RELATIONSHIP BETWEEN FOREIGN EXCHANGE RISK AND PROFITABILITY OF OIL COMPANIES LISTED IN THE NAIROBI SECURITIES EXCHANGE

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UNIVERSITY OF NAIROBI
2013
DECLARATION

STUDENT’S DECLARATION

This research is my original work and has not been submitted to any other university for academic award.

Sign………………………….. Date………………………………

Runo Fredrick Njihia
D61/70745/2009

SUPERVISOR’S DECLARATION

This research project has been submitted for examination with my approval as the candidates University Supervisor.

Sign………………………….. Date………………………………

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DEDICATION

Dedicated to my wife Wambui, my son Liam both of who have encouraged me throughout the period of the study. Without their support this work would have been more difficult to accomplish.

For this I say thank you.
ACKNOWLEDGEMENT

I wish to thank my Supervisor Dr. Aduda for his unwavering guidance and encouragement in supervising this study. I am grateful to my wife and family for the support and understanding during the long hours I put working on this project, may God bless you.

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Many thanks goes to my colleagues at Mapco: Rhoda, Sylvester and Richard for sitting in when away, my boss Mr. Mukesh and David for giving me time to attend the many visits to meet my supervisor, I am truly indebted to you.

Thank you all.
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<td>FOREX</td>
<td>Foreign Exchange</td>
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<td>HC</td>
<td>Home currency</td>
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<td>LC</td>
<td>Local currency</td>
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<td>NSE</td>
<td>Nairobi Securities Exchange</td>
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<td>OTS</td>
<td>Open Tender System</td>
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<td>VAR</td>
<td>Value-At-Risk</td>
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<td>PAT</td>
<td>Profit After tax</td>
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<td>GP</td>
<td>Gross Profit</td>
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ABSTRACT
Firms are exposed to Foreign Exchange Risk if the results of their projects depend on future exchange rates and if exchange rate changes cannot be fully anticipated it can lead to major financial losses. This research has examined the influence of foreign exchange risk on the profits of oil companies listed in the Nairobi Securities exchange namely; KenolKobil and Total Kenya ltd. The objective of the study was to examine the relationship between how foreign exchange risk and profitability of oil companies listed in the Nairobi securities exchange.

Using descriptive analysis, correlation and regression analysis, research results indicated that the foreign exchange risk greatly influences the profits reported by these oil companies. Other variables namely the gross profit and operational expenses were used as predictors of profitability along with the foreign exchange risk and were also found to have a strong correlation to the profits. Foreign exchange risk as measures by the foreign exchange gain/loss reported by these companies was found to carry more weight in predicting the profitability of these two companies with a correlation coefficient of 95%.

Since it was evident that foreign exchange risk greatly affects the profits, It was recommended that the firm should develop a robust foreign exchange risk management framework which clearly shows their currency risk assessment Procedure and implementation of currency risk management strategies. The firm should also emphasize the use of currency risk transfer strategies through hedging, insuring and diversification of foreign exchange risk as management strategies in order to cushion their profits from getting negatively affected by the foreign exchange fluctuations as seen in both companies where KenolKobil recorded a loss after tax of 6.2 billion Shillings in 2012 out of which 4.6 Billion was comprised of foreign exchange losses whereas Total Kenya Ltd recorded a loss of 202 Million shillings after tax and 81 million out of this was due to foreign exchange losses.
CHAPTER ONE

INTRODUCTION

1.1 Background
Corporates whose business involves dealing with foreign currency are inevitably exposed to foreign exchange risk. The management of this risk has increasingly become essential for survival of companies in today's volatile financial markets. The risk arises from exposure of an organization to potential fluctuations in foreign exchange rates. These fluctuations can occasion instability in profit margin, expected future cash flows as well as significant losses to organizations (Lei and Niannian, 2007). This chapter introduces foreign exchange risk and its effect on the profits of oil companies. The objective of the study as well as parties likely to benefit from the study is also discussed.

1.1.1 Foreign Exchange Risk
Foreign Exchange Risk is defined as an exposure of an institution/ firm to the potential impact of movements in foreign exchange rates. According to Armitage et al (2002), foreign exchange risk is the risk that profits will change if foreign exchange rates change. According to Shapiro, 1996), there are three types of foreign exchange rate risks that are faced by companies namely; translation or accounting risk, transaction risk, and economic risk.

Translation risk which is basically balance sheet exchange rate risk arises during where the exchange rate used causes changes in the value documented in the parent company's financial statements. In essence, translation risk is the effect exchange rates have on the figures shown on the parent company's consolidated balance sheet. Thus, while income statements are usually translated at the average exchange rate over the period, balance sheet exposures of foreign subsidiaries are often translated at the prevailing exchange rate at the time of consolidation.

Transaction risk, on the other hand, is the extent to which given exchange rate will change the value of foreign-currency-denominated transactions, which have already been
entered into by a company. In other words, when a business contract is entered into, with the agreement that payment will be settled at a future date, the exchange rates that exist on the date the contract is entered into and the date that the contract is settled, may be different. As a result, the cash that is received on the date of settlement may be different from what was expected when the contract was entered into. Consequently, the cash flow to the firm is directly affected.

Economic risk is the extent to which the present value of a firm’s future cash flows will change due to a change in the exchange rate. Further, Dhanani (2000) states that economic risk is the effect of long-term exchange rate movements on a firm's future expected cash flows and is hard to identify because the cash flows linked to the risk are not certain to materialize.

Under today's system of floating foreign exchange rates, currencies often move erratically over short periods. Empirical studies demonstrate that foreign exchange volatility can have significant impact on companies' profits (Arbitrage et al, 2002). In addition, David (1997) observes that under current system of floating exchange rates, investors have experienced significant real and paper volatility in earnings as a result of relative fluctuations in foreign exchange rates. Most researchers have measured the impact by studying how changes in foreign exchange rates affect market capitalization (Bonder and Richard, 1998). Researchers consistently find that periods of significant foreign exchange movements produce substantial changes in stock market capitalization (Dahl Quist, 1999).

Earlier studies by Nance and Smith (1993), Rawls and Smithson (1990), Beckman and Brandbury (1996) and Smithson (1995) suggested that foreign exchange risk management would benefit companies. In addition Chow and Lee (1997) argued that risk management could reduce the effect of foreign exchange risk volatility on companies. Hence, foreign exchange risk management gives positive effect to shareholders. Doled (1993) in a study on United States companies showed that foreign exchange risk management adds value to them. This is supported by Makar and Huffman (1997) that
foreign exchange risk management has a positive correlation with foreign exchange risk. Organizations manage foreign exchange risk using a variety of strategies and products. Strategies for managing this type of risk often entail use of financial derivatives. These are securities whose value is derived from the value and characteristics of underlying security. The most common types of derivatives include: forward contracts, future contracts, options and swaps. The derivatives are traded widely among financial institutions and on organized exchange platforms (Torcher, 2005).

1.1.2 Financial performance of oil companies

Financial performance of publicly listed company is measured by the value of the company’s share or stock in the market or the profit after tax. For those not listed, the profit after tax is a good indication of the overall performance of a company. Oil companies in Kenya inevitably face similar risks due to the regulated environment they operate in. However, some factors peculiar to this industry affect the general performance of these companies. Factors like the international crude oil prices, availability of stocks, and the local currency exchange rate to the USD are major determinants of how these companies perform. There are two publicly listed oil companies in the Nairobi stock Exchange; namely Total Kenya and KenolKobil. KenolKobil’s net profits steadily rose since listing to an all-time high of Sh3.2 billion in 2011, before the company posted its largest loss of Sh6.2 billion in 2012 (NSE Historical data, 2012). The share price fluctuates accordingly depending on performance and during the period 2009-2012, the average share price was KES 15.65 (NSE Historical data) with occasional spikes during major announcements. The share value has however dropped below KES 10 since announcement of a loss of KES 6.2 billion in 2012 and a failed takeover bid buy a potential multinational company called PUMA. Total Kenya, the other listed company financial performance during the same period replicated KenolKobil’s but the share price did not fluctuate as much due to the share structure of the company as majority is owned by the parent company in France. The share averaged KES 16.18 during the period with a low of KES 14.30 and a high of KES 16.95 despite posting a net loss of KES 71 Million in 2011. (NSE historical data)
Since these two listed companies are the market leaders commanding a combined market share of close to 45% they have been taken as a representation of the Kenya’s oil industry performance.

1.1.3 Foreign Exchange Risk and profitability of oil companies

The oil companies get exposed to foreign exchange rate risks through importation of oil products and subsequent exportation to the neighboring countries. The products are imported in bulk, and as a result, import transactions pose the greatest exposure to exchange rate risks to the companies. Petroleum products are imported through Open Tender System (OTS) which is coordinated centrally by Ministry of Energy. Under this system, oil companies are invited to tender for supply of the products to the entire industry on a monthly basis or when need arises through emergency tenders. The tender is awarded to the most competitive bidder who in turn imports the products and invoices the rest of the participants who are obligated to pay the importer within two and three working days from the date the vessel transporting the product completed discharge at Mombasa. (Open Tender System agreement June 2011).

