CHALLENGES FACING NON-FINANCIAL FIRMS IN HEDGING FINANCIAL RISKS USING DERIVATIVES

Christopher Mutembei Murungi

Kenya Methodist University, Kenya

Prof. Kinandu Murage

Executive Director, Kenya School of Monetary Studies, Kenya

Dr. Kenneth Wanjau

Jomo Kenyatta University of Agriculture and Technology, Kenya

CITATION: Murungi, C. M., Murage, K. & Wanjau, K. (2014). Challenges facing non-financial firms in hedging financial risks using derivatives. *International Journal of Social Sciences and Entrepreneurship, 1* (10), 361-374.

ABSTRACT

With the advancement in technology and accompanying information age and globalization, firms are increasingly exposed to financial risks, posing a threat to their financial performance even leading ultimate collapse. Nonetheless, innovation has led to innovative ways of hedging against financial risks through derivatives. However, financial risk hedging and derivative use in Kenya has remained low in Kenya coupled with lack of studies and dearth of knowledge on the possible reasons for limited use of derivatives, this study is warranted. The study looks at financial risk exposures facing financial firms, their hedging practices and challenges facing derivative use. The descriptive study was conducted on the 39 nonfinancial firms listed at the NSE. The firms' heads of finance or risk management department were the targeted respondents to whom semi structured questionnaires were sent. The study used descriptive statistics such as frequency, percentages, mean and standard deviations to analyze and summarize the results. The findings and concluded that nonfinancial firms do not use derivatives owing to managerial skepticism, limited derivative market microstructure, and knowledge on derivative use and accounting. The study recommends that education programs on derivative and their use should be rolled to firm's managers and firms to develop hedging policies that act as blueprint in hedging financial risks.

***Key Words**: Derivative, Hedging, Financial Risks, Risk Aversion, Nairobi Security Exchange*

Introduction

Financial risk management has become one of the most important business strategies of firms. Hedging practices varies from company to company, with the hedging practices ranging from derivative to non-derivative techniques (Adams, 2011). Owing to innovation in risk management, derivative hedging of financial risk management has been developed. Thus, derivatives use has had a tremendous impact on shareholders' wealth maximization (Ithai, 2013). Financial risk, is the risk a corporation faces due to its exposure to market factors such as interest rates, foreign exchange rates and commodity and stock prices.

Financial risks, for the most part, can be hedged due to the existence of large, efficient markets through which these risks can be transferred. Derivatives are financial instruments whose values are derived from the values of other basic underlying assets (for example, stocks, bonds, real-estate property among others), rates or other variables (Stulz, 2005). These financial instruments includes: swaps, futures and options (Hull, 2008). Derivative are used by firms to hedge against risks ranging from foreign exchange risks, interest rate risk, commodity price risk, equity to credit risks. Risk manager should completely understand the firm's exposure and risk policy before applying hedging techniques.

Derivatives are important risk management tools. They allow investors to trade exposures, diversifying risk and reducing earnings volatility. Today derivatives have moved beyond the more familiar instruments used for managing interest rate, currency, commodity, equity and credit market risk to instruments used to mitigate risks such as catastrophe, pollution, electricity, weather and inflation (Berkman, Bradbury, Hancock, and Lunes, 2002). Equity derivatives are generally over-the-counter (OTC) structured financial products, and include equity swaps, options, and futures.

Derivatives markets can facilitate the management of financial risk exposure, since they allow investors to unbundle and transfer financial risk. Derivatives markets are divided into two; the over the counter (OTC) and the exchange markets. Though both exchange-traded and OTC derivative contracts offer many benefits, the exchange traded contracts have rigid structures compared to the OTC. The exchange-traded derivatives market works through a clearinghouse or exchange which is central to its operation and with standardized contracts. OTC derivatives, on the other hand, are private contracts between two parties, typically either between the proprietary trading desks of two banks, or between a bank and one of its customers and these contracts are heterogeneous (González-Hermosillo, 1994).

