

**TESTING OF THE DAY OF THE WEEK ANOMALY ON FOREIGN  
EXCHANGE RATE IN THE FOREIGN ECHANGE MARKET IN  
KENYA**

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## **DECLARATION**

This research project is my original work and has not been presented for a degree in any other University.

Signed..... Date.....

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**D63/70887/2014**

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

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## **DEDICATION**

To my parents for their absolute belief in me.

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## ABBREVIATIONS

<b>CBK</b>	Central Bank of Kenya
<b>EMH</b>	Efficient Market Hypothesis
<b>FOREX</b>	Foreign Exchange
<b>GARCH</b>	Generalized Autoregressive Conditional Heteroscedasticity
<b>KSH</b>	Kenya Shilling
<b>NSE</b>	Nairobi Securities Exchange
<b>PPP</b>	Purchasing Power Parity
<b>S &amp; P</b>	Standard & Poor 500 index
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>US</b>	United States
<b>YEN</b>	Japanese YEN



## **ABSTRACT**

In an efficient market, prices reflect all the market information whether past, publicly held or private information. Investors should therefore expect to make only normal profits by earning a normal rate of return on their investments. There is an interesting contradiction to this hypothesis. This is the day of the week anomaly. Other researchers have called this Monday effect, Friday effect and Weekend effect. There have been observations in Finance Research that stock returns on Mondays are lower than those of other days of the week. Most of the studies done have depicted different results, more so in Kenya, where most studies conducted on the day of the week have concentrated on the stock exchange returns at the Nairobi Securities Exchange. The main objective of the study was to test the day of the week anomaly on foreign exchange rate in the foreign exchange market in Kenya. The research study made use of descriptive research design. This study used secondary data on the daily mean Kenyan Shilling/Dollar exchange rates from January 1, 2011 to December 31 2014 downloaded from the Central Bank of Kenya's website. The US dollar is the most traded currency on the spot market and is the denominator of most business transactions and asset valuations thus selected as a representative for the study. The quantitative data collected was summarized and analyzed using cross tabulations and descriptive statistics. The study found day of the week effect is present in exchange rate in the foreign exchange market in Kenya. It was clear from these findings that Friday recorded the highest mean score than other days of the week over the period studied. The study concludes the Day-of-the-Week has no significant effect in the foreign exchange market in Kenya during the investigated period. The findings of this study suggest that companies as well as individual investors should not consider the day of the week effect in their investment decisions.



# **CHAPTER ONE: INTRODUCTION**

## **1.1 Background of the Study**

In recent years the testing of market anomalies on stock returns has become an active field of research. The day of the week effect implies that the stocks return is not independent of the day of the week in which they are generated. The existence of seasonal behaviour in return and volatility of different international stock exchanges may be considered as an indication of non-integrated financial markets. In recent years the testing of market anomalies on stock returns has become an active field of research in empirical finance. Calendar effect is cyclical anomalies on returns in the financial market, where the cycle is based on the calendar. These effects relate to the difference in returns across different days of the week. The most important calendar anomalies are the January effect, holiday effect and the day of the week effect. The day of the week effect has been documented extensively on foreign exchange (forex) markets (Cornett, Schwarz, & Szakmary, 1995).

One of the central insights of the monetary approach to the exchange rate is the notion that the exchange rate, being a relative price of two assets, is determined in a manner similar to the determination of other asset prices and that expectations concerning the future course of events play a central role in affecting current exchange rates. If the foreign exchange market is efficient and if the exchange rate is determined in a fashion similar to the determination of other asset prices, we should expect current prices to reflect all currently available information.

Expectations concerning future exchange rates should be incorporated and reflected in forward exchange rates (Were, Kamau & Kisinguh, 2013). Fama (1970) defined an efficient market as one in which prices fully reflect all available information. This research proposal assesses the existence of the day of the week anomaly in the Kenya Shilling (KSH) versus United States (US) Dollar foreign exchange market. The researcher shall use the actual mean exchange rate as given by the central bank of Kenya. The study will use the foreign exchange prices on the spot market in Kenya.

### **1.1.1 Day of the Week Anomaly**

An anomaly is an incident that cannot be explained by a prevailing theory (Al-Loughani, Al-Saad & Ali, 2005). In the case of securities markets, anomalies are occurrences that dispute the Efficient Market Hypothesis (Brooks & Persaud, 2001). Existence of anomalies in securities markets can be attributed to several factors, such as variations in seasons or the weather, or changes in liquidity preferences before vacations or holidays.

The securities returns tend to underperform in the summer compared to winter months and to do better on sunny compared to rainy days. Investors sell their securities towards holidays or vacations for liquidity reasons. Anomalies can also be attributed to tax-loss selling late in the financial year (Grinblatt & Markowitz, 2003).

The basic tenet of traditional finance is rational behavior. It means an individual is assumed to be always rational in making decision. An individual is assumed to have an objective and purpose in achieving his/her utility (Thaler, 1990). In modern finance theory, market efficiency is not only determined by the information adjustment acceleration, but also how the market fully reflects all available information (Fama, 1970).