Trading in oil products require huge amount of working capital. This is due to the high cost of importing the products in bulk coupled with requirement for upfront payment of taxes at entry point according to Petroleum Amendment Act, 2006. Most oil companies use short-term financing facilities (i.e. bank loans) to meet this huge working capital requirement and in turn the product is used by the banks as security against the loan hence the product is kept on financial hold until payment is received from the various participants directly paid to the importers bank. The product’s Cost and Freight which form about 95% of the total cost are paid in US Dollars to the importer who in turn pays the seller and the freight service provider. Since the oil companies sell the products in local currency but repay the loans in US Dollar, they get exposed to the risk of unpredictability in foreign exchange rate fluctuations or transaction risk. The companies may therefore experience losses in situations when on the loan repayment day, the transaction currency (US Dollar) has a higher buying power than in at moment of concluding trade financing contract.
1.1.4 Oil Companies in Kenya

Oil forms a major source of energy in Kenya and world at large for it contributes about 40% of world energy consumption. Kenya's petroleum market has 30 major oil marketers making up 96% of the total market (Petroleum insight March 2013) and independent station dealers making up the remaining 4%. Out of the oil majors, only two companies are publicly listed in the Nairobi Stock Exchange and these are KenolKobil and Total Kenya. The rest are multi nationals in most cases foreign based. These two listed companies will be the subject of this study.

Fore risk is quite significant in oil companies, for instance, during the year ended December 2012, KenolKobil reported a loss of KES 6.2 billion in 2012 out of which 4.6 billion was attributed to foreign exchange loss (NSE historical data). Similarly, Total’s management in a profit warning statement for 2012 results attributed the company’s dismal performance to currency fluctuation (NSE historical data 2012). Furthermore, apart from selling their products locally, some oil companies export the products to the neighboring countries which again expose them to exchange rate risk. Most major companies like KenolKobil and Total have fully owned subsidiaries in different countries in Africa. These companies consolidate the financial statements of those foreign subsidiaries with that of the home country (Kenya) in order to do this, the companies first restate the financial statements of these subsidiaries from foreign currency to that of Kenyan currency. This process exposes the companies to translation foreign exchange risk.

According to Balu and Armeanu (2000), exchange rates between one currency and another can change dramatically in a short period of time, leaving unprepared businesses exposed to potentially crippling losses (e.g. KenolKobil’s drastic shift from a profit of KES 3.2 billion in 2011 to a loss of KES 6.2 billion reported in 2012) The efficient management of this risk is essential for the survival of a company and any business that is exposed to such a risk should ensure that it is fully prepared to manage it.
The risk management measures taken by these companies greatly influence the company’s overall bottom-line. For example, KenolKobil still made a loss of KES 982 Million attributed to forex fluctuations in 2011 whereas Total boasted of minimal exposure to forex risk due to good forex management practices adopted. (NSE historical data 2011)

1.2 Research Problem

The international trade transactions for import of oil products and export to the neighboring countries expose Kenya’s oil companies to foreign exchange risks which require to be mitigated in order to guarantee their profitability and survival, managing foreign exchange risk is a fundamental component in the safe and sound management of all institutions that have exposures in foreign currencies. It involves prudently managing foreign currency positions in order to control, within set parameters, the impact of changes in exchange rates on the financial position of the organization. The frequency and direction of rate changes, the extent of the foreign currency exposure and the ability of counterparts to honor their obligations to the organization are significant factors in foreign exchange risk management.

Studies on companies engaged in international trade, hedging, and exchange rate risk have stressed the fact that as the companies expand their involvement throughout the world, the higher the probability that they will face exchange rate fluctuations/volatility in their operations. In turn, they face the possibility of negative effects on their cash flows. Mathura (1982) finds that most companies institute hedging program to reduce the negative effects of foreign exchange rate changes on their cash flows and reported earnings. He also finds that a formal foreign exchange management policy is more common among larger firms. Baronet al (1996) find relationship between exchange rate variability and stock return volatility, and attribute this to foreign currency transactions.

Earlier studies on management of foreign exchange risk in Kenya mainly focused on finance and service industries. Omagwa (2005) carried out a study on how foreign owned commercial banks in Kenya managed their foreign exchange risk exposure. Ubindi(2006) on the other hand focused on foreign exchange risk management practices before bureaus
in Kenya whereas Chiira (2009) performed a survey of foreign exchange risk management practices by oil marketing companies in Kenya but did not touch on the impact of these risks on profitability or the firm value. Diffu (2011) analyzed the relationship between foreign exchange risk and profitability in the airline industry. Considering the vital role played by oil companies in Kenya’s economy and the volume of foreign exchange dominated transactions they carry out, acknowledge gap exists that seeks to assess and establish the impact of foreign exchange risk on a company’s profitability. Understanding effects of foreign exchange is crucial for it affects many aspects of the companies such as financing costs and profitability which in turn influence the fuel costs in the country.

A research gap exists since earlier studies in this field focused on either risk management practices adopted in various sectors like banks and bureaus whereas this research aims at establishing a relationship between foreign exchange risks and the financial performance of oil companies. Despite numerous foreign currency denominated transactions, the oil industry in Kenya has received little attention in terms of research on the subject hence this research comes in to analyze whether there is a correlation between foreign exchange risk and financial performance of oil companies in Kenya by looking at public listed oil companies.

The research question that will be of help in addressing the research problems outlined above can be phrased in this form;

i. What is the impact of foreign exchange risk on the profits of oil companies?

1.3 Research Objective
Establish the relationship between foreign exchange risk and profitability of Oil companies listed in the Nairobi Securities Exchange.

1.4 Value of the study

1.4.1 Oil marketing companies
Oil companies operating within the Kenyan market face a lot of turbulence as a result of exposure to financial, political and business risks, the findings will bring awareness to
them regarding the practices that are used by similar firms to hedge against risks that arise from fluctuations in foreign exchange rates. In particular, the Finance Managers of the oil companies can use the research findings and recommendations to lay out strategies to strengthen their roles in financial risk management.

1.4.2 Energy Regulatory Commission
This is the regulatory body mandated with Kenya’s fuel pricing, licensing and operations of the oil companies. The commission has been trying to establish policies that can bring costs of fuel down the study will therefore enable the Commission appreciate and put into consideration the aspect of foreign exchange risks faced by the companies in its monthly pricing formulae so as to accommodate the oil marketer’s foreign exchange risk exposure.

1.4.3 Shareholders
These are the owners of these companies, in the case of listed companies some maybe laymen in this area of foreign exchange hence this study will go a long way in helping them understand the reason for losses/profits by their companies despite consistent performance in all other areas of business.

1.4.4 Other researchers
This group will find the study useful as a springboard to further research on the wide topic of foreign exchange risk and its management in the Kenyan oil sector. A review of earlier studies revealed that they concentrated on finance and service sectors (banks, air travel companies and forex bureaus). Hence this study will bring awareness of corporate practice in the subject of foreign exchange risk management in the oil sector in Kenyan market and how these risks affects financial performance.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction
Foreign exchange risk is real and failure to manage foreign exchange risk can lead to losses that may impact on the overall company’s bottom line despite good performance in all other areas of business. This chapter deals with various concepts that relate to foreign exchange risk, foreign exchange risk management practices as well as the relationship between foreign exchange risk and financial performance. In addition, theories related to foreign exchange risk management and empirical studies performed in the same field will be discussed.

2.2 Theoretical studies
Scholars in the field of foreign exchange have come up with theories related foreign exchange risk. They argue that exchange rates, interest rates and inflation rates are linked to one another through a classical set of relationships these are;

2.2.1 Interest Rate Parity
This theory states that the size of forward premium (or discount) should be equal to the interest rate differential between two countries of concern. When interest parity exists, covered interest arbitrage (a situation whereby by foreign exchange risk is covered) is not feasible because any interest rate advantage in the foreign country is offset by discount on the forward rate. Hence the act of covered interest rate arbitrage would generate a return that is no higher than what would be generated by a domestic investment.

In summary therefore this theory implies that equal returns will be generated in two different countries when the expected change in exchange rate is taken into account. As long as the forward represents an expectation regarding the future spot rate, it does not matter where an investor invests, the return will be the same both domestically and in a foreign country.

Therefore covered interest arbitrage has an advantage in that there is an incentive to invest in higher interest rate currency to the point where discount of that currency in the
forward market is less than the interest differentials. If the discount on the forward market of the currency with the higher interest rate becomes larger than the interest rate differentials, than it pays to invest in the lower interest currency and take advantage of the excessive of forward premiums on this currency.