Modern markets for derivatives are believed to be in existence for around 300 years connected with the historical situation in United States of America. Chicago Board of Trade (CBOT) was established in 1848 in order to bring order and control in the markets (Pathak, 2011). Derivative use was limited until 1970s, when economic conditions and advances in the pricing of derivatives led to spectacular growth of derivatives. Foreign exchange and interest rates volatility increased sharply during this period and increase in international trade, capital flows and market

deregulation made it imperative for firms to establish the most effective way of hedging against these risks (Bezzina and Grima, 2012). Besides, this growth was enhanced by advances in finance theory in the 1970s by scholars such as Fischer Black's and Myron Scholes' 1973 paper, on pricing of options (Stulz, 2005). Although derivatives have been used as hedging instruments, there are some who have been skeptical against the benefits of such uses and/or experience a number of challenges in using the instruments (Simon, 2008).

Problem Statement

The use of derivatives in corporate risk management has grown rapidly in recent years, fueled in part by the success of the financial industry in creating a variety of over-the-counter (OTC) and exchange-traded products. Derivatives markets can facilitate the management of financial risk exposure, since they allow investors to unbundle and transfer risk. In principle, such markets could contribute to a more efficient allocation of capital and cross-border capital flow, create more opportunities for diversification of portfolios, facilitate risk transfer, price discovery, and more public information (Ilyina, 2004).

Derivatives markets enable increased access to finance by allocating finances to the most suitable investments; enable financial risk management by providing businesses with the choice of obtaining insurance against price fluctuations and enhance financial market deepening and assist economies to meet the challenges of globalization by contributing to development of stock market and influencing cross border flows. According to Olatundun (2009), emerging economies are characterized by shallow financial markets and inadequate access to finance which is a major problem and derivatives trading would greatly assist in the solving of the problem. The trading volume of derivatives has escalated rapidly, and non-financial companies continue to purchase and trade them in ever-greater numbers. Although various factors which affect the proper use of derivatives have been suggested in the literature, there still remains a need for an inventory that exploits such factors.

Research Objectives

1. To find out the extent of financial risk exposures of non-financial firms listed at the NSE
2. To establish the extent of derivative and non-derivative hedging of the financial risks;
3. To determine the challenges facing non-financial firms in hedging against the financial risks using derivatives.

Theoretical Review

Finance theory indicates that hedging increases firm value if there are capital market imperfections such as expected costs of financial distress, expected taxes and other agency costs. Theoretical models of corporate risk management indicate that derivatives use increase with leverage size, the existence of tax losses, the proportion of shares held by directors and the payout ratio (Bezzina and Grima, 2012).

Option Pricing Theory

Options as derivative instruments have existed—at least in concept—since antiquity. However, it wasn't until publication of the Black and Scholes (1973) and Merton (1973) option pricing formula that a theoretically consistent framework for pricing options became available. Also known as Black-Scholes theory or derivatives pricing theory, option pricing theory traces its roots to Bachelier (1900) who invented Brownian motion to model options on French government bonds. Option pricing theory is the theory of how options are valued in the market. The Black-Scholes model is the most common option pricing theory.

Option pricing theory or Black-Scholes formula takes into account the following factors: strike price, time until expiration, volatility, whether the underlying stock distributes dividends, and interest rates. The binomial model is a discrete-time model for asset price movements, with a time interval (t) between price movements. As the time interval is shortened, the limiting distribution, as t -> 0, can take one of two forms. First, if as t -> 0, price changes become smaller, the limiting distribution is the normal distribution and the price process is a continuous one. Secondly, if as t->0, price changes remain large, the limiting distribution is the poisson distribution, i.e., a distribution that allows for price jumps.

The Black-Scholes model applies when the limiting distribution is the normal distribution, and explicitly assumes that the price process is continuous and that there are no jumps in asset prices. The version of the model presented by Black and Scholes was designed to value European options, which were dividend-protected. The value of a call option in the Black-Scholes model can be written as a function of the following variables:

S = Current value of the underlying asset

K = Strike price of the option

t = Life to expiration of the option

r = Riskless interest rate corresponding to the life of the option

s2 = Variance in the ln(value) of the underlying asset.