As one of the evidence of the violation of rational behaviour and hardly to be explained by using market efficiency, the day of the week has been explored extensively. The day of the week is an anomalous condition in stock market where the returns in certain day are dispersing highly compared with other days. It indicates the irrationality of investor in trading. This anomalous condition violates the main assumption in finance, which is rational behaviour implying the inability of conventional finance theory to explain the phenomenon (Dimson & Marsh, 2001). Much research on the day of the week effect has examined the explanation beyond this anomaly with other approaches.

### **1.1.2 Foreign Exchange Rate**

An exchange rate is the price of one currency in terms of another (Mishkin, 2008). It can either be direct or indirect whereby a direct quotation refers to how much of the home currency is required to buy a unit of the foreign currency while an indirect quotation refers to how many units of the foreign currency can be obtained for a unit of the home currency.

Exchange rates can also be spot or forward (Taylor, 2001). The spot exchange rate refers to the current exchange rate whereas forward exchange rate refers to an exchange rate that is quoted and traded today but for delivery and payment on a specific future date. According to Mishkin (2008), the exchange rates are determined in the foreign exchange market, which is open to a wide range of different types of buyers and sellers where currency trading is continuous.

According to Choi and Prasad (1995), the most used exchange rate regimes are free floating, managed floating and fixed exchange rate regimes. In free floating system the exchange rate is formed under the influence of the market demand and supply and may vary significantly in size.

The size of the demand for foreign exchange is determined by the needs of the country in imports of goods and services, tourist spending in the country, demand for foreign financial assets and demand for foreign currency in connection with the intentions of residents to invest abroad. In managed floating system, besides supply and demand, the central banks of the country have a strong impact on value of exchange rate, as well as various temporary market distortions. A fixed exchange rate or pegged exchange rate is a type of exchange rate regime where a currency's value is matched to the value of another single currency or to a basket of other currencies. As the reference value rises and falls, so does the currency pegged to it.

### **1.1.3 The Day of the Week Anomaly and Foreign Exchange Rates**

Poshakwale (1996) defined day of the week effect as the existence of a pattern on the part of exchange rate returns, whereby these returns are linked to a particular day of the week. He noted that such a relationship has been verified mainly in the US, where the last trading days of the week, particularly Friday are characterized by positive and substantial returns while Monday the first trading day differs from the other days by producing negative returns. The presence of such an effect would mean that equity returns are not independent of the day of the week which is evidence against random walk theory.

Cabello and Ortiz (2002) demonstrated that there are differences in distributions of stock returns in each of the days-of-the-week. Accordingly, the average return on Monday is significantly less than the average return during the other days-of-the-week. Whereas, according to the Efficient Market Hypothesis, the expected daily returns on stocks are the same for all days-of-the week.

A rise in the exchange rate of a country's currency means that the home currency has weakened thus low returns from the exchange of the currencies while a fall in the value of the home currency is reflected in a fall in the exchange rate, hence higher returns in the currency exchange.

#### **1.1.4 Foreign Exchange Market**

Exchange rates are determined in the foreign exchange market, which is open to a wide range of different types of buyers and sellers where currency trading is continuous. The demand and supply of currencies is price driven and at any point in time, a currency should exhibit the price at which the demand is equal to that currency in order to represent the equilibrium exchange rate. Authorized commercial banks and foreign exchange bureaus are licensed to transact in the spot market. There is an interbank (wholesale) spot market and also a retail spot market in which banks and foreign exchange bureaus function as market makers for individuals and businesses. Conditional on approval by the Central Bank of Kenya (CBK), commercial banks can also enter into forward contracts for foreign exchange, Mishkin (2008).

The exchange rate of the currency in which a portfolio holds the bulk of its investments determines that portfolio's real return. In Kenya, the Nairobi Securities Exchange supports trading, clearing and settlement of equities and debt. A declining exchange rate decreases the purchasing power of income and capital gains derived from any returns. Moreover, the exchange rate influences other income factors such as interest rates, inflation and even capital gains from domestic securities. While exchange rates are determined by numerous complex factors that often leave even the most experienced economists flummoxed, investors should still have some understanding of how currency values and exchange rates play an important role in the rate of return on their investments and whether these returns vary depending on the day of the week (Mishkin, 2008).

The foreign exchange market plays a vital role in the economic development of a nation, since they facilitate trade through provision of the much needed currencies in ensuring the exchange of goods and services. The foreign exchange market in Kenya is influenced by a number of factors the major being the performance and the nature of current economic situations in the country.

The economic situation is reflected by the changes in the macroeconomic variables such as the level of the Gross Domestic Product, interest rate levels, inflation, the amount of money supply in the economy, unemployment rates, government policies and activities of the government such as elections (Kaminchia, 2014).