2.2.2 Purchasing Power Parity

This theory is built around the idea of the exchange rates reflecting relative purchasing power s of the currencies under consideration say an item that costs a dollar in the USA will cost KES 85 in Kenya and Euros 0.78 in Europe. Purchasing power parity focuses on the inflation exchange rate relationship and it is in two forms:

The Absolute form, also referred to as the “law of one price” suggests that “prices of similar products of two different countries should be equal when measured in a common currency” if a discrepancy in price as measured by the common currency exists, the demand should shift so that these prices converge. This absolute version is however too idealistic and does not factor in market imperfections like taxes and transportation costs. An alternative version of the absolute form comes in to account for these market imperfections and states that because of the market imperfections, prices of similar products of different countries will not necessarily be the same when measured in a common currency it states that the rate of change in prices of these products should be almost similar when measured in a common currency as long as the imperfections remain unchanged. In equilibrium form:

According to this theory, any differential exchange rate to the one propounded by the theory is the real appreciation of real depreciation of the currency over the other.

2.2.3 International Fisher Effect

This theory uses interest rates as opposed to inflation rates used by purchasing power parity theory. However, since interest rate and inflation are highly correlated, the two theories are closely related. According to International fisher effect, ‘nominal risk free interest rates contain a real rate of return and an anticipated inflation meaning that if investors require the same real return, interest rates differentials between countries maybe the result of expected inflation. It further suggests that foreign currencies with relatively
high interest rates will depreciate because the high nominal interest rates reflect expected inflation. The nominal interest rate would also incorporate the default risk of an investment.

2.2.4 The balance of payments or equilibrium theory of exchange rates
The theory affirms that the exchange rates tend to establish itself where it will maintain balance of payments equilibrium and eliminate surpluses and deficits. The theory might be valid if the exchange rates were allowed to float freely and attain their market or equilibrium levels; however, government intervention in the exchange markets impedes the free movement of the rates. Hence, the theory is more of a statement of a tendency than a complete explanation.

2.2.5 The supply and demand theory
According to this theory, the exchange rate is determined by the supply and demand of foreign currencies.

2.2.6 The psychological theory
This theory states that the exchange rate is largely conditioned by the attitude of those who deal in it. If in their opinion, a rate is below its correct level or will rise in the future, they are inclined to buy it; they thereby increase the demand for the currency and work to raise its rate. If on the other hand they feel that the rate overvalues the currency or is likely to decline, they are apt to sell their holding and thereby increase market supply of the currency and push its rate down.

2.3 Review of Empirical Studies on Foreign Exchange Risk its Management
Empirical studies on foreign exchange risk show that this risk is important to manage. Marshall (1999) finds that foreign exchange risk management is one of the most important financial activities in large American, British and Asian firms. He states four main objectives of foreign exchange risk management: minimize foreign exchange losses, reduce the volatility of cash flows, and protect earnings fluctuations and hedge the risk of the views on foreign exchange risk. Loderer and Pichler (2000) made a similar survey for Swiss companies. They obtain as main reasons for managing currency risk as guaranteeing cash flow, reducing financing costs, simplifying planning, preventing losses
and reducing taxes. Omagwa, (2005), in his study on foreign exchange risk management practices by foreign owned commercial banks in Kenya finds that this risk is important to manage. He states that the main reason for managing this risk is to protect earnings fluctuations.

On whether firms hedge or not, Batten et al (1993) find that all firms hedge foreign exchange exposure. In their sample of Australian firms, 21 out of 69 fully hedged, 48 are partially hedged. On their side, Bodnar and Richard (1998) results reveal that the majority of firms hedge less than 25% of their perceived exposure. This suggests that foreign currency hedging, rather than eliminating completely exposures, generally only reduces them. Furthermore, they find out that firms show a clear preference for short term hedging: 82% of firms’ hedge with maturity of 90 days or less. Ubindi, (2006), in his study on foreign exchange risk management practices by forex bureaus in Kenya finds that all bureaus he surveyed practice hedging. His finding is consistent with that of Omagwa, (2005) on commercial banks.

Empirical studies on management of transaction, translation and economic exposures by Batten et al (1993) reveal that 61.1% of the Australian firms manage transaction exposure only, 8.3% both translation and transaction and 16.6% transaction, translation and economic exposures. For Swiss firms, Loderer and Pichler (2000) find that transaction exposure is the most frequently hedged. Translation and economic exposures appear to be less important. Omagwa, (2005) finds that all Kenyan commercial banks he surveyed banks hedged against transaction exposure while 60% and 30% hedged against accounting and economic exposures respectively.

Empirical studies on instruments used by firms for hedging by Allayannis and Ofek (2000) reveal that exporters prefer the use of foreign currency derivatives to the use of foreign currency debt when hedging their operations. They explain this by the nature of exporting, which can require customized, short-term contracts that are better served by derivatives rather than by long term foreign debt. The advantage of derivatives is that they have a predetermined cost and are accessible by all companies where as foreign debt is limited to large firms. Bodnar and Gebhardt (1998) state that German and US firms
prefer to use over the counter instruments (forwards, swaps, and options) rather than exchange traded instruments such as futures. Forwards are recommended for firm commitments whereas options should be preferred for uncertain foreign currency denominated future cash flows. When hedging more uncertain exposures from anticipated transactions, forwards are the preferred instruments because the uncertainty can be taken into account by adjusting the hedge ratio with forwards. The most frequently used derivative contract to hedge transaction is the currency forward contract.

Henschel and Kothari (2001) conducted an empirical study to determine the extent to which firms used derivatives to reduce overall stock return volatility. They defined hedging as risk management that reduces return volatility and speculation as risk management that increases return volatility, Sample data were obtained from 425 (325 non-financial, 100 financial) large US corporations. The sample in their research consisted of a sample of 200 largest industrial non-financial corporations, the 25 largest retailers, 25 largest transportation companies, 25 largest utilities, 50 largest diversified financial firms excluding insurance companies and 50 largest commercial banks. These corporations were selected based on the ranking of highest sales in 1987 and published in April 25, 1988 issue of the fortune magazine. The data was obtained from the 1992, 1993 annual financial statements notes pertaining to derivative positions. The findings were based on the notes related to derivatives contained in the annual financial statements of these companies. The findings contradicted the hypothesis that firms use derivatives to speculate on large exposures. They also found out that there was no noticeable reduction in the firms’ overall risk exposure as a result of using derivatives to hedge. They concluded that firms use derivatives to reduce the risk exposure associated with short term contracts.

Bodnar et al (1998) confirms that options are less frequently used than forwards. Furthermore, they found that options were mainly used in longer-term exposures. Firms avoid using options either because of the cost they incur in order to get the options or because they find another instrument that is better suited for the given exposure. For Australian firms, Batten et al (1993) find similar results: the most used instruments to
hedge are forwards, options and currency swaps. Marschall (1999) finds that USA, UK and Asian firms use both internal hedging and external hedging for covering transaction exposure. For translation exposure, US and UK companies use internal and external hedging as well whereas Asian firms use mainly internal methods. Bodnar et al (1998) find that a majority of firms use natural hedging. In Switzerland, Loderer and Pichler (2000) demonstrate that firms use money market hedges, choice of currency of billing and currency risk sharing as internal hedging techniques. Pricing policy, credit policy and choice of countries in which to buy inputs and sell goods are other frequently used techniques. Bodnar et al (1998) shows that the most frequently cited motivation for using foreign exchange derivatives is for hedging short term observable exposures. However, many firms use foreign currency derivatives at least sometimes to hedge long term exposures. Few firms use foreign currency derivatives to hedge translation exposure.

According to Bodnar and Gebhardt (1998), German and US firms use derivatives primarily to manage foreign exchange (and interest rate) risk. They show that the main purpose of using derivatives in exchange risk management is to minimize the variability in cash flows. They also show that companies prefer to use simple foreign exchange instruments. Similar results are found by Bodnar et al (1998): 83% of derivative using firms use foreign currency derivatives and 95% of US manufacturing firms’ hedge foreign exchange risk with derivatives. Allayannis and Wetson (2001) find that from 1990 to 1995 there is an increase in the number of firms with foreign exchange sales that use currency derivatives. In contrast, the percentage of firms with no foreign sales that use foreign currency derivatives is small.

Omagwa (2005) and Ubindi (2006) find that each organization had its peculiar hedging instruments and strategies. This variation is due to the fact that there are no formal corporate approved risk management practices that must be adopted in Kenya and hence each organization has a leeway to make its choice on practices it deems as best. Omagwa (2005) finds that most banks practiced conventional foreign exchange risk management practices. He further observes that forward contracts and foreign currency options as the most frequently used instruments. He also finds that 80% of the banks practiced natural hedging practices. On the other hand, Ubindi (2006) finds that use of
conventional foreign exchange risk management practices is quite low among bureaus in Kenya. He also finds that forward contracts, money market hedge, currency options and currency swaps are the mostly used instruments.