Value of call = $S\ N(d_1) - K\ e^{-rt}\ N(d_2)$

Where:

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right) t}{\sigma \sqrt{t}}$$

$$- d_2 = d_1 - \sigma \sqrt{t}$$

If the dividend yield (y = dividends/ Current value of the asset) of the underlying asset is expected to remain unchanged during the life of the option, the Black-Scholes model can be modified to take dividends into account.

The theory posits that having an understanding of the underlying factors is helpful because changes in these elements affect an option's premium. However, though calculating theoretical price may help one gauge an option's value, market demand always determine an option's actual price, regardless of its theoretical worth (DeRosa, 1998). Thus, other derivative instruments, just like options involve risk and are not suitable for all investors. The theory on options pricing have wide margins for error because their values are derived from other assets, usually the price of a company's common stock. Time also plays a large role in option pricing theory, because calculations involve time periods of several years and more.

Challenges to Derivatives Hedging

Hedging has a cost. A critical factor to consider when determining which risks to hedge is the materiality of the potential loss that might occur if the exposure is not hedged; a corporation's optimal risk profile balances the benefits of protection against the costs of hedging (Giddy, 2013). Another challenge is evaluating the costs of hedging in light of the costs of not hedging. If the expected risk does not materialize, hedging will prove an ineffective way of doing business. All these complexities associated with hedging through derivatives pose a great challenge to hedging of risk (Gandhi, 2006). Denga and Oren (2006) averred that regulatory rules also play an important role in hedging practices. The complexity of today's derivatives markets poses tremendous challenges in collecting and analyzing data, before any prudent regulatory and supervisory actions can be taken. Regulators, thus, have to ensure that organizations conduct derivatives transactions with a scale and complexity commensurate to its capital and market position (e.g. leader, new entrant, etc) (Hou, 2010).

Derivatives markets are deep and broad, presenting both challenges and opportunities in their wakes (Dasgupta and Chakrabarty, 2009). For many entities, the breadth and complexity of accounting for derivatives and hedging activities have created significant challenges. The time and energy required have prompted some entities to use the assistance of third parties. Though there are guidelines on such accounting, entities continue to face challenges associated with application of the guidance (Jaschke, 2013).

Auditing hedging activities to measure its effectiveness involves complex audit procedures, requiring specialized skills and knowledge to perform audit tasks. The major risks involved with auditing the effectiveness of hedging operations are: the hedge does not represent a hedge, rather it is a bet that fair value of financial assets price will move in a specific direction, generating profits for the entity; all hedging transactions are not identified or disclosed properly in the financial statements of the entity; entity is exposed to greater risks than approved by the management or the board (Dasgupta and Chakrabarty, 2009).

Dasgupta and Chakrabarty list common structural faults in hedging which include: committing too high a proportion of underlying production to the hedge programme; using overly complicated products with barriers and/or embedded leverage; failing to examine how the hedge would perform in both upside and downside price scenarios; and, disguising price speculation.

Best hedging decisions are made when risk managers acknowledge that market movements are unpredictable and such practices are meant to minimize risks not gambling purposes (Giddy, 2013). When speculation is mixed with hedging, it is destructive. Hedging and speculation are not similar answers to a problem. They cannot be used interchangeably for getting desired results or to meet similar objectives. Hedging is a risk management or reducing technique, where the objective is not to earn profits, unlike speculation (Gandhi, 2006). Hedge ineffectiveness can be gauged by the extent to which change in present value of expected cashflow or fair value of derivative hedging instrument doesn't offset those of hedged items. Worst hedging using derivatives are made when the risk managers are not familiar with derivative products (Giddy, 2013). Besides, some managers view derivative instruments as too complex to understand. Another reason for not hedging using derivatives is the fear of reporting a loss on a derivative transaction (Giddy, 2013). This fear reflects widespread confusion over the proper benchmark to use in evaluating the performance of a hedge.

