IMPACT OF CENTRAL BANK INTERVENTIONS ON FOREIGN EXCHANGE RATE VOLATILITY IN KENYA

BY

OUMA PETRO KEMBE

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE MASTER OF BUSINESS ADMINISTRATION (MBA) DEGREE, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

2013

DECLARATION

This project is my original work and has not been submitted to any other University for any degree award

_____ _____

Signature Date

Ouma Petro Kembe

D61/71047/2009

Declaration by Supervisor

This research project has been submitted with my approval as the University supervisor

Dr. Sifunjo Kisaka

_____ _____

Signature Date

ACKNOWLEDGMENT

First appreciation goes to my project supervisor Dr. Sifunjo Kisaka for his useful comments and relevant reading material with which he supplied me in the course of the research. Special thanks to my other lectures notably Dr. Ogutu, Mr Ondigo and Mr Chitahi for their objective comments and criticisms which enormously added value to the project

Special thanks to my parents, Samuel Ouma Omoro and Eucabeth Awuor Ouma for instilling in me virtues of hard work, determination and resilience. I have found these virtues very fruitful during the journey of writing this project work.

I also express heartfelt gratitude to my siblings Elly, Shellemiah and Merab whose support and encouragement have gone a long way in helping me get good results in all my endeavors.

To my wife Sarah Akwabi and my little children Kaylie Awuor and Hannah Atieno, thanks for enduring the trying moments. I also appreciate the support and constant encouragement to press on even when the heart is not willing to do so. I remain committed to you.

Finally, I must not forget my MBA classmate like Antony, Harrison and Victor who added enormously to the number of my friends. I enjoyed your company for the two years. Much thanks also goes to my colleagues at Barclays Bank namely, Eunice, Gladys, Michael and Sarah. Your support has made me come this far.

DEDICATION

Special dedication to my wife Sarah and my little children Kaylie Awuor and Hannah Atieno. I love you very much.

ABSTRACT

This study explored the impact of central bank intervention on foreign exchange rate volatility in Kenya. The central banks have undertaken an unprecedented number of both coordinated and unilateral intervention operations in the last 10 years. Existing empirical evidence on the effectiveness of intervention is mixed: studies using data from the 1970s suggest that intervention operations that do not affect the monetary base have, at most, a short-lived influence on exchange rates, but more recent studies indicate that the intervention operations that influenced both the level and variance of exchange rates. This paper examines the impact of central bank intervention on the volatility of the US Dollar, Euros, and Sterling Pounds against Kenya Shilling in Kenya over the period of 2008 and 2011.

Secondary data were collected from the CBK and analyzed using analysis of variance. The results indicate that intervention operations generally reduce exchange rate volatility. This is particularly true of interventions that are made with the notification of the public. The results have also shown that the impact of the CBK intervention is felt in the market immediately and that CBK only intervene to calm disorderly market.

Given the conclusion, the market, including the central bank, the banking sector and the corporate sectors, ought to develop hedging instruments to minimize speculative tendencies prevalent in the foreign exchange market and the need of the central bank to intervene to smooth out the wide fluctuation in the exchange rate. This would minimize the misalignments in the exchange rates from its fundamental levels, caused by both speculation and central bank intervention this would be supplemented with the development of the domestic securities market geared at reducing liquidity to make the market more sensitive to changes in the central bank policy rates.

TABLE OF CONTENTS

LIST OF TABLES

DEFINITION OF TERMS

There are key terms in this paper that require clear understanding and whose definitions are quite appropriate. Among them are the following:

Foreign Exchange Hedging Techniques:

These are a set of cash management techniques designed to minimize the impact of expected volatility in the value of foreign cash flows.

Foreign Exchange Risk Management:

These are the methods of managing foreign exchange rate risk and currency exposures through the foreign exchange market. It typically involves use of derivatives instruments such as forwards, futures, swaps and options.

Foreign Exchange Rate Risk:

They are risks that the value of an asset or liability, portfolio or legal entity will change due to the exchange rate fluctuation over time.

Volatility:

Refers to the fluctuations in the exchange rate over time. Volatility and movements are used interchangeably.

LIST OF ABBREVIATIONS AND ACRONYMS

BOJ	Bank of Japan
CC	Cross Currency
CCS	Cross Currency Swap
FERM	Foreign Exchange Risk Management
FX	Foreign Exchange
GBP	Great British Pound
IAS	International Accounting Standards
IFE	International Fischer Effect
MNC's	Multinational Corporations
NSE	Nairobi Stock Exchange
OTC	Over-The- Counter
PIEA	Petroleum institute of East Africa
PPP	Purchasing Power Parity
USD	United States Dollar

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Foreign exchange intervention is the process by which central banks and other monetary authorities either buy or sell foreign exchange in the foreign exchange market normally against their own currencies in line with some policy objective. Some of the objectives include among others to control inflation or maintain internal balance; to maintain external balance and prevent resource misallocation or preserve competitiveness and boost growth; and to prevent or deal with disorderly markets or crises. To achieve these objectives, central banks might seek to target the level of the exchange rate, dampen exchange rate volatility or influence the amount of foreign reserves.

1.1.1 Central Bank Interventions

Central banks have been intervening in the foreign exchange market ever since the early 1970s.The practice that initially started with the G-5 countries has now spread all over the world and while developed countries rarely intervene in their foreign exchange markets, developing and emerging market economies have pushed up their levers in as far as the practice of intervention is concerned. The key question that has always been asked is whether this intervention does in tend achieve its objectives of reversing trends or reducing currency volatility. This question has been empirically tested over the years and therefore there exists a large body of knowledge on the topic (Dominguez, 2006).

There are a number of reasons why CBK intervene in the foreign exchange markets. There are however, four common reasons; to calm disorderly markets (smoothing

volatility), Cure exchange rate misalignment, signal future monetary policy and build international reserves.

Exchange rates like many other financial assets exhibit volatility trends which may result in loss of liquidity. This volatility may also have adverse effects on international trade, the external balance and threaten the orderly functioning of the market. Central banks may therefore intervene to calm this disorderly behavior (Sarno – Taylor, 2001). Intervention may also be used to signal future changes to monetary policy and calm expectations if monetary policy is changed unexpectedly which might otherwise lead to a loss in confidence and thereby induce an unwarranted moves in the exchange rate. Finally, central banks may want to build international reserves of foreign currencies and so they will enter the foreign exchange market to purchase a foreign currency. International reserves are sometimes used as collateral to attract foreign investors.

The practice of intervention has been around for a while though it really intensified after the collapse of the Bretton Woods System in 1972. Before then intervention was allowed for the sake of keeping exchanges rates within agreed parity bands. However, after the demise of the fixed exchange rate system, the discretion to intervene in the foreign exchange market became incumbent upon individual states and their monetary authorities. To this extent the International Monetary Fund (IMF) even issued guidelines on how member states should conduct their intervention activities. Historically, the G -5 countries who included Japan, Germany, the United States of America, and France signed the Plaza Agreement in 1995. The agreement was about coordinated intervention. Consequently, over the years all major developed countries have intervened in the foreign

exchange market on a number of occasions albeit the frequency now is very minimal. However, developing countries are now more active in this area.

However, the key question in academia, politics and government is whether this intervention is really effective. Unfortunately, this question and the debate around it have been raging from the time of the introduction of the floating exchange system in the early 1970s, and it does not seem to be receding. There are three different views points on this matter. One strand of thought posits that intervention operations do not at all affect the level or volatility of the exchange. Another school of thought states that intervention while not being only ineffectual at influencing the level of the exchange rate also increases the volatility of the exchange. The last strand of thought states that intervention operations do influence the exchange rate and do also calm disorderly markets in the process arresting volatility(Dominguez 1998, Edison et al 2003)Empirical studies conducted in the early 1980s have suggested that intervention whether sterilized or not was ineffective in as far as affecting the exchange rate was concerned.

1.1.2 Foreign Exchange Rate Volatility in Kenya

A foreign exchange market in which exchange rates always fully reflect all available information is said to be efficient. Three degrees of market efficiency are customarily distinguished; the weakly efficient market hypothesis says that series of historical exchange rates contain no information which can be used to forecast future spot exchange rates. Secondly the semi strong version of market efficiency holds that a large and competitive group of market participants have access to all publicly available information relevant to the formation of expectations about future rates; finally if the set of available

information also includes private or insiders' information, the market is said to be strongly efficient (Jacque, 1981).

1.1.3 Impact of Monetary Interventions on Exchange Rate Volatility

The monetary channel, discussed for example by (Galati – Melick, 2002), works only if the intervention is not (or not to the full extent) sterilized. In this case, intervention influences domestic monetary base, money supply in the money market and thus short-term interest rates. The interest rate change affects through the uncovered interest rate parity the demand for domestic assets and the exchange rate, as described in traditional monetary models of exchange rate determination. Suppose that the central bank wants to depreciate the domestic currency and purchases foreign currency, without offsetting the effect of the resulting higher money supply. Short-term interest rates in money market decline, investors sell domestic assets for (now more profitable) foreign assets and the domestic currency depreciates.

There is a strong consensus that non-sterilized intervention can influence exchange rates similarly to monetary policy via affecting money supply, interest rates and market expectation (Sarno – Taylor, 2001), (Edison, 1993).On the other hand, continuing discussion about the precise effects of changes in monetary base on interest rates (for example, in the presence of standing facilities preventing the market interest rates from deviating too much from the central bank's main policy rate) and that of interest rates changes on exchange rates (Bilson – Marsto 2006).