Diffu (2011) in her study of foreign exchange risk in the airline industry concluded that there was a negative relationship between foreign exchange risk and financial performance although it is difficult to single out or quantify this effect due to the many variables involved in the analysis.

2.4 Foreign exchange risk management
Foreign currency exchange risk is the additional riskiness or variance of a firm’s cash flows that may be attributed to currency fluctuations (Giddy, 1977, Brigham and Ehrhardt, 2005). Normally, foreign currency risk exists in three forms; translation, transaction and economic exposures. Foreign currency risk management involves taking decisions which aim at minimizing or eliminating the negative effects of currency fluctuations on balance sheet and income statement values, a firm’s receipts and payments arising out of current transactions, and on long term future cash flows of a firm. Creativity by managers and innovations in financial instruments have made available to firms mitigating tools that can be used in containing the impact of foreign currency rate fluctuations. These tools are commonly known as hedging techniques. A hedge is a means of prevention against a possible probable loss. Hedging is the process of reducing exposure and consists of a number of techniques intended to offset or minimize the exchange risk of loss on the assets or liabilities which are denominated in a foreign currency. Some hedging techniques can be implemented within the firm without involving any market-based financial instruments. These are known as internal hedging techniques. All other techniques necessitate taking recourse to market - based financial instruments these are external hedging techniques

2.4.1 Classification of Foreign Exchange Risk
Currently, there are three main types of foreign exchange risks as given by Shapiro (2006). The first one is translation exposure, also known as accounting exposure, arises from the need, for purposes of reporting and consolidation, to convert the financial statements of foreign operations from the local currencies (LC) involved to the home
currency (HC). If exchange rates have changed, liabilities, revenues, expenses, gains, and losses that are denominated in foreign currencies will result in foreign exchange gains or losses. It is basically balance sheet exchange rate risk and impacts balance sheet assets and liabilities and income statement items that already exist.

The second type of foreign exchange risk is transaction exposure, also known as commitment exposure and it results from transactions that give rise to contractually binding future foreign currency-denominated cash inflows or outflows. As exchange rates change between now and when these transactions settle, so does the value of their associated foreign currency cash flows, leading to currency gains and losses. It is basically cash flow risk and this exposure deals with changes in cash flows as the result from existing contractual obligations, such as the effect of exchange rate moves on transactional account exposure related to receivables (export contracts), payables (import contracts) or repatriation of dividends.

The third type of risk is economic exposure and it measures the change in present value of the firm resulting from any change in the future cash flows of the firm caused by unexpected change in the exchange rates. Future cash flows can be divided into cash flows resulting from contractual commitments and cash flows from anticipated future transactions. In a way, economic exposure comprising future cash flows resulting from contractual commitments and denominated in foreign currency. However, there is a clear distinction between transaction exposure and economic exposure. Transaction exposure arises from firm contractual commitments and the amounts to be paid or received are known. With economic exposure these amounts are uncertain and based on estimates. Economic exposure is basically the future effect of foreign exchange rates on liquidity, operations, financial structure and profit.

2.4.2 Measurement of Foreign Exchange Risk

Measuring and forecasting exchange rates can be useful for different reasons. First, for hedging decisions, if the forecast of foreign exchange rate is that it will stay stable, the company can decide not to hedge. Second, for financing decisions, when the firm decides to borrow, it can choose the currency. The ideal currency will have a low interest rate and
will depreciate over time. The forecast will help to choose the potential currency exhibiting these features. Third, for investing decisions, the ideal currency should have a high interest and appreciate over time. Fourth, for budgeting decisions, when choosing to open a new subsidiary, the firm will estimate the future cash flows and will therefore need an accurate forecast of foreign exchange rate. Finally, for translation exposure, earnings form subsidiaries need to be converted into home currency. A forecast will help to evaluate the future earnings that will be reported (Popov and Stutsman, 2003).

Measuring currency risk may prove difficult, at least with regards to translation and economic risk (Van Deventer et al., 2004; Holton, 2003). At present, a widely-used method is the value-at-risk (VaR) model. Broadly, value at risk is defined as the maximum loss for a given exposure over a given time horizon with $z\%$ confidence. The VaR methodology can be used to measure a variety of types of risk, helping firms in their risk management. However, the VaR does not define what happens to the exposure for the $(100 - z)\%$ point of confidence, i.e., the worst case scenario. Since the VaR model does not define the maximum loss with $100\%$ confidence; firms often set operational limits, such as nominal amounts or stop loss orders, in addition to VaR limits, to reach the highest possible coverage (Papaioannou and Gatzonas, 2002).

### 2.4.3 Exchange Rate Risk Management process

For their currency risk management decisions, firms with significant exchange rate exposure often need to establish an operational framework of five best practices (Allen, 2003; Jacque, 1996).

The first principle involves identification of the types of exchange rate risk that a firm is exposed to and measurement of the associated risk exposure. As mentioned before, this involves determination of the transaction, translation and economic risks, along with specific reference to the currencies that are related to each type of currency risk. In addition, measuring these currency risks - using various models (e.g. VaR) - is another critical element in identifying hedging positions.

The second one involves development of an exchange rate risk management strategy.
After identifying the types of currency risk and measuring the firm's risk exposure, currency strategy needs to be established for dealing with these risks. In particular, this strategy should specify the firm's currency hedging objectives - whether and why the firm should fully or partially hedge its currency exposures. Furthermore, a detailed currency hedging approach should be established. It is imperative that a firm details the overall currency risk management strategy on the operational level, including the execution process of currency hedging, the hedging instruments to be used, and the monitoring procedures of currency hedges.

The third principle entails the creation of a centralized entity in the firm's treasury to deal with the practical aspects of the execution of exchange rate hedging. This entity will be responsible for exchange rate forecasting, the hedging approach mechanisms, the accounting procedures regarding currency risk, costs of currency hedging, and the establishment of benchmarks for measuring the performance of currency hedging. These operations may be undertaken by a specialized team headed by the treasurer or, for large multinational firms, by a chief dealer.

The fourth one involves the development of a set of controls to monitor a firm’s exchange rate risk and ensure appropriate position taking. This includes setting position limits for each hedging instrument, position monitoring through market-to-market valuations of all currency positions on a daily basis (or intraday), and the establishment of currency hedging benchmarks for periodic monitoring of hedging performance (usually monthly).

Finally, the firm would need to establish a risk oversight committee. This committee would in particular approve limits on position taking, examine the appropriateness of hedging instruments and associated Appositions, and review the risk management policy on a regular basis.

**2.4.4 Tools and Techniques used in Foreign Exchange Risk Management**

Today foreign exchange risk could not only influence a firm's profitability, but also determine its survival. A variety of financial instruments emerge as the financial markets
require managing the different growing exposure that firms face and maybe broadly
categorized into two; Internal and External hedging.

2.4.4.1 Internal Hedging (Natural Hedging)
According to Papaioannou (2006), internal hedging includes all techniques that do not
require external parties. Before purchasing external hedges, the company should first
look for internal hedges since they have a relatively low cost. He outlines six internal
hedging techniques. The first one, known as netting involves reduction of the number of
transactions that a firm needs to make in order to cover an exposure. It requires the firm
to have a centralized organization of its cash management. The centralization means that
the company collects foreign currency cash flows between subsidiaries and groups them
together so as an inflow offsets an outflow in the same currency.

Another internal hedging is prepayment. Import commitments can include an option to
prepay. This is used if currency is thought to appreciate; then prepaying enables the
company to pay at a lower rate. If the future rate finally depreciates, the firm is worse off
than if it had done nothing.

The third one, leading and lagging, involves accelerating or delaying the original
payment but within a company's divisions or subsidiaries. If the currency of a subsidiary
is sought to appreciate it may accelerate its payment (leading) and realize the payment
before the currency appreciates. The reverse is true if a currency is expected to
depreciate, then the company will delay its payment (lagging). However, the firm should
not only take into account the gain or loss from the currency but also the cost from
increasing or decreasing the liquidity.

The fourth technique, long term structural changes, which entails restructuring, is a more
complex task than hedging a currency transaction. However, once the restructuring is
finished, the reduction has a long-term effect. The firm can act on four parameters:
change the sales, change the foreign suppliers, change the foreign production factories or
change the foreign debt. The idea is to change the relationship between cash inflows and
outflows. Restructuring is a very attractive technique to manage economic exposure, but
it is quite difficult to apply and cannot be reversed immediately.