Giddy (2009) listed issues that have posed challenges to risk management using derivatives which have included: not measuring risk, lack of linkage of risk to value, lack of effort to anticipate risks, lack of business risk policy, many fragmented effort and narrow focus in risk management, poor risk communications, and lack of an integrated risk assessment framework. Jaschke (2013) noted that derivative hedging experiences challenges related to increased hedging transaction costs or counterparty defaults which might create a total or partial derivative markets disruption, and misestimate of risk assumptions. Finally, a hedging program requires a system of internal policies, procedures and controls to ensure that it is used properly. The system, often documented in a hedging policy, establishes, among other things, the names of the managers who are authorized to enter into hedges; the managers who must approve trades; and the managers who must receive trade confirmations. The hedging policy may also define the purposes for which hedges can and cannot be used (Giddy, 2013).

Research Methodology

The study took a descriptive survey research design. Saunders, Lewis and Thornhill (2009) state that descriptive research answers research questions who, what, where, when and how is the problem which would be fundamental in describing the data and characteristics about the population of phenomenon being studied; hedging practices of financial risks. Besides, the design utilizes elements of both quantitative and qualitative research methodologies which offers an avid and apt description of the challenges to derivative use. The study population was all the 39 non-financial firms listed at the NSE and using purposive sampling, head of finance, risk departments or equivalent was selected. Primary data was collected using semi-structured questionnaires sent to the 39 respondents. Questionnaire, thus, sought collect both qualitative and quantitative data from open and close ended questions. Before actual data collection, a pilot study was done on 10 non-financial firm not listed at the NSE to determine the validity and reliability of the research instruments. The data collected was subjected to descriptive and inferential statistical analysis. Descriptive analysis involved the use of frequencies in their absolute and relative forms (percentage). Mean and standard deviations was used as measures of central tendencies and dispersion respectively.

Research Results

The data obtained from the 38 nonfinancial firms served as input for achieving the research objectives and hypotheses testing. The study inquired about the extent to which financial risks affected the firms' operations. A 5-point Likert scale ranging from not at all to very high extent was used to collect and analyze in an ordinal level of measurement. Foreign exchange risks had a mean of 3.47. Likewise, Karp (2009) states that Kenya is net importer and foreign exchange fluctuation affects firms' pricing and production cost strategies. Similar, Turana (2011) avers that Kenyan shilling exchange rate is volatility against major currencies exposing firms to exchange risks as was the case in 2011.

Interest rate risks and commodity price risks had a mean of 3.18 and 3.16 respectively. Mugwe, (2011) established that Kenyan firms incur most of their input in foreign currencies which has occasionally led to exported inflation which affects the commodity prices; hence commodity price risks. Equity market exposure (mean of 2.18) was the least experienced risk which could be explained by relatively efficient stock exchange market where information do not get quickly reflected in share prices, thus, market valuations of a company (Munyi, 2010).

The study sought to establish how risk exposures affect derivative use. Pearson Correlation analysis was used to achieve this end at 90% confidence level ($\alpha = 0.1$). Table 1 shows insignificant correlation coefficients were established between individual derivative use and financial risks exposures.

Table 1: Correlations Matrix

		Use Derivative	Foreign Exchange Risks	Interest rate risks	Commodity Price Risks	Liquidity Risk
Foreign exchange risks	Pearson Correlation	-.132	1			
	Sig. (2-tailed)	.438				
Interest rate risks	Pearson Correlation	-.038	.596**	1		
	Sig. (2-tailed)	.824	.000			
Commodity price risks	Pearson Correlation	-.290	.371*	.027	1	
	Sig. (2-tailed)	.082	.022	.874		
Liquidity risk	Pearson Correlation	.267	.321*	-.133	.021	1
	Sig. (2-tailed)	.111	.049	.424	.899	
Equity market exposure (stock prices)	Pearson Correlation	.069	-.210	-.160	-.169	-.036
	Sig. (2-tailed)	.683	.207	.337	.309	.828
	N	37	38	38	38	38

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The findings indicated that majority of the firms listed at the NSE had not used derivative instruments: 66.7% had never used options and futures (52.8%). Swaps and forwards were the most used as only 48.6% and 34.3% respectively had never used the instruments. Nzuki (2010) established that firms in Kenya under-hedge their financial risks; that is, there hedging practices were below the industry optimal level. Ngugi, Njagi and Kimani (2013) found that derivatives instruments used by Kenyan companies are the forward contracts and swaps. The least used derivative instrument was options which were used to foreign exchange exposure (3.7%) and interest rate exposure (7.4%). Karp (2009) establish that hedging activities in Kenya is low making shareholders lose billions of shillings owing to directors' failure to shop for appropriate hedging instruments or their imprudent choice of hedging.