Over the last decade or so, increasing attention has been paid to the details of financial market structure and practice. Microstructure researchers have used data from banks and infrastructure providers on the detailed flow of orders and tick price movements, which

are now available on an extremely high-frequency basis. They have discovered that there is a relationship between order flow and subsequent price action that is different from the relationship between trading volumes and price action, and has better predictive qualities than the relationship between news releases on conventional fundamentals and subsequent price action (Canales-Kriljenko 2003).

Market professionals are perhaps able to detect from order flow patterns forces that are relevant to the exchange rate, and act on that information in a way that helps shape exchange rate behavior. Central banks may be able to alter order flows with their own orders. If market professionals react more powerfully to changes in the order flow pattern that are presumed to originate from commercial entities rather than the central bank, anonymous and secret interventions may be more powerful

1.1.4 History of Foreign Exchange Market in Kenya

Exchange rates in Kenya have undergone three major regimes since independence. These includes the fixed-peg regime that was adopted at the independence to the early eighties, the crawling peg regime between eighties and 1993, and the floating or flexible exchange rate regime from 1993 to present. Fixed exchange rate occurs when the government establishes the price of currency and maintains it through active interventions (Bryns and Stone 1987). During the fixed peg regime, the value of the shilling was fixed by CBK at a certain exchange rate of the dollar and was dominated by macro-economic management control.

Crawling peg system is an exchange rate where, in short term currencies are fixed or pegged against each other and does not change in value whilst in the longer term, the

value of the currency can be change if economic circumstances so dictates (Anderton 2000). Under the crawling system, a country fixes its currency value against another within a band. A mechanism is built into the system which allows the band to rise and fall regularly over time, for example three months. During the crawling peg, the value of the shilling was based on the availability of the foreign exchange reserve at the central bank.

From March 1993 Kenya adopted flexible rate system which according to Byrns and stones (1987) is one that is allowed to change in response to changing demand and supply conditions. The central bank does not directly set exchange rates. Wonnacott et al (1987) state that if government or central banks withdraw completely from the exchange markets, the floats are clean. A float is dirty if central bank intervenes in exchange markets by buying or selling foreign currencies in order to affect exchange rate.

1.2 Research Problem

Considering the exchange rate risk that an investor encounters when investing internationally, it is obvious that the volatility of an exchange rate affects the expected returns of an investment. On the other hand an appreciation of the home currency increases your return on the investment. Consequently, a volatile exchange rate increases the volatility of an internationally invested portfolio. Earlier research has shown that a volatile exchange rate add somewhere between 15% –100% on the initial risk of a portfolio investment (Sharpe, Alexander & Bailey, 1999).

Every business activity is confronted with one risk or the other and coping with risk has always been an important managerial function. More importantly, firms dealing in multiple currencies face a risk (an unanticipated gain/loss) on account of sudden/unanticipated changes in exchange rates, quantified in terms of exposures. A key

assumption in the concept of foreign exchange risk, nonetheless, is that exchange rate changes are not predictable and that this is determined by how efficient the markets for foreign exchange are. Therefore, once a firm recognizes its exposure, it then has to deploy resources in managing it.

In the developing nations Kenya included, the fluctuations in exchange rate cause losses at certain times and create gains at other times. Furthermore, the nature of exchange rate systems in these countries allows firms to anticipate exchange rate movements and undertake either hedging or speculative measures to minimize exchange losses. Studies originating in these countries have thus emphasized the hedging of foreign exchange risks to suit their circumstances. Recent studies have empirically investigated the value relevance of foreign exchange risk management (Lim and Tan, 2007; Seow and Tam, 2002; Allayannis and Weston, 2001). Wang *et al*. (2005) extended the scope of market risk disclosure research by examining the value relevance of the trading and non-trading derivative amount disclosed in the annual filings for the US banks. They report that disclosed notional amount of trading and non-trading derivatives is useful in explaining variations in bank values.

Local studies done in Kenya on the efficiency of the foreign exchange market have found the market to be very inefficient (Muhoro 2003). Her study entitled determining the efficiency of the foreign exchange market in Kenya concluded that the foreign exchange market is generally inefficient due to the existence of arbitrage opportunities for both bureaus and banks. Higher arbitrage profits could be obtained among bureaus than banks. This could be due to the fact that banks may be able to better disseminate information amongst themselves than bureaus may. The foreign exchange market has proved to be

inefficient even when rational expectation approach is used in a study (Kimani 2006). It is this inefficiency of the foreign exchange market that causes the CBK to intervene with the hope of creating order in the way transactions are done at the market. It is for these reason that this study seeks to determine whether the involvement of the CBK do have any impact on the exchange rate volatility.

Nonetheless, previous studies have dwelt very much on foreign exchange risks management and the efficiency of the foreign exchange market of which the market has been found to be very inefficient. This inefficiency causes the CBK to intervene in the market. Thus, this study therefore fills the existing gap by answering the question: what is the impact of central bank on foreign exchange in exchange rate volatility in Kenya?

1.3 Objective of the Study

To determine the impact of central bank interventions on foreign exchange rate volatility in Kenya.

1.4 Value of the Study

The study is of benefit to different groups of people:

Policy Makers: Decision makers at the various levels of management gains value added information on the foreign exchange management practices as a key enabler of developing economic perspective.

Academics: Fellow scholars and business researchers are able to borrow from the findings of this research to support literary citations as well as develop themes for further research. Specifically, the study hopes to make theoretical, practical and methodological

contributions. The findings contribute to professional extension of existing knowledge in foreign exchange markets.

Business People: Business persons, for instance entrepreneurs, bankers, financial markets and institutions and financial institutions can use the findings from this research to aid them in implementing their organizational management practices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature review organized as follows; section 2.2 entails information of nature and impact of foreign exchange risks; section 2.3 presents theories of central bank intervention in foreign exchange market volatility; section 2.4 presents empirical evidence on central bank intervention and foreign exchange rate volatility; lastly section 2.5 presents summary of the literature.

2.2 Theories of Central Bank Intervention in Foreign Exchange Market Volatility

As rule central banks sterilize their interventions in the foreign exchange market by acting in the interbank market in an opposite way. It is now common practice to distinguish the effects of such sterilized intervention on the exchange rate through the portfolio balance channel from the effects on exchange rate expectations through a signaling channel (Isard, 1995). The portfolio-balance channel of intervention (Dominguez and Frankel, 1993) has lost its appeal because the amounts involved seem too small compared to the size of transactions on the foreign exchange market to induce a significant readjustment in agents' portfolios. The signaling channel came too readily to be confused with one of its specific cases where the signal refers to future monetary policy. However many results which seem "perverse" when seen in the light of the latter approach have been rationalized when considered from the point of view of an alternative approach where the signal refers to the exchange rate target of thecentral bank.

The discussion of signaling effects (Mussa, 1981) suffered initially from the failure to focus explicitly on how much market participants are assumed to know about the incentives of the central bank. Recent work has shown that with rational agents the effectiveness of signaling depends on the degree of information of market participants about the incentives of the central banks. Within the context of a *flexible* exchange rate regime, the signaling view argues that exchange rates would be influenced by interventions since the latter are used by central banks to enlarge the market's information set by providing it with private central bankinformation.

2.2.1 The Game Theory

In a game-theoretic setting, Battacharya and Weller (1997) model a central bank, with 'inside information' about its exchange rate target, trading with risk averse speculators who have private information about future spot rates. Since it has a privileged position in the foreign exchange market, the central bank can accurately infer speculators' information related to expectations about the exchange rate. By contrast, speculators only learn part of the actions of the central bank. The central bank is assumed to aim at limiting the deviation of the exchange rate from a target value. To achieve its objective the Bank intervenes in the foreign exchange market. The utility function of the Bank is such that latter faces a trade-off between the expected costs of intervention and the benefit drawn from stabilizing the exchange rate around the target.

In this model the spot rate can become very sensitive to interventions. This stems from the fact that the equilibrium spot exchange rate reveals some information about the current exchange rate target of the authorities, which can be used to predict the future

spot exchange rate. The authors identify circumstances in which alleged 'perverse' responses to intervention are observed; i.e. the domestic currency depreciates when the central bank purchases it. Such a result is explained by the double effect of an increase in the spot rate on the level of the speculative demand for the currency: the first effect increases the forward rate and thus decreases speculative demand for the forward currency; the second effect leads speculators to revise upwards their expectations of the future spot rate. When the second effect dominates the first, a 'perverse' response to intervention occurs. This can be illustrated when the central bank endeavors to implement a soft-landing of the currency by consistently purchasing it as the currency continues its depreciation. The likelihood of such a ‘perverse’ response is higher when the market holds a relatively precise view of the (central bank’s) exchange rate targetand an imprecise one of fundamentals.

2.2.2 The Portfolio Balance Theory

Viewed from the perspective of a representative investor in an international portfolio of assets, a change in the relative scarcity of domestic versus foreign currency assets will cause a portfolio reallocation that changes relative prices in the process. One of those relative price changes might be the exchange rate.

Until a few years ago, the general consensus was that this channel is rather weak. For a start, at least in the context of large and well developed financial systems, only very small changes in the relative scarcity of domestic and foreign assets can be induced by sterilized intervention. The intervention capacity of the central bank is just too small

compared with the total quantum of domestic and foreign assets that might be exchanged for each other.

Empirical research has tended to lend weight to this argument. More recent research, however, is somewhat more open to the possibility that the exchange rate can be influenced by foreign exchange market interventions through changes in the relative scarcity of imperfectly substitutable assets, even in developed country cases (Dominguez & Frankel (1993); Sarno & Taylor (2001).)