The fifth one, price adjustments involves changing prices in different manners. First,
when the local currency of a subsidiary is devaluing, the subsidiary can increase the
price, so as to cancel the effect of devaluation. This technique is particularly used in countries where devaluation is high and where derivative markets are inefficient.

The last technique, Asset Liability Management (ALM), is related to leading/ lagging and has the same rationale: for currencies likely to appreciate, increase assets and reduce liabilities. For currencies likely to depreciate do the reverse. For illustration, suppose a currency appreciates. A firm will then increase its assets by increasing investment and reduce its liabilities by reducing the short-term debt. The long-term assets/liabilities are more difficult to change. Long-term debt cannot be reduced easily and buildings cannot be sold promptly. This technique can be used for hedging translation exposure.

2.4.4.2 External Hedging

When internal hedging is not enough to manage successfully exchange rate risk, companies can get into contact with banks or go to the market and do external hedging. External hedging is more expensive and more complicated than internal hedging and not all companies can afford it, but is quite successful and many firms use it. External hedging consists in using foreign exchange derivative contracts such as forwards, futures, options or swaps. These instruments can be regrouped into two main categories: the first category contains instruments such as currency forwards and futures, and money market contracts. With these instruments the exchange rate is fixed at the moment when the risk appears. The main disadvantage with these instruments is that they cannot benefit from a favorable movement of exchange rate. The second category contains instruments such as currency options that protect the company from an unfavorable movement of the exchange rate and at the same time keep the possibility of benefiting from a favorable movement of exchange rates. The following is a brief description of these instruments (Lei and Niannian, 2007).

Foreign exchange forward is an agreement to exchange one currency for another with a specific quantity, where the exchange rate is fixed on the day of the contract but the actual exchange takes place on a pre-determined date in the future. The predetermined exchange rate is the forward exchange rate. The amount of the transaction, the value date, the payments procedure, and the exchange rate are all determined in advance. Forward contracts in major currencies can be available daily with maturities of up to 30, 90, and 180 days. They are used to hedge exposures that are short to medium term and whose
timing is known for certainty. Empirical researches such as Belk et al. (1992) and Bodnar et al. (1995) indicate that the most frequently used method is forward exchange contract. Money market contracts this is a market where company and individuals can lend and borrow as short as overnight and as long as twelve months period at an interest.

Currency future is another instrument to reduce the risk of foreign exchange volatility is an exchange-traded contract specifying a standard volume of a particular currency to be exchanged on a specific settlement date (Lei, 2007). It is similar to forward contract in that they allow a firm to buy or sell certain currency at a fixed price and at a future point in time. Yet, there are some differences between these two kinds of techniques. One way in which futures differ from forwards is that futures are standardized both for amounts and delivery date (normally March, June, September and December), while Forward is for any amount and any delivery date which the two parties make agreed another difference is in terms of liquidation that futures contracts are settled by offset of gains and losses for each day, while forward contracts are settled by actual delivery whether full delivery of the two currencies or net value only at the contract maturity. Both futures market and forward market are most important ways to hedge risk. A study by Belk and Glaum (1992) found that none of the companies which were interviewed used currency futures, because the standardized features of exchange traded futures most often do not enable the companies to hedge their positions perfectly.

Foreign exchange options is an instrument gives the holder of the contract the right to buy or sell a certain amount of a certain currency at a predetermined price (also called strike or exercise price) until or on a specified date, but he is not obliged to do so. The seller of a currency option has obligation to perform the contract. The right to buy is a call; the right to sell, a put. There is option premium needed to pay by those who obtain such a right. The holder of a call option can benefit from a price increases (profit is the difference between the market price and the strike price plus the premium), while can choose not to excise when the price decreases (locked in loss of the option premium). Vice versa is for the holder of a put option. For the advantages of simplicity, flexibility, lower cost than the forward, and the predicted maximum loss—which is the premium, the currency option has become increasing popular as a hedging devise to protect firms against the exchange movements. Whenever there is uncertainty in the size of cash flows...
and the timing of cash flows, currency option contracts would be superior to traditional hedging instruments such as forward contracts and futures contracts. Grant and Marshall (1997) examined the extent of derivative use and the reasons for their use by carrying out surveys in 250 large UK companies. They found that a widespread use of both forwards and options (respectively 96% and 59%). The pointed out that comparing to the primary reasons for the use of forwards were company policy, commercial reasons and risk aversion, a good understanding of instrument, and price were prominent while the primary reasons to use option for company management.

Currency swaps; Lei (2007), outlines this as a relative new financial derivative used to hedge foreign exchange exposure, currency swaps have a rapid development. Since its introduction on a global scale in the early 1980's, currency swaps market has become one of the largest financial derivative markets in the world. A currency swap is a foreign exchange agreement between two parties to exchange a given amount of one currency for another and, after a specified period of time, to give back the original amounts swapped. It can be negotiated for a wide range of maturities up to at least 10 years, and can be regarded as a series of forward contracts. Grant and Marshall (1997) found that the use of swaps and forwards/futures is dominant in UK, Bodnar et al. (1995) found that swaps dominate the interest rate risk management in US.

2.5 Relationship between Foreign Exchange risk and profitability
Oil companies face an array of external risks primarily crude oil prices and exchange risks which can have negative effects on firm’s performance and ultimately its stock value. A good example is KenolKobil whereby despite a minimal drop in turnover of just 13% in 2012 compared to 2011, the company recorded an all-time high after tax loss of 6.2 billion, the highest ever recorded in NSE history at the time of reporting. Considering that in the same period ending December 2011 the same company had made an after tax profit of 3.2 billion, this drastic shift in performance begs a lot of explanations especially by the shareholders as there was no significant investment or borrowing and the fact that cost of sales and operating costs dropped by 10% in 2012 compared to 2011 raises more questions. Similarly, Total Kenya in 2012 made a loss of 243 Million out of which 46 Million was purely attributed to depreciation of local currency against the US dollar.
However, in 2011, Total hedged properly unlike KenolKobil it made a forex gain of 68 million.

The management of both companies stated in a cautionary statement that the losses are attributed to foreign exchange fluctuations. In KenolKobil, the management took some forward covers which did not go their way as a result the company made a whopping 4.6 billion loss from these hedges. In 2011, the company also made a loss of 1.1 billion from foreign exchange hedging but profits in other segments of the business cushioned the overall performance in that financial year. It is therefore evident that foreign exchange if not managed properly can be detrimental to a company’s performance.

2.6 Conclusion

Though risk management is considered to involve a set of complex indicators which face substantial measurement error due to the complex nature of the interaction between risk variables and performance indicators make it difficult to directly link foreign exchange risk and profitability. Previous research studies have provided a link between currency risk and firm performance (Duangploy et al., 2008); (Ankrom, 2007) with little conclusive results. Others (Lee, 2010) have shown that firms that have robust currency risk management frameworks have higher firm performance.

Considering the vital role played by oil companies in Kenya’s economy and the volume of foreign exchange dominated transactions they carry out, it is evident from the above mentioned studies that foreign exchange is a vital component to keep in check as far as financial performance of a company is concerned. The responsibility solely lies in the management of the company on which tools to use in hedging in order to best cushion themselves against losses occasioned by foreign exchange rate fluctuations.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Research Design
The study was a case study as it allows a detailed examination of a company. The Oil industry in Kenya is comprised of 30 active oil companies that make up 96% of the market out of these; only two are listed in the Nairobi Stock Exchange (KenolKobil and Total). There are also small scale independent dealers that make up 4% of the overall market share, this makes it difficult to collect data especially that which pertains to financial performance of companies that are not public listed. As a result of the aforementioned limitation, the research was a case study of the two oil companies listed in the NSE.

3.2 Population
As this was a case study, the research focused on two companies. In this case, KenolKobil and Total was the subject of the study and as the two companies combined market share make up 45% of Kenya’s oil sector, the two were considered representative of the industry.

3.3 Sample design
Historical data relating to the company performance, gross profit, operating expenses and sales pattern was considered for a period of eleven years (2002-2012). This was considered sufficient for analysis as this period is long enough to make conclusive observations.

3.4 Data Collection
There are two kinds of data, namely: primary and secondary data. Secondary data refers to data that has already been collected by someone else for a different purpose and is readily available for different uses. The data used in this study is secondary data. Data collected was in relation to the Net profit of KenolKobil and Total Kenya, gross profit, operating expenses and foreign exchange gain/loss for the period under investigation. This data was obtained from the Capital Markets Authorities historical data that is readily available in the company’s website. There were no hindrances in obtaining all this data as
it is all public information. The period under study was (2002-2012), this period was considered sufficient.

3.5 Data analysis

To meet the objective of the study, the data collected was analyzed by a combination of both descriptive analysis and correlation analysis in particular, the Pearson’s correlation coefficient to test whether a significant relationship exists between foreign exchange risk and profitability. The latest version of Statistical package for social sciences (SPSS) and Microsoft Office Excel were used in the generation of frequency tables, charts, correlations and regression. Multiple linear regression analysis was used to examine the magnitude of influence of the independent variable on the respective dependent variables.