Non-financial firms, however, extensively use non-derivative hedging techniques such as price adjustments (100%), sales in foreign currency (78.4%), buying and saving currency in advance (71.1%), delay payments (61.8%), prepayment/advance payment (52.8%) and netting (50%). Ngugi, Njagi and Kimani (2013) established that Kenya do not have a functioning derivative market. Thus, not all firms use derivatives and not all firms use all types.

Findings indicated that the non-financial firms used hedged to: 'reduce cashflow volatility to maintain stability (avoidance of fluctuations)' (mean of 4.12); 'reduce cashflow volatility to avoid cash shortfalls' and 'trading for profit' (3.88); 'reduce accounting earnings volatility' (3.65). Similarly, Stulz (2003) argued that hedging instruments are employed to minimize cashflow variability by reducing financial distress cost, underinvestment problem, agency cost of

debt among others. Chapman (2006) established that failure to hedge against risks could result in loss making and even eventual business failure.

Firms also hedge to 'managing balance sheet accounts' (3.38). Stulz (2003) argued that hedging instruments are employed to reduce risks in assets. Kamenchu (2013) found that 44 percent of the firms use derivatives to hedge, the balance sheet. Firms hedge to 'stabilize market value of the firm' as shown by a mean of 3.24. Just as the study's findings, Marek and Yousiph (2006) found that non-financial firms enter into hedging to stabilize their share value in the market.

The study sought to determine the association between non-financial firm ownership with respect to local or foreign ownership and derivative use. The aim was to show whether firms with foreign ownership use derivatives than locally owned firms using cross tabulation and Chi-square. Findings show that 20% of firms that use derivative as the only hedging instrument were foreign-local owned firms while 80% of locally owned firms. Seventy two percent (72.7%) of firms that used non-derivative hedging techniques were locally owned while 27.3% were foreign-local owned firms. From Table 2, a Pearson Chi-square value of 0.097 was established at $p = 0.953$. This depicts insignificant association between ownership and derivative use.

Table 2: Chi-Square Tests - Ownership of Company

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.097[a]	2	.953
Likelihood Ratio	.100	2	.951
Linear-by-Linear Association	.087	1	.768
N of Valid Cases	32		

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.25.

Findings indicated that 'Difficulty in quantifying underlying exposure from operations' had a mean of 3.59; 'concerns about accounting treatment, tax implications and legal issues' had a mean of 3.53. Kamenchu (2013) found that firms refrain from hedging because of regulatory skepticism about the use of derivatives. 'Perception of derivatives by investors, regulator and the public' and 'volatility or change in risk exposure e.g. volatile exchange rate or inflation' which had a mean of 3.47. Similarly, Adams (2011) established that hedging decisions are based on the risk attitude of the company's management team. Kamencu (2013) also established edging motives appear to be influenced by the management's perceptions of the stakeholder's attitudes to risk. The companies also had issues in: getting the right foreign currency mix necessary in hedging foreign exchange risks; transaction and/or administrative costs in derivative use; lack of knowledge about the overall handling of derivatives; fluctuation in demand;

The study used component analysis using factor analysis to regroup the challenges in derivative use. Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity tests presented in Table 3, provide a minimum threshold for doing factor analysis. KMO measure varies between 0 and 1, and values closer to 1 are better with a threshold of 0.6. Bartlett's Test of Sphericity tests the null hypothesis that the correlation matrix is an identity matrix. Since p-value is less than 0.5 (p-value < .001) the null hypothesis is rejected.