2.2.3 Signaling or Expectations Theory

Intervention might change perceptions of one or more of the factors that are relevant to different groups of market participants. Perceptions of future relative scarcities, of future income streams and of risk can and do change prices without a single transaction taking place (Truman 2003).

Some discussions of signaling concentrate on signals of *future monetary policy*, and there is some evidence that it is through changed expectations of future monetary policy that exchange rates are influenced. Sarno and Taylor (2001), for example, conclude that intervention is likely to be more effective if it is consistent with the underlying stance of monetary and fiscal policy. If monetary policy is not related to intervention in a predictable way, however, this link is weakened. Such may be the case in some emerging market economies. Domaç and Mendoza (2004 found that monetary policy signals in Mexico and Turkey do not seem to affect the level or volatility of the exchange rate. Other discussions of signaling allow for unspecified signals of the future course of *exchange rate policy*. The literature on speculative attacks suggests that such signals can

be powerful, but with the direction of influence depending crucially on the credibility of the signal. In general, a central bank's signals of determination to resist currency appreciation might be more credible than signals of resistance to depreciation.

Another component of the signaling or expectations channel relates to coordination failure, meaning the propensity for exchange rates to deviate for extended periods from their equilibrium values because of trading dynamics akin to those observed in asset market speculative bubbles. If autoregressive (trend-following, momentum) trading strategies are dominant enough, even those traders who are aware of probable disequilibrium may take positions that reinforce the disequilibrium (Frankel &Foot (1990); Taylor & Allen (1992).In this view, central bank intervention could serve to disrupt extrapolative trading, or persuade the "swinging voter" that equilibrating forces are likely to dominate. In this sense ,intervention might coordinate trading in the direction of equilibrium (Sarno& Taylor 2001) The central bank in effect gives voice to people's half-formed views, or consolidates their expectations, in a way that has a material effect on behavior. Hence this channel would perhaps best be described as the coordination channel.

2.3 Nature and Impact of Foreign Exchange Risks

The foreign exchange market is arguably the largest and most liquid of the international markets, and large and rapid movements in exchange rates are common place. The effect of these movements in exchange rates on the company may be on its profits, its cash flows, or its market value. In order to minimize the possibility of financial loss, it is

therefore essential that corporations with foreign exchange exposures identify measure and manage their foreign exchange risk effectively (Jacque, 1981).

Foreign exchange risk is one of the unique complications of financial management in an international environment. The values, in a firm's reference currency, of many of its cash flows depend on foreign exchange rates expected to be in effect of settlement. Therefore, expectations about future exchange rates are important determinants of the expected future values and thus the current values of such cash flows; further, variability in exchange rate forecast may be a major source of variability in current value. The variability is foreign exchange risk (Hekman, 1985). Rakhimova (2000) defines foreign exchange risk or exposure as the potential for a firm's profitability, net cash flows or market value to change because of a change in exchange rates.

Managing foreign exchange risk is a fundamental component in the safe and sound management of all firms or 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 institution (Adler and Dumas, 1984).

2.3.1 Transaction Exposure

Transaction exposure is the exposure a firm is facing regarding all its specific commercial transaction that has already been booked. The terms of these transactions are established and settled at a given time period and their exposure can easily be measured by accounting systems. The implicit or explicit contractual agreements have to be taken into account as well when measuring the overall exchange rate exposure. While such

commitments create contractual exposure, a firm's domestic and foreign assets and liabilities, whose values are also affected by currency fluctuations, cause translation exposure (Muller and Verschoor, 2006).

Foreign market entry through direct investment, by contrast, results in so-called translation exposure which Wihlborg (1978) defines as the uncertain domestic value of a net accounting position denominated in a foreign currency future date; that is, a future foreign currency denominated stock. The practice periodically consolidating or aggregating parent's and affiliates' balance sheets will generally entail exchange gains or losses of non-cash flow (paper) nature as exchange rates fluctuate over the accounting horizon. While this traditional analysis of transactions exposure is correct in a narrow, formal sense, it is really relevant for financial institutions, only (Giddy and Dufey 1983). With returns from financial assets and liabilities being fixed in nominal terms, they can be shielded from losses with relative ease through cash payments in advance (with appropriate discounts), through the factoring of receivables, or via the use of forward exchange contracts, unless unexpected exchange rate changes have a systematic effect on credit risk.

Transaction exposure exists when the future cash transactions of a firm or individual are affected by exchange rate fluctuations. It arises out of transaction exposure which entails gains or losses that arises from the settlement of transactions whose terms are stated in foreign currency (Eiteman and Stonehill 1979).However, the essential assets of non-financial firms have non-contractual returns, i.e. revenue and cost streams from the production and sale of their goods and services which can respond to exchange rate changes in very different ways. Consequently, they are characterized by foreign exchange

exposure very different from that of firms with contractual returns (Giddy and Dufey, 1983).

2.3.2 Accounting Exposure

The concept of accounting exposure arises from the need to translate accounts that are denominated in foreign currencies into the home currency of the reporting entity in accordance with appropriate accounting principles. Translation risk is a multinational company's concern and its consideration may be absolutely irrelevant to many locally incorporated companies (Allayannis and Ofek, 1997).

Accounting exposure considers the sensitivity of company value to fluctuations in foreign exchange rates. This focus on economic valuation contrasts accounting-based transaction and translation exposures defined in terms of the book values of assets and liabilities denominated in foreign currencies. The accounting exposure of a firm can be estimated from time series data as the coefficient computed by regressing shareholders returns on the percentage change in foreign exchange rate (Miller and Reuer, 1998).Most commonly the problem arises when an enterprise has foreign affiliates keeping books in the respective local currency. For purposes of consolidation these accounts must somehow be translated into the reporting currency of the parent company. In doing this, a decision must be made as to the exchange rate that is to be used for the translation of the various accounts. While income statements of foreign affiliates are typically translated at a periodic average rate, balance sheets pose a more serious challenge (Jacque, 1981).

2.3.3 Economic or Strategic Foreign Exchange Exposure

Dumas (1978), Adler and Dumas (1984), and Hodder (1982) define economic exposure to exchange rate movement as the regression coefficient of the value of the firm on the exchange rate across states of nature. However, the definition does not imply that exchange rate exposure is simultaneously determined by a firm's foreign sales) and its financial hedging. As a general rule, economic exposure management should aim at neutralizing the impact of unexpected exchange rate changes on net cash flows; this will generally be achieved by striving for a balanced currency mix of cash flows between the cost and revenue side (Jacque, 1981). An operational approach for implementing this concept of economic management was developed by Nauman-Etienne (1977), he identified managerial policies, operational characteristics, and environmental parameters to which economic exposure is sensitive; define protective steps to minimize adverse effects of unexpected exchange rate changes on future cash flows.

Economic exposure is tied to the currency of determination of revenues and costs. Economic exposure represents any impact of exchange rate fluctuations on a firm's future cash flows. It is the possibility that the parent currency denominated net present value of cash flows will adversely be affected by exchange rate movement (Walker, 1978).Unlike the transaction exposure, economic exposure is long-term in approach and does not only focus on hedging their currency payables or receivables but also determines how all the cash flow of a firm will be affected by possible exchange rate movements (Miller and Reuer, 1998). Economic currency risk has wide ranging impacts on business and its consideration is essential in assessing the long-run health of the business (Adler and Dumas, 1984). Its consideration is pertinent in appraising projects intended to be financed

partly through foreign currency denominated debt. Economic currency risk is however inevitably subjective as it relies on estimations of future cash flows over uncertain time horizons.

2.4 Empirical Evidence

Central banks have been intervening in the foreign exchange market ever since the early 1970s.The practice that initially started with the G-5 countries has now spread all over the world and while developed countries rarely intervene in their foreign exchange markets, developing and emerging market economies have pushed up their levers in as far as the practice of intervention is concerned. The key question that has always been asked is whether this intervention does intend achieve its objectives of reversing trends or reducing currency volatility. This question has been empirically tested over the years and therefore there exists a large body of knowledge on the topic.

Some studies have produced evidence that intervention has an impact on both the level and volatility of the exchange rate while others have found that intervention is actually ineffective. This chapter provides a critical review of these studies. One of the very first studies on the effectiveness of central bank intervention on exchange rates came through a report of a study commissioned by the G7 economic summit at Versailles in 1982. The Jurgensen Report (1983) concluded that intervention effects were very small and only occurred in the short-run. Another study by Bordo and Schwartz (1991) agreed with the Jurgensen Report. They tested the portfolio balance channel by calculating standard deviations of the daily United States dollar ($)/Germany mark (M) as well as the $/ Japanese yen (Y) exchange rates. They found that there was no evidence that intervention

worked and the study concluded that intervention only increased foreign exchange market uncertainty. Therefore, the consensus among policy makers and academics during that time was that intervention was ineffective and if at all it was its effects were only in the short-run.

The major problem with these early studies was that the researchers did not use real high frequency intervention data provided by central banks. During this period central banks were very secretive in their intervention operations and so they did not release their intervention data to researchers or indeed the market. So most researchers instead, used proxies of various kinds as intervention variables. Expectedly therefore their results were not really reliable. Bordo and Schwart's methodology of standard deviation is not a very good econometric model and as such its estimates are likely to be biased and inefficient. Sarno and Taylor (2001) reviewed the various channels of intervention and the empirical studies that had been done in the area of central bank intervention. They opined that due to poor quality of data in the early studies conducted in the 1980s; most empirical studies indicated that intervention was ineffective.