To be able to answer the research question, historical data from the financial statements of these oil companies was used. The time frame for all historical data was year 2002 to 2012. The study was targeted oil companies listed in the NSE which together make up 45% of the overall market share.

The analytical tools used however contain many variables and since it is difficult to incorporate all the variables that predict profitability the analysis was simplified to capture the most significant variables that affect the financial performance of a firm.

3.5.1 Empirical model

Regression analysis model was used to test the extent to which the independent variables predict the behavior of the dependent variable. The model used and the variables are as given below.

Using the regression model below;

\[ Y_{it} = B_0 + B_1X_{1it} + B_2X_{2it} + B_3X_{3it} + U_{it} \]

\( Y_{it} \) represents PAT for firm \( i \) at time \( t \)

\( X_{1it} \) represents gross profit for firm \( i \) at time \( t \)

\( X_{2it} \) represents operating expenses for firm \( i \) at time \( t \)
$X_{3it}$ represents foreign exchange risk for firm $i$ at time $t$

$i = 1$ firm

$t = 2002-2012$

$U_{it} = error$ term

$B = change$ in estimated value of $Y$

$B_0 = Change$ in estimated value of $Y$ when all estimates $= 0$

Foreign exchange risk considered was transactions foreign exchange exposure reported by the firms during the period of study as given in the company financial statements.

The regression analysis model did not include all factors that can affect the net profit but rather the major variables that are likely to have significant influence on the profits.
CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION

4.1 Introduction
This chapter addressed data analysis and research findings on the relationship between working capital management and profitability. Data was collected from secondary sources which were the financial statements of the two oil companies listed in the NSE namely KenolKobil and Total Kenya Limited. Data was analyzed using both descriptive and quantitative analysis by use of Microsoft Excel and SPSS. Analysis of data collected is done to see whether the results fulfill the research purpose and answers the research question which was to understand the relationship between foreign exchange risk fluctuations and a firm’s profitability.

4.2 Data Presentation
Tables and figures in this chapter are derived from the findings of the study. The financial data as given in Appendix 2 were derived from published financial statements of KenolKobil and Total Kenya. The independent variables used in the study taken to be predictors of financial performance were Gross profit, operational expenses and foreign exchange loss/gain which represent the fluctuations in foreign exchange rate arising mainly from transactions.

4.2.1 Descriptive statistics
Table 1: Descriptive statistics of variables

<table>
<thead>
<tr>
<th></th>
<th>NET INCOME-PAT</th>
<th>NET SALES</th>
<th>GROSS PROFIT</th>
<th>EXCHANGE (LOSS)/GAIN</th>
<th>OPERATING EXPENSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>456</td>
<td>65,463</td>
<td>3,943</td>
<td>(349)</td>
<td>2,162</td>
</tr>
<tr>
<td>Median</td>
<td>551</td>
<td>41,049</td>
<td>2,724</td>
<td>(30)</td>
<td>1,377</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1,660</td>
<td>57,603</td>
<td>2,639</td>
<td>1,008</td>
<td>1,422</td>
</tr>
<tr>
<td>Range</td>
<td>9,358</td>
<td>212,684</td>
<td>10,725</td>
<td>4,863</td>
<td>5,044</td>
</tr>
<tr>
<td>Minimum</td>
<td>(6,285)</td>
<td>9,757</td>
<td>1,609</td>
<td>(4,606)</td>
<td>816</td>
</tr>
<tr>
<td>Maximum</td>
<td>3,274</td>
<td>222,441</td>
<td>12,333</td>
<td>258</td>
<td>5,860</td>
</tr>
</tbody>
</table>

Source: Research Findings
The table above represents the descriptive statistics of KenolKobil and Total Kenya for 11 years. The mean of Profit after tax (PAT) was 456 million and has a standard deviation of 1,660 million. This means that PAT can deviate from both sides by 1,660 million. The maximum value of PAT was 3,274 million with a minimum (loss) of (6,285) million.

The Gross had a mean of 3,943 million and could deviate on both sides by 2,639 million. Operational expenses had a mean of 2,161 million and could deviate on both sides by 1,422 million.

The fluctuations in foreign exchange as represented by the foreign exchange loss/gain was found to be a mean loss (349) million and could deviate on either side by 1,008 million. The maximum foreign exchange gain recorded was 258 million whereas the highest loss recorded was (4,606) million.

4.2.1 Graphical presentation of data

4.2.1.1 Net Sales trend

The net sales have been on a steady rise since 2002 through to 2012 with the highest turnover being recorded by KenolKobil in 2011.
4.2.1.2 Gross Profit trend

The gross profit has been steady from 2002-2007 before rising steadily from 2008 through to 2012 with the highest figure recorded by KenolKobil in 2011.

4.2.1.3 Profit after Tax

PAT for both companies have been steady and on the rise since 2002. However there is a turn of events in 2011 and 2012 where Total recorded a loss in 2011 while KenolKobil registered an all-time highest loss of over 6 billion Kenya shillings.
4.2.1.3 Operating Expenses trend

The operating expenses for both companies have been on a steady rise since 2002 through to 2012 with the highest figures for both companies being recorded in 2012.

4.2.1.4 Foreign Exchange gain/loss

Foreign exchange risk has been erratic throughout the decade but the figures are modest prior to 2007. From 2008, the figures are significant with both companies recording a loss from 2008 through to 2012 with the exception of Total which recorded the highest gain in 2011.
4.2.3 Pearson’s correlation Analysis

Pearson’s correlation analysis was used to determine whether there exists a relationship between foreign exchange risk and firm’s financial performance. If foreign exchange risk increases then we expect the profitability of the firm to reduce hence a negative relationship between the two will be expected.

Table 2: Pearson’s correlation coefficients

<table>
<thead>
<tr>
<th></th>
<th>NET INCOME-PAT</th>
<th>GROSS PROFIT</th>
<th>EXCHANGE (LOSS)/GAIN</th>
<th>OPERATING EXPENSES</th>
<th>NET SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NET INCOME-PAT</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>0.57</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCHANGE (LOSS)/GAIN</td>
<td>0.95</td>
<td>0.36</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPERATING EXPENSES</td>
<td>0.57</td>
<td>0.98</td>
<td>0.38</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>NET SALES</td>
<td>0.58</td>
<td>0.98</td>
<td>0.39</td>
<td>0.98</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

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

Source: Research Findings

When the independent variables were run against the dependent variable PAT and against each other, the resulting correlation co-efficient (Pearson) were as shown above.

Against the PAT, the three variables individually; Gross profit, operating expenses and Foreign exchange gain/loss show a certain association with ROA. The three predictor variables return a significant Pearson correlation co-efficient indicative of quite a strong positive correlation between themselves with values ranging from 0.39 to as high as 0.95 at both 95% and 99% confidence level.

The table above shows the results of correlation co-efficient between variables. There was a strong positive relationship between Foreign exchange figure reported and the PAT as expected meaning that an increase in foreign exchange gain results into an increase in profit after tax and vice versa for losses. Similar results were observed for gross profit and operating expenses with the two variables returning identical correlation coefficient of 0.57.
The correlation results are therefore consistent with the theoretically perceived relationship between these variables.

4.2.4 Regression Analysis

Correlation results depicted the strength and magnitude of the relationship between the Independent variable and the dependent variable. They did not however indicate the Simultaneous impact of the independent variables on the dependent variable. In order to investigate and explain the simultaneous impact of the independent variables on the dependent variable, multivariate dependence analysis was adopted. This method helped predict the dependent variable on the basis of the independent variable. Multiple regression analysis was thus used to assess the simultaneous impact of the independent variable (Foreign exchange risk, gross profit and operating expenses) on the firm’s profitability as measured by profit after tax (PAT).