Table 3: KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.683	
Bartlett's Test of Sphericity	Approx. Chi-Square	148.360
	df	36
	Sig.	.000

Using Varimax (Variance Maximization) with Kaiser Normalization of factor analysis, two components were extracted as shown in Table 4. The results show that difficulty in quantifying underlying exposure from operations, lack of knowledge about the overall handling of derivatives, concerns about accounting treatment, tax implications and legal issues, getting the right foreign currency mix, fluctuation in demand for certain foreign currency, and getting the needed foreign currency belonged to the first component belonged to the first component. This can be construed to belong to firm's technical capacity in handling derivative hedging. On the other hand, the second component was composed of: overall costs, such as transaction costs or administrative costs, concerns about the perception of derivatives by investors, regulator and the public, and volatility or change in risk exposure e.g. volatile exchange rate or inflation. This point to external factors incidental and effecting the performance of derivative hedging. Thus, by and large, derivative use by non-financial firms are affected by firm's technical capacity in handling derivative hedging, and external factors incidental and effecting the performance of derivative hedging.

Table 4: Rotated Component Matrix

Factors	**Component**	
	1	**2**
Difficulty in quantifying underlying exposure from operations	.297	
Lack of knowledge about the overall handling of derivatives	.522	
Concerns about accounting treatment, tax implications and legal issues	.917	-.400
Overall costs, such as transaction costs or administrative costs		.342

Factors	Component	
	1	2
Concerns about the perception of derivatives by investors, regulator and the public	.395	.919
Volatility or change in risk exposure e.g. volatile exchange rate or inflation		.218
Getting the right foreign currency mix	.335	
Fluctuation in demand for certain foreign currency	.379	
Getting the needed foreign currency	.440	

Conclusions

Non-financial firms in Kenya do not hedge using derivatives as they feel that exposures are more effectively managed by other means (non-derivative use) and some felt that they were insufficiently exposed to financial risks. Kamenchu's (2013) established that firms drive for financial risk hedging is directly related to their exposure to financial risks affecting their interest rate, currency, stock and bond returns and commodity prices. Nonfinancial firms' use of derivatives is also affected by management scepticism against derivative use as hedging instrument. Derivative market and instruments use is not fully developed in Kenya hindered by political environment, knowledge of derivatives, participants' attitude, financial infrastructure and foreign competition. Thus, firms find it had to use derivative against the necessary market microstructure. Firms also find difficulty in pricing and valuing derivatives and accounting treatment of derivative even though such use is relatively inexpensive and effective method to reduce risk. To the contrary, nonfinancial firms in Kenya view costs of establishing and maintaining a derivative program as exceeding the expected benefits.

Recommendations

The study advocates for speedy establishment of derivative market in Kenya together with its ancillary regulatory framework that would protect market participants. Educational programs on derivatives should be developed and undertaken in Kenya to demystify derivative trading and its accounting and valuation procedure. This would mitigate against managers skepticism on such uses. The finance offices would also understand the disadvantages and advantages of each and every hedging practice. Most firms did not have a deliberate policy on hedging and management of financial risks is solely left on the devices and whims of managers which make investors incur agency costs. There is, thus, a need for organization wide policy on hedging and derivative use to act a operation manual for the managers and firms' agents.

References

Adams, F.K. (2011). Managerial Risk Attitudes and Biases, and Hedging Behaviors in the Financial Markets.

Bachelier, L. (1964). *Theory of Speculation, The Random Character of Stock Prices*. Paul H. Cootner (editor), Cambridge: MIT, Translated from the 1900 doctoral thesis.

Berkman, H., Bradbury, M.E, Hancock, P., & Lunes, C. (2002). Derivative Financial Instrument use in Australia. *Accounting and Finance*, 42(2).

Bezzina, F.H., & Grima, S. (2012). Exploring factors affecting the proper use of derivatives: An empirical study with active users and controllers of derivatives. *Managerial Finance*, 38(4), 414 – 435.

Black, F., & Scholes, M.S. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy*, 81, 637-54.

Chance, D.M. (1995). A Chronology of Derivatives. *Derivatives Quarterly 2* (Winter), 53-60.

Chapman, A. (2006). Regulating Chemicals—From Risks to Riskiness. *Risk Analysis*, 26: 603–616

Danescu, T., Spatacean, O., & Nistor, P. (2013). Measuring Hedge Effectiveness - A Major Challenge in Auditing Derivative Instruments used in Portfolio Management. *4th International Conference on Finance, Accounting and Law,* Chania, Crete Island, Greece August 27-29, 2013.