On the other hand in the 1990s the veil of secrecy was removed and central banks became more open and transparent: they released intervention data to the market on a regular and timely basis. Studies done in this dispensation seem to suggest that central bank intervention is effective. A number of studies were undertaken to test the signaling channel hypothesis and most of them concluded that there was evidence that intervention affected the exchange rate through this channel. In this regard, Dominguez (1990) examined 3G central banks' foreign exchange interventions operations. She studied intervention activities of the 3G countries namely the United States of America (U.S.A),

Germany and Japan for the period from 1985 to 1987. Her aim was to establish whether or not unilateral and coordinated intervention operations influenced market operations.

Dominguez (1990) used newspaper accounts of intervention to develop an ex-post excess returns model under the framework of the signaling channel hypothesis. She defined ex-post excess returns as they realised return that market participants made by borrowing from one institution and lending to another. Intervention was construed to signify conveyance of central bank credible inside information to the market about future monetary policy. The study found that coordinated intervention operations consistently impacted on the longer term market expectations. However, the results were mixed in as far as unilateral interventions by the Federal Reserve and the Bundes bank on influencing ex post excess returns was concerned. The evidence presented indicated that market participants were overall able to observe the source and size of intervention and this had a significant economic and statistical effect on market expectations.

The above findings are supported by another study conducted by Dominguez (1998) herself. She again used the signaling channel to examine the impact of central bank's intervention on daily and short –term behaviour of exchange rate volatility. Her sample period ranged from 1977 to1994 and included the U.S.A, Germany and Japan. Using data from the three central banks in relation to $/Y and $/M markets, she constructed a GARCH conditional variance model to measure ex-post daily and weekly volatility. Her results were quite robust and fundamentally her GARCH parameters were highly significant. The study revealed that for the mid 1980 sub period, for example, for both the dollar –mark and dollar –yen, central banks' interventions reduced volatility and the Bundes bank interventions overall reduced dollar-mark and dollar –yen volatility during

the sample period. The study also brought out a very important fact that intervention need not be publicly announced for it to be effective. Secret intervention was also effective in calming volatility.

Kim et al (2000) used the Exponential GARCH methodology to study the effectiveness of the Reserve Bank of Australia's intervention of the United States Dollar/ Australian Dollar exchange rate. Studying intervention activities for the period 1983- 1997, they found that RBA intervention had some success as there was evidence of a stabilizing influence on the exchange rate. In particular, purchases of the Australian dollar tended to strengthen the currency and reduced itsvolatility. Aguilar and Nydahl (2000) the Swedish's Riks bank's foreign exchange market interventions for the period between January 1993 – 1996. They used actual daily data from the central bank to estimate a GARCH model and implied volatilities from currency options. They were examining the krona/mark and krona/USD exchange rates. The results were mixed. They found that the interventions depreciated the krona though the magnitude was small. Secondly, the effects of interventions on volatility were not significant and the estimated coefficients of the intervention variable were negative. However, for the 1995 and 1996 intervention had significant effects on the krona/mark and krona/usd exchange rates. For the whole period no significant effect of intervention was found.

A number of studies were also conducted to test the microstructure channel of intervention. Dominguez (2003) examined the effectiveness of central bank intervention in relation to the state of the market under the auspices of the market microstructure channel at the time of intervention. To do this she used Reuters intra-daily data in the $-

Mark and $-Yen markets of the3G‟s intervention activities (U.S., Germany and Japan). The study covered the 1987-1995 time periods.

Further, Dominguez (2006) analysed the influence of interventions on exchange rate volatility. She studied the United States of America's (Federal Reserve Bank) activities in the deus mark dollar and Japanese yen/ dollar foreign market from August 1989 to August. Beine, Benassy- Quere and Lecourt (2002) assessed the effects of the U.S, Germany and Japanese central banks' intervention on the evolution and volatility of the daily M/$ and Y/$ exchange rates. They covered the 1985 to1995 time period and used the FIGARCH methodology as a measure of volatility. They found that central bank interventions had a significant impact on the conditional mean of the exchange rate variations though net purchases of currencies were associated with subsequent depreciation of the currencies. This finding was in line with findings of previous studies by Almekinders and Eijffiner (1993) and others. This meant that what actually happened was leaning –against –the wind. Evidence showed that intervention increased volatility across all the three banks over some sub –periods which supported the microstructure channel where market participants test the central bank's determination after an intervention activity.

Frenkel and Pierdzioch (2005) examined the effects of the Bank of Japan (BOJ) intervention of the Y/$ volatility for the 1993-2000 period. One remarkable difference between this study and others was that the data used was official data obtained from the BOJ while the previous studies had used inaccurate reports contained in the financial press. They used volatilities implicit in foreign currency options as a measure of volatility and used a model similar to Dominguez (1998) and Tanner (1996). They found that there

was a statistically significant positive link between the interventions and the yen/$ volatility. The study also revealed that the mere presence of the BOJ in the foreign exchange market contributed to the exchange rate volatility. Concerning empirical tests on the effect of expected exchange rate volatility and press reports of BOJ intervention, their results demonstrated that interventions that were done secretly and therefore not reported in the press were positively correlated with exchange rate volatility.

It should also be pointed out that because of the nature of foreign exchange markets in these emerging markets it is very difficult to identify a single channel that could be used to study central bank intervention and let alone explicitly identify as a channel through which intervention affected the exchange rate. Therefore, most studies are of a general nature. One emerging market economies study was done by Edison, Cashin and Liang (2003).

Local studies done in this area have shown mixed results. Tobias (2011) examined the effect of short term interest rate on the volatility of the foreign exchange rate. In his study he used Treasury bill rates from august 1991 to December 2007. He used the GARCH model to analyze the data. The results of the study were consistent with the hypothesis that the volatility is positively correlated with the level of short term interest rates. The key findings revealed that there exists a link between short term interest rates and the volatility of foreign exchange rate in Kenya.

Todani and Munyama (2004) in their study entitle “exchange rate volatility and export in South Africa, trade and even development: Opportunity and challenges”. Their objective was to establish the relationship between exchange rate volatility and exports in South Africa using diverse measures of volatility. Depending on the measure of volatility used

the concluded that either there exist no statistically significant relationship between South Africa export flows and exchange rate volatility or when significant relationship existed, it was positive. No evidence of long run good and service export demand relations were found.

2.5 Summary

The chapter has presented literature related to the study. The effect of movements in exchange rates on a company are on its profits, its cash flows, or its market value. In order to minimize the possibility of financial loss, it is therefore essential that corporations with foreign exchange exposures identify measure and manage their foreign exchange risk effectively (Jacque, 1981).Foreign exchange market intervention involves trying to change the value that market participants put on a particular currency. For cross-border investors with medium- to long-term investment horizons, on the other hand, the immediate and near-term pressure of order flows on market-makers' open positions is almost irrelevant. Several interventions, by Central banks such as the monetary policy channel, the portfolio balance channel, signaling or expectations and the order flow channel helps in management of foreign exchange rate volatility.

The existence of divergent conclusions on the impact of the central bank interventions in foreign exchange market on foreign exchange rate volatility from studies in different parts of the world call for similar studies here at home. Majority of studies at home have focused mostly on the foreign currency risk and various ways of mitigating the risks at the same time efficiency of the foreign exchange market has also been studied in detail. The studies done have not looked at the impact of the central bank on foreign exchange

rate volatility in a country that experience very irregular movement of foreign exchange rate. It is against this backdrop that this study seeks to determine the impact of the central bank of interventions in foreign exchange market on foreign exchange rate volatility in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter briefly highlights the methods and procedures that were used in carrying out the study. It includes the following; section 3.2 presents survey research design; section 3.3 presents the population; section 3.4 presents sampling frame and technique used; section 3.5 entails data collection methods (instruments and procedures); while section 3.6 presents data analysis, analytical model as well as data presentation methods.

3.2 Research Design

The study used the descriptive research design. Norman and Fraenkel, (2001) define a descriptive research design as an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Phil (1996) says that descriptive research studies are designed to obtain information concerning the current situation and other phenomena and wherever possible to draw valid conclusion from the facts discussed. This descriptive research explored the existing status of two or more variables at a given point in time. For this research, the researcher carried out descriptive study on impact of central bank interventions on Foreign Exchange market in foreign exchange rate returns. This design was deemed suitable for this study since the study would, through data collection from and draws conclusions based on the findings.

3.3 Population

Mugenda and Mugenda (2005) refer to Population as the "universe'. Borg and Gall (1999) define population as all the members of a real or hypothetical set of people, event or objects to which a researcher wishes to generalize the results of the study. The population of this research consisted of all foreign currencies exchange rate traded at the foreign exchange market. As at December 2012 twenty one currencies were traded at the foreign exchange market.

3.4 Sampling Design

Sampling was a process used by a researcher to identify people, places or things to study (Kombo and Tromp, 2006). The sampling frame described the list of all population units from which the sample is selected (Cooper & Schindler, 2003).The study used the exchange rates traded for the four major currencies used in Kenya. This includes US Dollar, GBP, Euro and Kenya shillings.

3.5 Data Collection Instruments and Procedures

The researcher used secondary sources to collect the data. Secondary data was obtained from various Monthly Bulletin published by the CBK and also from the CBK web page. The study used daily data of exchange rate traded and net purchases from January 2009 to December 2012.Net purchases were defined as the difference between purchases and sales of the foreign currencies by the CBK.

3.6 Data Analysis

For empirical analysis, the researcher used monthly data on average exchange rate and net purchases. Net purchases are defined as the difference between purchases and sales of dollar by the CBK. This included spot transactions in foreign exchange market, representing millions of dollars. The exchange rate is the nominal exchange rate of Kenya shillings against the US dollar.

