	-0.7288
		10.85	11	11.5%	34%	0.5	1.271626	0.806967	10.3	-1.82	-0.1070
		10.85	<b>12</b>	11.5%	34%	0.5	0.845	1.324	10.3	-1.40	<b>0.3752</b>

				5%	%	5	358	821				
<b>Kenol Kobil Ltd</b>	8.75	6	11.5%	21%	0.5	2.750 214	0.002 153		8.7	-2.80	-2.3450	
	8.75	16	11.5%	21%	0.5	6.04E -05	6.356 011		8.7	-0.05	0.9440	
	<b>Stock price (\$)</b>	<b>Exer cise price (X)</b>	<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>		
	8.75	7	11.5%	21%	0.5	2.154 994	0.013 847	8.7	-2.20	-1.7138		
	8.75	8	11.5%	21%	0.5	1.303 288	0.106 263	8.7	-1.35	-0.8063		
	8.75	9	11.5%	21%	0.5	0.653 621	0.400 718	8.7	-0.70	-0.1007		
	8.75	<b>10</b>	11.5%	21%	0.5	0.268 107	0.959 326	8.7	-0.32	<b>0.3407</b>		
<b>KPLC</b>	13.3	8	11.5%	35%	0.5	5.476 377	0.013 56	14.45	-4.33	-6.1625		
	13.3	18	11.5%	35%	0.5	0.304 288	3.998 482	14.45	0.85	-0.4485		
	13.3	14	11.5%	35%	0.5	1.332 98	1.250 686	14.45	-0.18	-1.7007		
	13.3	<b>15</b>	11.5%	35%	0.5	0.950 013	1.811 841	14.45	<b>0.20</b>	-1.2618		
<b>B.A.T Kenya Ltd</b>	649	568	11.5%	32%	0.5	128.0 811	15.04 778	908	130.92	-355.3598		
	649	578	11.5%	32%	0.5	120.7 476	17.45 009	908	138.25	-347.4501		
	649	588	11.5%	32%	0.5	113.8 713	20.01 5	908	145.13	-340.0150		
	649	628	11.5%	32%	0.5	88.79 857	32.70 711	908	170.20	-312.7071		
	649	648	11.5%	32%	0.5	77.76 63	40.55 729	908	181.23	-300.5573		
	649	1400	11.5%	32%	0.5	0.052 793	672.8 234	908	258.95	-180.8234		
	649	1414	11.5%	32%	0.5	0.045 239	686.0 336	908	258.95	-180.0336		
	649	1600	11.5%	32%	0.5	0.005 769	861.6 008	908	258.99	-169.6008		
	649	1700	11.5%	32%	0.5	0.001 906	956.0 091	908	259.00	-164.0091		
<b>E.A.B. L</b>	283	260	11.5%	13%	0.5	38.06 025	0.631 447	308	-13.06	-48.5260		
	283	270	11.5%	13%	0.5	29.64 004	1.552 955	308	-4.64	-39.5530		
	283	280	11.5%	13%	0.5	21.96 176	3.315 886	308	3.04	-31.3159		
	283	275	11.5%	13%	0.5	25.67	2.309	308	-0.68	-35.3094		

				5%	%	5	585	369			
		283	<b>276</b>	11.5%	13%	0.5	24.9176	2.489398	308	<b>0.09</b>	-34.4894
<b>CFC Stanbic Holdings Ltd</b>		129	109	11.5%	29%	0.5	27.56756	1.617027	124	-32.57	-16.4686
<b>Company name</b>	<b>Stock price (\$)</b>	<b>Exer cise price (X)</b>		<b>Rf</b>	<b>V</b>	<b>t</b>	<b>Call Price</b>	<b>Put price</b>	<b>stock price at expirati on</b>	<b>value of european call option</b>	<b>value of european put option</b>
	129	119		11.5%	29%	0.5	20.30199	3.652499	124	-25.30	-8.6525
	129	129		11.5%	29%	0.5	14.21462	7.00634	124	-19.21	-2.0063
	129	139		11.5%	29%	0.5	9.515989	11.74893	124	-14.52	3.2511
	129	130		11.5%	29%	0.5	13.68252	7.418369	124	-18.68	-1.4184
	129	131		11.5%	29%	0.5	13.16446	7.844425	124	-18.16	-0.8444
	129	132		11.5%	29%	0.5	12.66038	8.284466	124	-17.66	-0.2845
	129	<b>133</b>		11.5%	29%	0.5	12.17022	8.73843	124	-17.17	<b>0.2616</b>
<b>Safaricom Kenya Ltd</b>	12.45	11		11.5%	17%	0.5	1.876834	0.067338	14.05	-0.28	-2.8471
	12.45	21		11.5%	17%	0.5	3.47E-05	7.376594	14.05	1.60	-0.4266
	12.45	12		11.5%	17%	0.5	1.305987	0.18545	14.05	0.29	-2.2354
	12.45	13		11.5%	17%	0.5	0.697846	0.521431	14.05	0.90	-1.5714
	12.45	14		11.5%	17%	0.5	0.317829	1.085535	14.05	1.28	-1.1355
	12.45	15		11.5%	17%	0.5	0.123678	1.835506	14.05	1.48	-0.8855
	12.45	16		11.5%	17%	0.5	0.041592	2.697542	14.05	1.56	-0.7475
	12.45	17		11.5%	17%	0.5	0.012276	3.612348	14.05	1.59	-0.6623
	12.45	18		11.5%	17%	0.5	0.003233	4.547427	14.05	<b>1.60</b>	-0.5974
<b>Britam</b>	19.9	14		11.5%	54%	0.5	7.332639	0.40707	29.75	2.52	-16.4147
	19.9	24		11.5%	54%	0.5	2.041715	4.800641	29.75	7.81	-10.5506
	19.9	54		11.5%	54%	0.5	0.028191	31.11077	29.75	9.82	-6.8608
	19.9	74		11.5%	54%	0.5	0.002008	49.96703	29.75	9.85	-5.7170
	19.9	84		11.5%	54%	0.5	0.000	59.40	29.75	9.85	-5.1568

				5%	%	5	587	683			
		19.9	66	11.5%	54%	0.5	0.00561	42.41765	29.75	9.84	-6.1677
		19.9	<b>67</b>	11.5%	54%	0.5	0.004923	43.36109	29.75	<b>9.85</b>	-6.1111