Table 3: Regression coefficients

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.98</td>
</tr>
<tr>
<td>R Square</td>
<td>0.96</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.96</td>
</tr>
<tr>
<td>Standard Error</td>
<td>349.46</td>
</tr>
<tr>
<td>Observations</td>
<td>22.00</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean square</th>
<th>F</th>
<th>Significance F</th>
</tr>
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<td>18,553,218.44</td>
<td>151.93</td>
<td>0.00</td>
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<td>Residual</td>
<td>18.00</td>
<td>2,198,169.75</td>
<td>122,120.54</td>
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<td></td>
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<tr>
<td>Total</td>
<td>21.00</td>
<td>57,857,825.07</td>
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<table>
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<th>Coefficients</th>
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<th>t Stat</th>
<th>P-value</th>
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<tr>
<td>Intercept</td>
<td>338.74</td>
<td>157.32</td>
<td>2.15</td>
<td>0.05</td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>0.40</td>
<td>0.14</td>
<td>2.81</td>
<td>0.01</td>
</tr>
<tr>
<td>EXCHANGE (LOSS)/GAIN</td>
<td>1.42</td>
<td>0.08</td>
<td>17.31</td>
<td>0.00</td>
</tr>
<tr>
<td>OPERATING EXPENSES</td>
<td>(0.44)</td>
<td>0.26</td>
<td>(1.67)</td>
<td>0.11</td>
</tr>
<tr>
<td>NET SALES</td>
<td>(0.00)</td>
<td>0.01</td>
<td>(0.09)</td>
<td>0.93</td>
</tr>
</tbody>
</table>
Source: Research findings and SPSS

Using the regression model below;

\[ Y_{it} = B_0 + B_1X_{1it} + B_2X_{2it} + B_3X_{3it} + U_{it} \]

\( Y_{it} \) represents PAT for firm \( i \) at time \( t \)

\( X_{1it} \) represents gross profit for firm \( i \) at time \( t \)

\( X_{2it} \) represents operating expenses for firm \( i \) at time \( t \)

\( X_{3it} \) represents foreign exchange fluctuation for firm \( i \) at time \( t \)

\( i = 1 \) firm

\( t = 2002-2012 \)

\( U_{it} = \text{error term} \)

\( B = \text{change in estimated value of } Y \)

\( B_0 = \text{Change in estimated value of } Y \text{ when all estimates } = 0 \)

4.3 Summary and interpretation of findings

The regression model can be completed by substituting in the constants in the regression model to arrive at the equation below that shows how the three variables combined predict the behavior of the Profit after tax of the firms.

\[ \text{PAT} = 338,737,019 + (396,191) \text{ GP} + 1,415,537 \text{ (FX)} + (-439,998) \text{ OE} \]

The variables can be explained as shown below:

Gross Profit(GP); a 396,191 increase in gross profit results in a unit increase in PAT.

Foreign Exchange (FX); a 1,415,537 increase in FX gain results in a unit increase in PAT.

Operating Expenses (OE); a 439,998 drop in OE results in a unit increase in a unit increase in PAT.

Constant (Intercept); in any year net income is KES 338,737,019 when all other variables are equal to Zero
4.3.1 Impact of the independent variables on the Profit after Tax

Results from the table indicate that the all the three variables taken to be the predictors of Net income were significantly correlated with the company’s Net income; \((R = 0.981)\). A coefficient of determination of 0.962 implies that approximately 96.2\% of the change in the firm’s net income is caused by movements in the three variables i.e. Gross profit, operation expenses and foreign exchange movements.

A significant F value in the ANOVA table imply that it is right to say that a combination of all the independent variables as a whole were contributing to changes in the net income of the firm.

It was necessary to establish whether all the independent variables impacted on the net income. Results indicated that all the independent variables had a significant positive impact on the firm’s PAT (significant values were more than 0.05).

Again, among all the independent variables, foreign exchange fluctuation was discovered to have more impact on the net profit since it had a higher value for beta as compared to other independent variables.

4.3.2 Relationship between Foreign exchange risk and profitability

From the correlation results and regression analysis, it is evident that foreign exchange movements have a significant impact on the profits of a firm. With a positive correlation coefficient of 0.95, foreign exchange risk is observed to impact on the profitability directly.

Both Total and KenolKobil have admitted in profit warning announcements that foreign exchange is a significant component in their profitability. For example in the financial year ended 2012, KenolKobil made a net loss of KES 6.2 Billion out of which 4.6Billion was directly attributed to foreign exchange loss. KenolKobil’s chairman of the board in June 2012 stated the following while issuing “Foreign exchange hedging positions (through Forward contracts) taken during 2011, to cover volatile foreign exchange movements, have crystallized into foreign exchange losses during the first half of 2012, above what was included in the consolidated statement of comprehensive income and balance sheet for 2011.”(KenolKobil profit warning statement, 2012). In 2011,
KenolKobil reported a profit of KES 3.27 Billion but the profits could have been higher were it not for the foreign exchange loss of 1.2 Billion.

The trend is the same for Total Kenya in 2012 whereby out of the loss reported of KES 202 Million, 81 Million was directly attributed to foreign exchange loss. In 2011 however, Total reported a foreign exchange gain of KES 257 Million in the same year that KenolKobil reported a loss. This shows that with proper foreign exchange management strategies, it is possible to cushion against foreign exchange losses.

Though previous research studies done on the subject have failed to provide convincing link between currency risk and firm performance (Duangploy et al., 2008); (Ankrom, 2007), the results of this study depict high correlation between the foreign exchange risk and profitability especially in years where the risk recorded is substantial like 2011 and 2012. This is consistent with the findings of Irene Diffu (2011) whose findings were the same for Kenya’s airline industry. However, since there are numerous variables that predict the behavior of the profits, it cannot be conclusively affirmed that foreign exchange risk determines the direction of profits especially when the figures involved are not significant.
CHAPTER 5
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary
The universal agreement by all selected firms that movements in exchange rates pose greater risks to firm’s present and future cash flows is indeed an issue that has globally dominated policy agenda in many countries. As mentioned by (Khoury and Chan, 2005), that it’s difficult to imagine a single firm in modern business that is not directly or indirectly affected by foreign exchange rate movements.

The study analyzed the relationship between foreign exchange risk and the profitability of oil companies listed in the NSE namely KenolKobil and Total Kenya. Two other variables perceived to directly affect the profitability were also considered and these were the gross profit and the operating expenses.

From the descriptive analysis, the three variables behave in the expected manner with foreign exchange having a negative mean value indicating that on average over the past decade both companies registered an overall loss in foreign exchange. The standard deviation is over a Billion shillings on either side confirming the extent of the uncertainty of foreign exchange fluctuations. The other two variables namely the gross profit and operating expenses behavior is also consistent with the behavior of the net income over the years as both company’s profits have been on a steady rise same to gross profit and operating expenses except for exceptional cases like in 2011 and 2012 where foreign exchange loss carries more weight and distorts the pattern.

Pearson correlation and regression were undertaken through SPSS software to test the relationship between foreign exchange risk and profitability of the two oil companies. The analysis revealed a positive relationship with very high correlation between the two variables. This means that foreign exchange risk as represented by the foreign exchange gain/loss reported by the firms is determines the overall profitability of a firm. This is also supported by the trends observed between the two variables and the big regression coefficient generated for foreign exchange risk as a predictor of the profitability compared to gross profit and operational expenses.
5.2 Conclusion

From the study, it is evident the kind of weight foreign exchange fluctuations carries in relation to the overall net profit reported by a company. Despite an insignificant drop in sales by just 13% between 2011 and 2012, the net loss reported by KenolKobil is huge and this can be directly attributed to foreign exchange loss of 4.6 Billion reported in the year. The gross profit also dropped significantly whereas the operating expenses went up by KES 1 billion. All these factors considered together led to the dismal performance of KenolKobil. The same was the case for Total Kenya in 2011.

It is also observed that despite currency fluctuations affecting all the firms in a particular sector in the same manner at the same time since the currencies used are the same in most cases, some firms take a harder hit than others. This is because it has been shown that risk is important to manage and foreign exchange risk management practices adopted by firms is different and is mainly controlled by the management. Total boasted of having sound foreign exchange risk management strategies in the same year that KenolKobil issued a profit warning due to foreign exchange loss in 2011, Total made a gain of KES 258 Million whereas KenolKobil made a loss of KES 1.2 Billion. All other factors held constant, it can be concluded that foreign exchange risk in the Kenyan oil sector is a great determinant of the profitability and if not properly managed it can affect the overall performance of a company.

These findings are in agreement with Diffu (2011) who carried out a similar study in the Kenyan airline industry and she found that foreign exchange risk is a major determinant of a firm’s profitability. This implies that no matter what industry a firm operates in, as long as there are foreign currency based transactions, the firm’s bottom-line profit is bound to get hit and unless rapid measures are taken to cushion against these fluctuations, the profits are in most cases going to be affected negatively although in some cases fluctuations might be to the firm’s advantage.
5.3 Policy Recommendations

From the above analysis, it is evident that the two companies need to manage foreign exchange risk. The company should develop a robust foreign exchange risk management framework which clearly shows its currency risk assessment procedure and implementation of currency risk management strategies. This should be regularly monitored and adjustments made where necessary.