3.6.1 Conceptual Model

The study used ANOVA to do its data analysis. It is used to measure deviations in a sampled population. Therefore variance analysis was used in the instances where CBK intervened in the market and in those days where CBK did not intervene. Conclusions were drawn based on the variations noted during various forms of interventions by the CBK.

The relationship among the variables is estimated using a function:

F = f (CI)…….**(**1)

F = Foreign Exchange Rate volatility

CI = Central Bank interventions

3.6.2 Analytical model

The definitional equation of sample variance is;

Variance analysis

$S^2 = \sum (Xi-\dot{X})/n-1$…….. ……(2)

Standard deviation

$S = \sqrt{\sum} (Xi- \dot{X}) /n-1$…… ……...(3)

Where:

S=standard deviation, $S^{2=}$variance, $\dot{X}$=mean, Xi= observations and n= sample size

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter briefly highlights the 4.2 data analysis, 4.3 results and 4.4 discussions. Analysis of variance was used to analyze the data which was then presented in form of tables and graph for ease of understanding and interpretation.

4.2 Summary of Statistics

To establish the impact of the impact of central bank intervention on foreign exchange rate volatility in Kenya, time series data was collected and used to estimate the various forms of the equation presented in 3.2 using analysis of variance.

4.2.1 Summary of Statistics on Variance of US Dollar

Table 4.1Analysis of Variance of US Dollar

Time		**Currency:$(US dollar)**		
Years	**Variance(S)**	**Standard Deviation(s2)**	**Mean**	**Observations(n)**
2008	34.57	5.88	69.19	12
2009	10.38	3.22	76.81	12
2010	4.14	2.03	79.23	12
2011	38.99	6.24	88.81	12

Source: CBK 2012

The results showed highly varied values of S across the four years. This indicates that the exchange rate of the US dollar is highly volatile. The highest rate of volatility occurred in 2011 while the lowest rate of volatility occurred in 2010.

After a long period without intervention, the CBK actively began to intervene in order to influence the exchange rate downwards in September 2007. This was as a result of serious depreciation of Kenya shillings against the USD caused by the panic due to the general election that was expected later that year. It was noted that the CBK only intervenes when there is disorder in the market which results in the depreciation of the Kenya shilling. The peak of the intervention was in January 2008. It was noted that by the start of 2009, the intervention operations had resulted in the appreciation of the Kenya shilling against the USD. The interventions operations that were mainly used during this period were portfolio balance channel, Signaling or expectations channel. Another period when the CBK did serious intervention operation was towards the end of 2010. October 2011 recorded the highest exchange rate for the period under study. The results have shown that the intervention operations take some time before they can influence the market.

4.2.2 Summary of Statistics on variance of Sterling Pounds

Table 4.2: Analysis of Variance of Sterling Pounds

Time		**Currency: Sterling Pounds**		
Years	**Variance**	**Standard Deviation**	**Mean**	**Observations**
2008	**39.93**	**6.31**	**127.29**	**12**
2009	**120.09**	**10.96**	**116.79**	**12**
2010	**21.01**	**4.58**	**122.51**	**12**
2011	**89.35**	**9.45**	**142.34**	**12**

Source: CBK 2012

The results showed highly varied values of S across the four years. This indicates that the exchange rate of the sterling pound is highly volatile. The highest rate of volatility

occurred in 2009 while the lowest rate of volatility occurred in 2010. The highest exchange rate traded was in the month of October 2011. Serious operation intervention for the sterling pounds occurred between the periods of September 2008 and June 2009 and also between November 2010 and April 2012. These periods saw the CBK use the three major intervention operation channels namely portfolio balance channel, Signaling or expectations channel, Order flow channel. During this period there was financial crisis in Europe which resulted in panic in the domestic foreign currency exchange market. The CBK intervention operation again proved to be very effective in reducing exchange rate volatility.

4.2.3 Summary of Statistics on Variance of Euro

Table 4.3: Analysis of Variance of Euro

Time		**Currency: Euros**		
Years	**Variance**	**Standard Deviation**	**Mean**	**Observations**
2008	8.17	2.86	101.22	12
2009	31.47	5.61	108.7	12
2010	15.47	3.93	105.12	12
2011	88.79	9.42	123.6	12

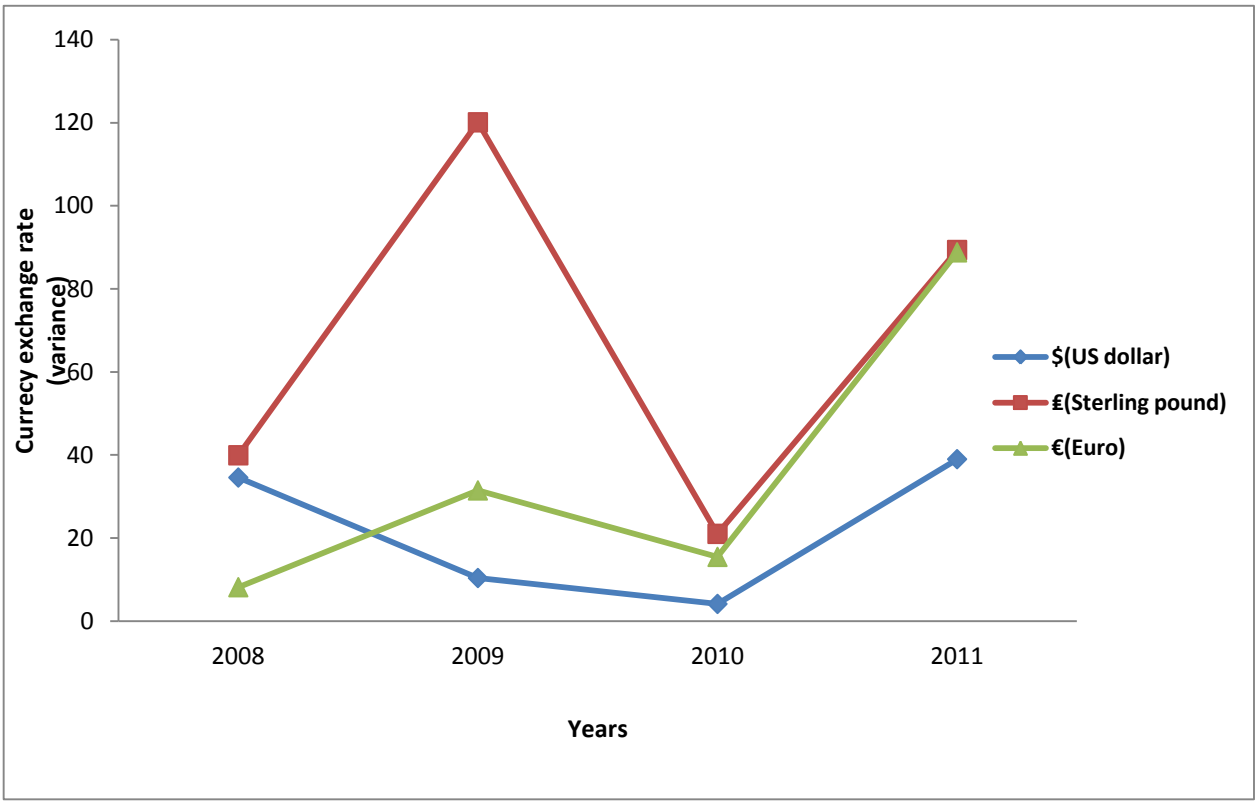
Source: CBK 2012

The results showed highly varied values of S across the four years. This indicates that the exchange rate of the euro is highly volatile. The highest rate of volatility occurred in 2011 while the lowest rate of volatility occurred in 2010.

4.3 The Impact of CBK Interventions on Volatility of Exchange Rate

The highest exchange rate traded was in the month of October 2011. Serious operation intervention for the sterling pounds occurred between the periods of September 2008 and June 2009 and also between November 2010 and April 2012. These periods saw the CBK use the three major intervention operation channels namely portfolio balance channel, Signaling or expectations channel, Order flow channel. During this period there was financial crisis in Europe which resulted in panic in the domestic foreign currency exchange market. The CBK intervention operation again proved to be very effective in reducing exchange rate volatility.

Time Series Graph of Variance (Volatility) against Time in Years



The results on the graph shows that foreign exchange rates for the currencies studied are highly volatile. The CBK comes in to calm the disorderly market and thus reduces the volatility.

4.4 Discussion of Findings

The results showed highly varied values of S across the four years indicating that the exchange rate of the US dollar is highly volatile. It was noted that the CBK only intervenes when there is disorder in the market which results in the depreciation of the Kenya shilling. This is in line with Dominguez (2006) who found that central bank interventions had a significant impact on the conditional mean of the exchange rate variations though net purchases of currencies were associated with subsequent depreciation of the currencies.

The results showed highly varied values of S across the four years indicating that the exchange rate of the sterling pound and euro is highly volatile. These periods saw the CBK use the three major intervention operation channels namely portfolio balance channel, Signaling or expectations channel, Order flow channel.

The CBK intervention operation in all cases proved to be very effective in reducing exchange rate volatility. However this is contrary to Aguilar and Nydahl (2000) who found that effects of interventions on volatility were not significant and the estimated coefficients of the intervention variable were negative.

4.5 Summary

The results showed highly varied values of S across the four years. This indicates that the exchange rate of the US dollar is highly volatile. The highest rate of volatility occurred in 2011 while the lowest rate of volatility occurred in 2010, indicating that the intervention operations take some time before they can influence the market.