Dasgupta, K., & Chakrabarty, C. (2009). Commodities Derivative Hedging: Portfolio and Effectiveness. *Commodity Insight Year Book*, 53- 59.

Denga, S.J., & Oren, S.S. (2006). Electricity Derivatives and Risk Management. *Energy*, 31, 940–53.

DeRosa, D.F. (1998). *Currency Derivatives: Pricing Theory, Exotic Options, and Hedging Applications.* London: Wiley Publisher.

Gandhi, G.S. (2006). Hedging Foreign Exchange Risk – Isn't it also a Risk? *Banking & Finance*, August, 260-64.

Giddy, I.H. (2009). *Hedging and Risk Control*. New York University, Stern School of Business.

Giddy, I.H. (2013). The Corporate Hedging Process. *New York University, Stern School of Business*, Accessed on August 27, 2013, http://people.stern.nyu.edu/igiddy/corphdg.htm

González-Hermosillo, B. (1994). The microstructure of financial derivatives markets: Exchange Traded versus Over-the-Counter, The Bank of Canada, Technical Report no. 68.

Hou, Y. (2010). The regulation and supervision of banks' derivatives activities: existing practices, challenges, and preliminary proposals from data perspective. *IFC Bulletin No 35*, 65-69.

Howton S.O., & Perfect, S.B. (1998). Currency and interest - rate derivatives use in US firms. *Financial Management*, 27(4).

Hull, J. (2008). *Options, Futures and Other Derivatives, 7th ed*. Upper Saddle River, NJ: Prentice-Hall.

Ilyina, A. (2004). The Role of Financial Derivatives in Emerging Markets. In '*Emerging Local Securities and Derivatives Markets, World Economic Surveys*', p. 69-90. Washington, DC: International Monetary Fund.

Ithai, J. K. (2013). Factors leading to slow adoption of derivatives use in Kenya: A case study of commercial banks in Kenya. *International Journal of Social Sciences and Entrepreneurship , 1* (3), 454-468.

Jaschke, S. (2013). Pricing and Hedging Derivatives on Actively Managed Funds. *Investment-Based Insurance Guarantees Conference*, July 8-9, 2013, Dublin, Ireland.

Kamenchu, I.J. (2013). Factors Leading to Slow Adoption Of Derivatives Use In Kenya: A Case Of Commercial Banks In Kenya. *Journal of Social Sciences and Entrepreneurship, 1*(3), 454-468.

Karp, A. (2009). Kenya Airways posts unexpected fiscal year loss on hedging charges. *Air Transport World*, June 8, 2009.

Marek, R., & Yousiph, K. (2006). PDE Approach to Basket Credit Derivatives. *Working Paper*, 2006.

Merton, R.C. (1973). Theory of rational option pricing. *Bell Journal of Economics and Management Science*, 4 (1), 141-183.

Mugwe, D. (2011). Companies Feel the Heat of Rising Interest Rates. *Business Daily*, November 14, 2011.

Munyi, J.N. (2010). Stock Splits Announcements In Kenya: A Test Of Stock Market Efficiency. *Unpublished MBA Project*, University of Nairobi.

Ngugi, N.N., Njagi, G.M., & Kimani, E.M. (2013). Factors Influencing Development Of Financial Derivatives Markets: A Survey Of Listed Companies in Kenya. *Global Advanced Research Journal of Management and Business Studies*, 2(5), 258-267.

Nzuki, V.G. (2010). Managing Price Risk Using Futures: Case Of Oil Companies in Kenya. *Master Thesis*, Kenyatta University.

Olatundun, J.A. (2009). The Derivatives Market in South Africa: Lessons for sub-Saharan African Countries. *IMF Working Paper*, WP/09/196.

Pathak, B.V. (2011). *The Indian Financial System: Markets, Institutions and Services, 3rd ed.* Noida: Dorling Kindersley.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students, 5th Ed*. New Jersey: Prentice Hall.

Stulz, R.M. (2005). Demystifying financial derivatives. *The Milken Institute Review*, Third Quarter, 20-31.