The companies should set up a risk management function within the organization tasked with the sole purpose of identifying, measuring managing and monitoring foreign exchange risk. Since the foreign exchange risk considered in the study was mainly from transactions, the companies can adopt both internal and external risk management measures to avoid fluctuations associated with currency movements. The easiest and cheap option is to go for internal foreign exchange risk hedging like leading and lagging, netting and prepayment. External hedging techniques may also be adopted for example forward covers which should not be for extended periods of time because that too might be risky with the unpredictable nature of currency movements. The long forward contracts taken by KenolKobil in 2010 crystalized in 2011 and 2012 and this is when the company reported the highest foreign exchange losses. The decision to hedge against currency fluctuations is delicate and should be done in an informed manner as it can lead to substantial losses.

Translation foreign exchange risk especially for companies with several subsidiaries can also affect the profits of the firm. In this case both companies were affected by this risk and since it only comes about during reporting by translating subsidiary’s currency to home currency short forward covers can be taken and monitored towards financial year end after monitoring the trend of the home currency against the US dollar.

If hedging is done in the right way, it can go a long way in cushioning the profits from erratic fluctuations in currencies and thereby have more consistent financial results.
5.4 Limitations of the study
Since there are only two oil companies listed in the NSE in Kenya, the two were the subject of this study. The other oil companies are private and the main challenge encountered was access to financial information as they are deemed confidential. This led to using the two listed companies which together make up 45% of the market share which was considered representative of the oil sector in Kenya.

More variables that are perceived to affect profitability would have been used but the time could not allow due to the data analysis required that is involving and time consuming. Given more time, variables analysis would have been presented in a more detailed manner; however analysis done was sufficient to give a firm conclusion.

The researcher requested for a meeting with the finance managers to understand the impact of foreign exchange risk and its management did not materialize as both companies declined citing confidentiality. A meeting would have given more insight on the topic and affirm the results of the findings.

Project related costs were also a challenge when the cost of internet, stationery, printing and binding are considered Sacrifice was required during the period of study

5.5 Suggestions for further research
Further research can be carried on how foreign exchange risk management affects the financial performance of oil companies by considering other variables that define financial performance of a firm like Growth like Stock return.

The foreign exchange risk considered in the study is purely transaction based, translation risk is also material and it affects a firm’s profits. The two risks maybe considered together or separately to determine their effect on the profits.

Other variables maybe used in predicting the profitability of a firm for example the impact of taxation is significant on the profits other aspects of financing costs and depreciation.
The foreign exchange risk considered in the study is purely transaction based, translation risk is also material and it affects a firm’s profits. The two risks maybe considered together or separately to determine the effect on the profits.
REFERENCES


Business Daily, Nation Media Group,
http://www.businessdailyafrica.com

Chiira Zachariah-(2009), “A survey of the foreign exchange rate risk management practices by oil companies in Kenya” Unpublished MBA project, University of Nairobi


David K., (1997), Multinational Business Finance, Addison Wesley Publishing


Diffu Irene-(2011), “Relationship between foreign exchange risk and financial performance of airline companies in Kenya, a case study of Kenya Airways” Unpublished MBA project, University of Nairobi


Lei, L. and Niannian, M., (2007), "Foreign Exchange Risk Management in Multinationals: An Empirical Investigation on China, Japan and US.


Popov V. and Stutzmann Y., (2003), "How is Foreign Exchange Risk Managed? An Empirical Study Applied to two Swiss Companies".


Stern, N .and Chew, S., (1987),"New Developments in International Finance"

APPENDIX 1: FINANCIAL DATA

KENOL KOBIL

<table>
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<tr>
<th>YEAR</th>
<th>NET SALES</th>
<th>GROSS PROFIT</th>
<th>NET INCOME-PAT</th>
<th>EXCHANGE (LOSS)/GAIN</th>
<th>TRANSLATION (LOSS)/GAIN</th>
<th>Movement in Hedge reserves</th>
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<td>1,609</td>
<td>441</td>
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<td>45</td>
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<tr>
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<td>843</td>
<td>37</td>
<td>-</td>
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<td>2,665</td>
<td>593</td>
<td>8</td>
<td>-</td>
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<tr>
<td>2008</td>
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<tr>
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<td>7,708</td>
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<td>(118)</td>
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<td>3,274</td>
<td>(1,155)</td>
<td>(58)</td>
<td>(1,462)</td>
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<tr>
<td>2012</td>
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<td>4,288</td>
<td>(6,285)</td>
<td>(4,606)</td>
<td>(106)</td>
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TOTAL KENYA LTD

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NET SALES</th>
<th>GROSS PROFIT</th>
<th>NET INCOME-PAT</th>
<th>EXCHANGE (LOSS)/GAIN</th>
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<td>2002</td>
<td>12,664</td>
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<td>2003</td>
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<td>2004</td>
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<tr>
<td>2005</td>
<td>30,808</td>
<td>2,402</td>
<td>422</td>
<td>59</td>
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<td>2006</td>
<td>30,661</td>
<td>2,252</td>
<td>486</td>
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<tr>
<td>2007</td>
<td>34,758</td>
<td>2,435</td>
<td>524</td>
<td>108</td>
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<tr>
<td>2008</td>
<td>44,561</td>
<td>2,893</td>
<td>704</td>
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<td>2009</td>
<td>32,677</td>
<td>2,809</td>
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<td>2010</td>
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<td>2011</td>
<td>92,535</td>
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<td>2012</td>
<td>107,451</td>
<td>5,873</td>
<td>(202)</td>
<td>(81)</td>
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APPENDIX II: VARIABLES ANALYSIS

SUMMARY OF REGRESSION OUTPUT

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<tr>
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<tr>
<td>Adjusted R Square</td>
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<td>Standard Error</td>
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<td>Regression</td>
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<td>Total</td>
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<th>Coefficients</th>
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<td>Intercept</td>
<td>338.74</td>
<td>157.32</td>
<td>2.15</td>
<td>0.05</td>
<td>8.22</td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>0.40</td>
<td>0.14</td>
<td>2.81</td>
<td>0.01</td>
<td>0.10</td>
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<tr>
<td>EXCHANGE (LOSS)/GAIN</td>
<td>1.42</td>
<td>0.08</td>
<td>17.31</td>
<td>0.00</td>
<td>1.24</td>
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<tr>
<td>OPERATING EXPENSES</td>
<td>(0.44)</td>
<td>0.26</td>
<td>(1.67)</td>
<td>0.11</td>
<td>(0.99)</td>
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</table>

RESIDUAL OUTPUT

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<thead>
<tr>
<th>Observation</th>
<th>Predicted NET INCOME-PAT</th>
<th>Residuals</th>
<th>Standard Residuals</th>
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<tbody>
<tr>
<td>1.00</td>
<td>(5,902.49)</td>
<td>(382.09)</td>
<td>(1.18)</td>
</tr>
<tr>
<td>2.00</td>
<td>(1,010.16)</td>
<td>808.02</td>
<td>2.50</td>
</tr>
<tr>
<td>3.00</td>
<td>(746.21)</td>
<td>674.77</td>
<td>2.09</td>
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<tr>
<td>4.00</td>
<td>(152.98)</td>
<td>513.18</td>
<td>1.59</td>
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<td>5.00</td>
<td>373.52</td>
<td>48.35</td>
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</tr>
<tr>
<td>6.00</td>
<td>549.92</td>
<td>(108.46)</td>
<td>(0.34)</td>
</tr>
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<td>7.00</td>
<td>571.05</td>
<td>(102.31)</td>
<td>(0.32)</td>
</tr>
<tr>
<td>8.00</td>
<td>641.97</td>
<td>(159.39)</td>
<td>(0.49)</td>
</tr>
<tr>
<td>9.00</td>
<td>663.98</td>
<td>(177.91)</td>
<td>(0.55)</td>
</tr>
<tr>
<td>10.00</td>
<td>719.07</td>
<td>(204.11)</td>
<td>(0.63)</td>
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<td>11.00</td>
<td>746.67</td>
<td>(222.48)</td>
<td>(0.69)</td>
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791.55
<table>
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<tr>
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<th>NET INCOME-PAT</th>
<th>NET SALES</th>
<th>GROSS PROFIT</th>
<th>EXCHANGE (LOSS)/GAIN</th>
<th>OPERATING EXPENSES</th>
</tr>
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<tbody>
<tr>
<td>Mean</td>
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<td>Standard Error</td>
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<td>563</td>
<td>215</td>
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</tr>
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<td>Median</td>
<td>551</td>
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<td>2,724</td>
<td>(30)</td>
<td>1,377.15</td>
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<tr>
<td>Standard Deviation</td>
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<td>2,639</td>
<td>1,008</td>
<td>1,422.04</td>
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<td>Sample Variance</td>
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<td>6,965,238</td>
<td>1,016,627</td>
<td>2,022,196.01</td>
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<td>Range</td>
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<td>10,725</td>
<td>4,863</td>
<td>5,043.76</td>
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<tr>
<td>Minimum</td>
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<td>1,609</td>
<td>(4,606)</td>
<td>816.06</td>
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<tr>
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<td>12,333</td>
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