The results also showed highly varied values of S across the four years. This indicates that the exchange rate of the euro is highly volatile. The highest rate of volatility occurred in 2011 while the lowest rate of volatility occurred in 2010. An appropriate intervention measure should be upheld as the foreign exchange rates for the currencies studied were found to be highly volatile, however when CBK comes in to calm the disorderly market it ineffectively reduces the volatility.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter briefly highlights the summary, conclusion and recommendations of the study. It is arranged 5.2 summaries, 5.3 recommendations and 5.4 conclusions

5.2 Summary of the Study

The aim of this study was to determine the impact of central bank interventions on foreign exchange rate volatility in Kenya. Portfolio balance channel, Signaling or expectations channel and order flow channel are some of the major channels used by the central bank of Kenya in intervening in the stock market to calm disorder.

The need to study the effect of the CBK was motivated by, on one hand by policy considerations (given that CBK intervenes to curb instability) and, on the other, the indication from the market about the effect of intervention. The results of the study suggests that although CBK interventions generally reduces volatility of the exchange rate, the market also believes that CBK interventions moves the exchange rate away from its fundamental and hence could be important in explaining the failure of the efficiency hypothesis. On the other hand, speculation, which may arise due to the seasonal pattern of exchange rate and the lack of hedging instrument against uncertainty and exposure, not only increases volatility in the market, but also moves the exchange rate away from its fundamentals. The market is also characterized by hedging behavior as agent try to self-insure themselves against future mishaps.

As a way forward, the study has identified three major issues that should be addressed to improve the efficiency in the market. The first is the role of information, given that the market thrive on information, the authorities should strengthen information dissemination process and sensitize the market players on the meaning of key macroeconomic aggregates and their implication on the market.

The study also showed that the exchange rates of the US dollar, sterling pound and the Euros are highly volatile; firms that depend of these currencies need to use modern foreign exchange techniques to shield them against the negative impact of foreign exchange rate fluctuations. Forward exchange contracts, options, marching, leading and lagging and netting can be used.

5.3 Conclusions

The first is the role of information - given that the market thrive information, the authorities should strengthen the information dissemination process and sensitize the market players on the meaning of key macro-economic aggregates and their implication on the markets. This would benefit some of the market players who have been followers to also have some role in price formation in the market, improve information assimilation and probably change the market behaviour.

Secondly, the market, including the central bank, the banking sector and the corporate sectors, ought to develop hedging instruments to minimize speculative tendencies prevalent in the foreign exchange market and the need of the central bank to intervene to smooth out the wide fluctuation in the exchange rate. This would minimize the misalignments in the exchange rates from its fundamental levels, caused by both

speculation and central bank intervention this would be supplemented with the development of the domestic securities market geared at reducing liquidity to make the market more sensitive to changes in the central bank policy rates. Central bank of Kenya policy rate, which are domestic money market based instruments, being weak in affecting the foreign exchange market is partly on account of the excess liquidity in the financial system. In the ideal situation, such policy rates should have an impact on exchange rates. But this is only possible if excess liquidity in the system is removed and the domestic securities market developed through secondary trading outside the CBK.

The need to reduce misalignment in the exchange rate is important in maintaining and restoring of the Kenyan external sector. To the extent that the market players have identified speculation and the continued central bank's intervention in the foreign exchange market as moving away the exchange rate from its fundamental, this could compromise the viability of the of the Kenyan external sector. On the other hand, donor resource disbursement and IMF program announcement affect the direction of the exchange rate. It therefore calls for the government of Kenya to create confidence in the donor community for the disbursement of the budget support funds. A breach of this benchmark could result into depreciation of the exchange rate, which is consistent, with the changes in the fundamentals. The importance of the MFI announcement and the disbursement of the donor flows will continue to be key in determining the direction of the exchange rate as long as Kenya is still dependant on donors to support its budget. Increase in the tax revenue base and export generating activities are therefore key in reducing reliance in donor financing and its implication on the exchange rate.

5.4 Limitations

In summary, improvement in information dissemination and sensitization of the market, the growth of the hedging market and instruments in the foreign exchange together with development of the domestic securities would go a long way in reducing volatility in the exchange rate. This is expected to increase the assimilation of information in the market expectation and improve efficiency of both domestic and foreign exchange market. The inefficiency in the market is what brings about the intervention of the central bank in Kenya. The CBK interventions in the market therefore result in the reduction of volatility of the exchange rate.

5.5 Recommendations for Further Research

The study set out to determine the impact of central bank interventions on foreign exchange rate volatility in Kenya. Left out are the causes of volatility in the exchange rate in Kenya. Need has been created, therefore, for the study on the possible causes of the volatility in Kenya. The results would be used to support this study as it would explain the causes of volatility in Kenya.

Volatility of exchange rate affects various firms that do transaction in foreign currencies. These firms could include those which do imports and exports. It is therefore important to study conclusively the impact of foreign exchange rate volatility on performance of these firms in Kenya. Minimal usage of foreign exchange management techniques by the firms that are directly impacted by the volatility of exchange rate. It should be noted that that several factors act in unison or severally to determine the prevailing exchange rate level. The concerned firms do not have control on these factors yet their impact may have

sudden and catastrophic repercussion on their financial health. A need for a shield against such impacts goes without say. Thus the reason why the affected firms have not implemented the use of such hedges should be investigated.

REFERENCES

Abor, J. (2005), Managing foreign exchange risk among Ghanaian firms, *Journal of Risk Finance*, 6(.4), 306-18.

ACCA, (2007).Foreign exchange and Interest rate risk**.** *Strategic Financial Management, Study text Paper* 3(.7),422-424.

Adler, M. and Dumas, B. (1984).Exposure to Currency Risk: Definition and Measurement. *Financial Management,* 13 (2), 41-50.

Akrom, R. K. (1974). Top level approach to the foreign exchange problem. *Harvard Business Review, 26(3),* 79-90.

Al Janabi, M.A.M. (2005).Trading risk management: practical applications to emerging-markets, in Motamen-Samadian, S. (Eds*), Risk Management in Emerging Markets, Palgrave/MacMillan, pp.91-136.*

Al Janabi, M.A.M. (2005b).*Quantitative analysis of the Mexican stock market: proactive relevance to market risk management,* Proceedings of the Spring Conference of the International Academy of Business and Public Administration Disciplines (IABPAD)

Al Janabi, M.A.M. (2007), Equity trading risk management: the case of Casablanca stock exchange, International *Journal of Risk Assessment and Management*, special issue on "Flexibility and risk management", International Journal of Risk Assessment and Management, 7(4), 535-568.

Allayannis, G., Ihrig, J., and Weston, J.P.. (2001). Exchange rate hedging: Financial versus operational strategies, *American Economic Review*, 91. (2), 391-395.

Allayannis, G. and Ofek, E. (1997).*Exchange rate exposure, heading, and the use of foreign currency derivatives* .NewYork: school of Business Virginia University.

Allayannis, G. and Ofek, E. (2001).Exchange rate exposure, hedging, and the use of foreign currency derivatives, *Journal of International Money and Finance*, Vol. 20(3),273-96.

Allen, S.L. (2003). *Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk,* Hoboken: New Jersey: Wiley.

Amihud, Y. (1993). *Evidence of exchange rates and the valuation of equity shares*. Illinois: Irwin.

Bank of America Corporation, (2007**).***Global Foreign Exchange portfolio and Risk Strategy.* Monograph series No. 243.

Bank of Jamaica, (1996).*Standards of sound business practices: Foreign exchange risk management,* 12(3), 67-78.

Barton, T.L.,Shenkir, W.G. and Walker, P.L. (2002). *Making Enterprise Risk Management Pay Off: How Leading Companies Implement Risk Management.*(Brookfield, Connecticut: Fei Research Foundation).

Bartov, E. and Bodnar, G.M. (1994).Firm valuation, earnings expectations, and the exchange rate exposure effect. *Journal of Finance,* 49(6), 1755-1785.

Bartov, E.,Bodnar, G.M. and Kaul, A. (1996). Exchange Rate Variability and the Riskiness of U.S. Multinational Firms: Evidence from the breakthrough of the Bretton Woods System, *Journal of Financial Economics,* 42(1), 105-132.

Batten, J., Mellor, R. and Wan, V. (1993). Foreign exchange risk management practices and products used by Australian firms"**.** *Journal of International Business Studies,* 24(3), 557-573.

Belk, P.A. and Glaum, M. (1990).The Management of Foreign Exchange risks in UK Multinationals an Empirical investigation, *Accounting and Business Research,* 2(81), 3-31.

Betts, C. and Devereux, P. (2000).Exchange rate dynamics in a model of pricing-to-market. *Journal of International Economics*, 50(3), 215-244.

Blenman L.P, Lee B., Walker M. (2006). *Measuring Foreign Exchange Exposure in US Multinationals: An Empirical Investigation (1985-1997).*University of North Carolina-Charlotte, Belk College of Business.

Boczko, A. (2005).International payment risk: what are the best methods to ensure that an importer in a territory new to your firm will honor its debts?" *Financial Management*, 12(2), 35-36.

Bodnar, G. and Gebhardt, G. (1998). *Derivatives Usage in Risk Management by U.S. and German Non-Financial Firms: A Comparative Survey*, NBER Working Paper No.
6705 (August), (Cambridge, Massachusetts: NBER).

Bodnar, G. and Gentry, W. (1993).Exchange rate exposure and industry characteristics: evidence from Canada, Japan and the US. *Journal of International Money and Finance*, 15(2), 29-45.

Bodnar, G.M., Hayt, G.S. Marston, R.C. and Smithson, C.W. (1995).Wharton Survey of Derivatives Usage by U.S Non-financial Firms. *Financial Management*,24,(2),104-114.

Carter, D.A.,Pantzalis, C. and Simkins, B.J. (2003).*Firm wide risk management of foreign exchange exposure by US multinational corporations.* US: University of South Carolina.

Chamberlain, S.,Howe, J.S. and Popper, H. (1997). The exchange rate exposure of U.S and Japanese banking institutions. *Journal of Banking and Finance*,21(4),871-892.

Choi, J.J., and Prasad, A.M. (1995). Exchange Risk Sensitivity and its Determinants: A firm and Industry Analysis of U.S. Multinationals**.** *Financial Management*, 24(3),77-88.

Collier, P. and Davis E.W. (1985).The Management of currency transaction risk by UK multinational companies. *Accounting and Business Research* 7(5),327-334.

Collins, M. (2002).Collecting your exporting dollars. *Canada One Magazine*, available at: www.canadaone.com/ezine/april02/exporting.html (accessed May 18, 2005)

Commonwealth Audit Report, Australia November 2003,78-79.

Crabb, P.R. (2003). Foreign exchange risk management practices of microfinance institutions. *Microfinance Journal*, 3(2), 36-45.

De Santis, G. and Gerard, B. (1998).How Big is the premium for Currency Risk?.*Journal of Financial Economics* 49 (3), 375-412.

Dhanani, A. (2000).Risky Business. *Financial Management(CIMA),*5(2),30-31.

Dominguez, K.M. and Tesar, L. (2006).Exchange Rate Exposure. *Journal of International Economics,* 68, (3), 188-218.

Dumas, B. (1978).The Theory of the trading firm revisited. *Journal of Finance,* 33(1), 1099 -1029.

Eichengreen, B. and Haussmann, R (1999*).Exchange rates and financial fragility***.** National Bureau of Economics Research, Working paper No. 7418.

Eiteman, O.K. and Stonehill, A.I. (1979).*Foreign exchange risk Management***:** multinational business finance, 2nd London: Prentice.

Fama, E.F. (1981).Stock returns, Real Activity, Inflation and Money. *Journal of Political Economy*, 84(4), 545-565.

Frey, R. and Stremme, A. (1994).*Portfolio insurance and Volatility***.** Discussions paper 188- Financial markets Group, London School of Economics.

Froot, K. and Thaler, R. (1990).Anomalies: Foreign Exchange**.** *Journal of Economic Perspectives,* 4(3), 179–192.

Gendreu, B.C. (1994). *Comments on exchange rates, the macroeconomic environment, and the firm.* New York, Irwin.

Giddy, I.H. and Dufey, G. (1983).Managing Foreign Exchange Risk**.** *International Financial Management, Review of Financial Studies*,16(2),.214-249.

Goldberg, S.R. and Tritschler, C.A. (1995).Financial Reporting for foreign Exchange Derivatives**.** *Accounting Horizons*, 9(2), 1-15.

Griffin, M..and Stulz, R.M. (2001).International Competition and Exchange Rate Shocks: A Cross-Country industry Analysis**.** *Review of Financial Studies*, 6(3), 215-241.

Hakala, J and Wystup, U. (2002*).Foreign Exchange Risk", Models, Instruments, and Strategies.* London: Risk Publications.

Hassan, A. (2009). Risk management practices of Islamic banks of Brunei Darussalam. *Journal of Risk Finance*, 10 (1), 23-37.

He, J. and Ng, L.K. (1998).The Foreign Exchange Exposure of Japanese Multinational Corporations.*"* *Journal of Finance* 53, (2), 733-753.

Hekman, C.R. (1985). A Financial Model of foreign exchange exposure. *Journal of International Business*, 16(2) , 83-99.

Hentschel, L. and Kothari, S.P. (1997).*Life insurance or lottery: are corporations managing or taking risks with derivations.* Working Paper, University of Rochester, Rochester, NY.

Holton, G.A. (2003). *Value-at-Risk: Theory and Practice*. San Diego, California: Academic

Press.

Hundman, K. (2000). *An analysis of the Determinants of Financial Derivative Use By Commercial Banks.* The park place Economist/Vol. VII pp.83-92.

International Accounting Standard No. 21 (2001**).***Effects of Changes in Foreign Currency Exchange Rates.*

International Accounting Standard No. 29 (2001), *Financial Reporting in Hyperinflationary Economies.*

International Accounting Standard No.39 (2001).*Financial instruments; Recognition and measurement.*

Financial Accounting Standards Board Statement No. 52 (2003).*Foreign currency translation.*

Financial Accounting Standards Board Statement No. 133 (2003).*Accounting for Derivative Instruments and Hedging Activities.*

Jacque, L. (1996).*Management and Control of Foreign Exchange Risk***.** Norwell, Massachusetts: Kluwer Academic Publishers.

Jacque, L.L. (1981). Management of foreign exchange risk: A review article. Journal of International Business Studies, 12 (1), 81-101.

Jorion, P. (1990).The Exchange rate exposure of US Multinationals. *Journal of Business*, 63(2), 331-345.

Jorion, P. (1991).The Pricing of Exchange Rate Risk in Stock Market. *Journal of Financial and Quantitative Analysis*, 16(2),363-376.

Jalilv and, A., Switzer, J.A., Tang, C. (2000).A global perspective on the use of derivatives for corporate risk management decisions. *Managerial Finance,* 26(3), 29-38.

Kamas, H. (2003).Estimation of foreign exchange exposure: An emerging market application. *Journal of Multinational Financial Management,* Vol. 13 pp.71-84.

Karol, B.J. and Stan, J.L (1994).Overview of derivatives as risk management tools. *Journal of Business and Finance*.6 (2), 11-22.

Lam, J. (2003). *Enterprise Risk Management" From Incentives to Controls*. Hoboken, New Jersey: Wiley.

Levi, M. (1994).*Exchange rates and valuation of firms*. New York, Irwin professional publishing.

Lim, Y.C. and Tan, M-S.P. (2007).Value relevance of value-at-risk disclosure", *Review of Quantitative Finance and Accounting*, 29 (3), 353-70.

Logue, E. E. And Oldfield, G. S. (1977).Managing foreign assets when foreign exchange markets are efficient**.** *Financial management* summer, 12(2), 16-22.

Kritzman, M. (1993).The Optimal Currency Hedging Policy with Biased Forward Rates,**"** *Journal of Portfolio Management,* 19 (4), 94-101.

Madura, J. (2004*). International Financial Management*. 7th ed. Boston: South Western Publishing Co.

Makar, S.D. and Huffman, S.P. (1997).Foreign Currency Risk Management Practices in U.S Multinationals. *Journal of Applied Business Research*, 13, (2), 73-86.

Makin, J.H. (1977). Flexible exchange rates multinational corporations and accounting standards**.** *Economic Review*, 13(3), 44-45.

Mathur, I. (1982). Managing Foreign Exchange Risk Profitability. *Journal of World Business*, 17, (4), 23-30.

Martin, A.D. and Mayer, L.J. (2003).Transaction versus economic exposure: Which has greater cash flow consequences? *International Review of Economics and Finance*, 21(1),.1-13.

Menon, S and Viswnathan, K.G. (2005).Foreign Currency Risk Management Practices in U.S Multinationals. *The Journal of International Business and Law*, 4,(1),pp 57-67.

Miller, K.D. and Reuer, J.J. (1998).Firms strategy and economic exposure to foreign exchange rate movements. *Journal of international Business studies*, 29(3), 493-514.

Muller, A. and Verschoor, W.F.C. (2006).Foreign exchange risk exposure: Survey and Suggestions. *Journal of Multi Financial Management* Vol. 16(3), 385-410.

Nauman-Ettiene, R. (1977). Exchange risk in foreign operations of multinational corporations. PhD dissertation, US: University of Michigan.

Nance, D.R., Smith, C.W. and Smithson, C.W. (1993).On the determinants of corporate Hedging**.** *Journal of Finance*, 48(3), 391-405.

Papaioannou, M. (2001).Volatility and Misalignments of EMS and Other Currencies During 1974–1998," in European Monetary Union and Capital Markets. *International Finance Review,* 2(2), 51–96.

Papaioannou, M. and Gatzonas, E.K. (2002).Assessing Market and Credit Risk of Country Funds: a Value-at-Risk Analysis in global risk management. *International Finance Review,* 3(3), 61–79.

Philips, A.L. (1995). Derivatives Practices and Instrument Survey. *Financial Management,*24(2),115-125.

Pringle, J.J. and Connolly, R.A. (1993).The nature and causes of foreign currency exposure. Journal of applied Corporate Finance, 6(3),61-72.

Rakhimova, N. (2000). *Foreign exchange risk Management***.** New York: Creighton University Press.

Schwab, B. And Lusztig, P. (1978).Apportioning foreign exchange risk through the use of third currencies: some questions on efficiency. *Financial Management,* 2 (2), 43-55.

Seow, G. and Tam, K. (2002).The usefulness of derivative-related accounting disclosures. *Review of Quantitative* Finance *and Accounting*, 18 (4), 273-291.

Shapiro, A.C. (2003). *Multinational Financial Management*. London: Allyn and Bacon.

Shapiro, A. C. and Rutenberg, D. P. (1976).Managing exchange risk in a floating world. *Financial management,* 5(3), 48-58.

Simkins, B. and Laux, P. (1997).*Derivations use and the exchange rate risk of investing in large corporation.* Working paper, case Western Reserve University.

Smith, S.W. and Stutz, R.M. (1985).The determinants of Firms hedging policies. *Journal of Financial and Quantitative Analysis,*20(5), 391-405.

Teoh, H.P. and Er, M. (1988).Impact of Floating Exchange rates on Company risk Management Practices: Australian Experience. Working Paper Series No.2, University of Wollongong, Australia.

Treasury Management Association, (1996), Results of the 1996 Survey Questionnaire on

Disclosure of Accounting Policies and Market Risk Relative to Derivative Financial and Commodities Instruments (October).

Van Deventer, D.R. Imai, K. and Mesler, M..(2004*).Advanced Financial Risk Management: Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management*. Hoboken, New Jersey: Wiley.

Walker, A. (1978).*An economic Analysis of Foreign Exchange Risk", Currency Risk Management.* Session paper No.14, 6-30.

Wang, L., Alam, P., Makar, S. (2005).The value-relevance of derivative disclosures by commercial banks: a comprehensive study of information content under SFAS Nos. 119 and 133.*Review of Quantitative Finance and Accounting*, 25(5),413-427.

Williamson, R (2001).Exchange Rate exposure and Competition: Evidence from the Automotive Industry. *Journal of Financial Economics,* 59(4),441-475.

Wihlborg, C. (1978).Currency risks in international markets. International markets. International Finance**,** 44(5), 385-410.

APPENDIX I

Raw Data for Central Bank Intervention on Volatility in Kenya for the Period January 2008 to December

USD

September 2008 to June 2009:

Portfolio balance channel,

Signaling or expectations channel

Order flow channel

May 2010 to July 2011:

Portfolio balance channel,

Signaling or expectations channel

Order flow channel

Sterling Pound

September 2008 to June 2009:

Portfolio balance channel,

Signaling or expectations channel

Order flow channel

May 2010 to July 2011:

Signaling or expectations channel

Order flow channel

GBP

September 2008 to June 2009:

Signaling or expectations channel

Order flow channel

May 2010 to July 2011:

Portfolio balance channel,

Signaling or expectations channel

Order flow channel

Source: CBK 2012

APPENDIX II

Raw Data for Average Monthly Exchange Rate Traded for the Period January 2008 to December 2011

Source: CBK 2012

Month, Year	Currency	Average	End Period
Dec, 2011	United States dollar	86.66	85.07
Dec, 2011	Sterling pound	135.1	131.12
Dec, 2011	Euro	114.15	110.06
Nov, 2011	United States dollar	93.68	89.72
Nov, 2011	Sterling pound	148.17	139.81
Nov, 2011	Euro	127.13	119.53
Oct, 2011	United States dollar	101.27	99.78
Oct, 2011	Sterling pound	159.41	159.56
Oct, 2011	Euro	138.74	139.62
Sep, 2011	United States dollar	96.36	99.83
Sep, 2011	Sterling pound	152.12	155.78
Sep, 2011	Euro	132.68	135.38
Aug, 2011	United States dollar	92.79	93.62
Aug, 2011	Sterling pound	151.9	153.73
Aug, 2011	Euro	133.04	135.94
Jul, 2011	United States dollar	89.9	91.1
Jul, 2011	Sterling pound	145	148.74
Jul, 2011	Euro	128.48	130.16
Jun, 2011	United States dollar	89.05	89.86
Jun, 2011	Sterling pound	144.4	144.62
Jun, 2011	Euro	128.11	130.21
May, 2011	United States dollar	85.43	85.7
May, 2011	Sterling pound	139.54	141.63
May, 2011	Euro	122.42	123.47
Apr, 2011	United States dollar	83.89	83.42
Apr, 2011	Sterling pound	137.14	138.91
Apr, 2011	Euro	121.14	123.74
Mar, 2011	United States dollar	84.21	82.99
Mar, 2011	Sterling pound	136.1	133.64
Mar, 2011	Euro	117.88	117.51
Feb, 2011	United States dollar	81.47	82.36

Feb, 2011	Sterling pound	131.45	132.69
Feb, 2011	Euro	111.29	113.37
Jan, 2011	United States dollar	81.03	81.27
Jan, 2011	Sterling pound	127.7	128.98
Jan, 2011	Euro	108.16	110.61
Dec, 2010	United States dollar	80.57	80.75
Dec, 2010	Sterling pound	125.65	124.77
Dec, 2010	Euro	106.54	107.63
Nov, 2010	United States dollar	80.46	80.97
Nov, 2010	Sterling pound	128.52	125.99
Nov, 2010	Euro	110.07	106.33
Oct, 2010	United States dollar	80.71	80.79
Oct, 2010	Sterling pound	127.98	128.71
Oct, 2010	Euro	112.2	112.13
Sep, 2010	United States dollar	80.91	80.78
Sep, 2010	Sterling pound	125.94	127.85
Sep, 2010	Euro	105.61	109.67
Aug, 2010	United States dollar	80.44	81.07
Aug, 2010	Sterling pound	125.94	125.07
Aug, 2010	Euro	103.79	102.5
Jul, 2010	United States dollar	81.43	80.23
Jul, 2010	Sterling pound	124.34	125.3
Jul, 2010	Euro	103.9	104.88
Jun, 2010	United States dollar	81.02	81.92
Jun, 2010	Sterling pound	119.63	123.19
Jun, 2010	Euro	98.99	100.05
May, 2010	United States dollar	78.54	79.75
May, 2010	Sterling pound	115.2	115.49
May, 2010	Euro	98.79	98.18
Apr, 2010	United States dollar	77.25	77.27
Apr, 2010	Sterling pound	118.51	118.71
Apr, 2010	Euro	103.71	102.45
Mar, 2010	United States dollar	76.95	77.33
Mar, 2010	Sterling pound	115.78	116.52
Mar, 2010	Euro	104.46	103.72
Feb, 2010	United States dollar	76.73	76.9
Feb, 2010	Sterling pound	120.1	117.53
Feb, 2010	Euro	105.09	104.48
Jan, 2010	United States dollar	75.79	75.89
Jan, 2010	Sterling pound	122.53	122.42
Jan, 2010	Euro	108.27	105.86

Dec, 2009	United States dollar	75.43	75.82
Dec, 2009	Sterling pound	122.54	121.89
Dec, 2009	Euro	110.27	108.94
Dec, 2009	Australian dollar	68.2	67.99
Nov, 2009	United States dollar	74.74	74.91
Nov, 2009	Sterling pound	124.14	124.08
Oct, 2009	United States dollar	75.24	75.24
Oct, 2009	Sterling pound	121.65	124.5
Oct, 2009	Euro	111.25	111.62
Sep, 2009	United States dollar	75.6	75
Sep, 2009	Sterling pound	123.57	120.29
Sep, 2009	Euro	110.01	109.69
Aug, 2009	United States dollar	76.37	76.23
Aug, 2009	Sterling pound	126.34	123.45
Aug, 2009	Euro	108.84	108.71
Jul, 2009	United States dollar	76.75	76.61
Jul, 2009	Sterling pound	125.58	126.59
Jul, 2009	Euro	108.02	108.21
Jun, 2009	United States dollar	77.85	77.16
Jun, 2009	Sterling pound	127.22	129.02
Jun, 2009	Euro	109.03	109.06
May, 2009	United States dollar	77.86	78.35
May, 2009	Sterling pound	120.03	125.53
May, 2009	Euro	106.23	109.7
Apr, 2009	United States dollar	79.63	78.66
Apr, 2009	Sterling pound	116.98	116.7
Apr, 2009	Euro	105.08	104.8
Mar, 2009	United States dollar	80.26	80.43
Mar, 2009	Sterling pound	113.98	114.84
Mar, 2009	Euro	104.98	106.42
Feb, 2009	United States dollar	79.53	79.69
Feb, 2009	Sterling pound	114.54	113.85
Feb, 2009	Euro	101.73	101.46
Jan, 2009	United States dollar	78.95	79.54
Jan, 2009	Sterling pound	114.28	113.13
Jan, 2009	Euro	104.85	102.55
Dec, 2008	United States dollar	78.04	77.71
Dec, 2008	Sterling pound	116.53	112.35
Dec, 2008	Euro	105.56	109.48
Nov, 2008	United States dollar	78.18	77.88
Nov, 2008	Sterling pound	119.59	119.76

Nov, 2008	Euro	99.33	100.41
Oct, 2008	United States dollar	76.66	79.65
Oct, 2008	Sterling pound	129.38	130.22
Oct, 2008	Euro	101.67	101.99
Sep, 2008	United States dollar	71.41	73.22
Sep, 2008	Sterling pound	128.58	132.1
Sep, 2008	Euro	102.96	105.28
Aug, 2008	United States dollar	67.68	68.73
Aug, 2008	Sterling pound	127.97	125.94
Aug, 2008	Euro	101.24	101.39
Jul, 2008	United States dollar	66.7	67.32
Jul, 2008	Sterling pound	132.62	133.25
Jul, 2008	Euro	105.41	104.98
Jun, 2008	United States dollar	63.78	64.69
Jun, 2008	Sterling pound	125.27	128.96
Jun, 2008	Euro	99.21	102.16
May, 2008	United States dollar	61.9	62.03
May, 2008	Sterling pound	121.62	122.57
May, 2008	Euro	96.32	96.16
Apr, 2008	United States dollar	62.26	62.14
Apr, 2008	Sterling pound	123.37	122.28
Apr, 2008	Euro	98.08	97.01
Mar, 2008	United States dollar	64.92	62.85
Mar, 2008	Sterling pound	130.08	124.93
Mar, 2008	Euro	100.79	99.2
Feb, 2008	United States dollar	70.62	68.98
Feb, 2008	Sterling pound	138.46	137.1
Feb, 2008	Euro	103.96	104.73
Jan, 2008	United States dollar	68.08	70.56
Jan, 2008	Sterling pound	134.01	140.37
Jan, 2008	Euro	100.16	104.93