## **1.2 Research Problem**

Finance academicians and practitioners have for decades been interested in the implications of the day-of-the-week effects. The day of the week effect, one of the documented anomalies, has revealed that security returns tend to be significantly higher in some days of the week relatively to other days of the week (Gerald, Vivek & Ninon 2006). Investors are not guaranteed of “good” returns simply because the firm’s earning power has grown. Rather, the time (day, week or month) can also determine the investors return including returns from the depreciation or appreciation of the exchange rates. A prominent paper about the day-of-the-week effect was written by French (1980). He found out that stocks in the U.S. tend to exhibit relatively large returns on Fridays compared to those on Mondays. This finding contradicts the Efficient Market Hypothesis (EMH) which states that average returns are similar for all the trading days in a week, hence the importance of this study to establish the existence of the day of the week effect in the Kenya Shilling/United States Dollar foreign exchange market.



Foreign exchange market inefficiency is one of the main sources of economic instability around the world and can lead to a depressed international trade. This is because prices of foreign assets, goods and factors of production are influenced by the change in exchange rates. Foreign exchange market volatility with its massive impacts on real economy, international trade, and other financial markets ultimately determines the gains or losses through changing exchange rates. The Kenya shilling has in the recent past been highly volatile against the major world currencies. This has created an increasing interest by the general public, exporters, importers and multinational companies as it directly or indirectly affects their income. The volatility has also posed a challenge for the policy makers while using the fiscal and monetary policies to affect the exchange rates (Ndung'u, 2001).

There are researches on the day of the week effect both internationally and locally. Internationally, Flannery and Portopapadakis (1988), Tang (1997) and Yamori and Mourdoukows (2003) investigated stock, bond and foreign exchange markets detecting the presence of the day of the week effect while Al-jafari (2011) results showed no significant differences in the returns during the days of the week. Locally, most studies conducted on the Kenya stock market found that the day of the week effect existed, Mokuu (2003), Elima (2007) Onyuma (2009) and Rutto (2014). Mwambi (2012) investigated the existence of the day of the week effect on the Kenyan/United states Dollar market where the results showed non existence of the day of the week effect.

It is important to know whether there are variations in volatility of forex rate returns by the day of the week and whether a high (low) return is associated with a correspondingly high (low) volatility for a given day. If investors can identify a certain pattern in volatility, then it would be easier to make investment decisions based on both return and risk. For example, Engle (1993) argues that investors who dislike risk may adjust their portfolios by reducing their investments in assets whose volatility is expected to increase.

Uncovering certain foreign exchange volatility patterns might also benefit investors in valuation, portfolio optimization, option pricing, and risk management. Most of the studies done in Kenya have depicted different results. Most studies conducted on the day of the week effect have concentrated on its effects on the market returns in the Nairobi securities exchange. Given the inconsistencies of results of studies in this subject in Kenya and the lapse of time since the last investigation on this phenomenon, this study used the most current data to build on works previously done by trying to clear the doubts on the existence of the day of the week anomaly in the Kenya Shillings/United states Dollar foreign exchange market.

### **1.3 Objective of the Study**

To analyse whether the day of the week effect exists in the Kenya shilling versus United States dollar foreign exchange market.

## **1.4 Value of the Study**

This study will benefit investors to devise better trading strategies to maximize their returns based on the days of the week. By understanding the currency volatility and ability to accurately focus exchange rate patterns, investors will be able to design more profitable investment strategies.

Policy makers like the Government through the Central Bank of Kenya will also benefit from the findings of this research. CBK will be in a better position to formulate trading rules and regulations which encourage market growth and development especially that of financial institutions and forex bureaus.

The study will make a great contribution to the existing literature for use by academicians and finance practitioners in Kenya and the entire world as will form the basis for future researchers and academicians who may be examining anomalies in the foreign exchange market.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter is divided into three sections: theoretical framework, review of empirical studies and a summary of literature review.

### **2.2 Theoretical Framework**

This section discusses the theory on Efficient Market Hypothesis, the Random Walk theory and the Purchasing Power theory.

#### **2.2.1 Efficient Market Hypothesis**

According to Fama (1970), an efficient market is a market where prices fully reflect the information available, such that an unusual profit cannot be earned through this information set (informational efficiency); puts available funds to their best possible uses (allocative efficiency) and undertakes transactions at least avoidable cost (operational efficiency). According to Jensen (1978), a market is efficient with respect to information set if it is impossible to make economic profit by trading on the basis of information set. By economic profit, we mean the risk adjusted returns net of all costs.

Literature on finance presents three different forms of informational efficiency in stock market: weak-form, semi-strong form, and strong form based on set of information reflected in security prices (Fama, 1970; Jensen, 1978).

In the weak form, the information set is taken to be solely the information contained in the past price history of the market as of time  $t$  whereas in the semi strong form is taken to be all information that is publicly available at time  $t$  such as published financial data about companies, government data about economy, earnings estimates disseminated by companies and security analysis. This includes the past history of prices so that the weak form is just a restricted version (Fama, 1970; Jensen, 1978).

According to Stiglitz (1981), market efficiency (informational efficiency) used by financial economists is only a part of overall market efficiency. This requires that, the market must provide the correct incentives for gathering the right amount and kind of information, the market prices must reflect the information available to the various traders, and the firms must be able to convey the information efficiently about their prospects to potential investors. Seyhum (1986) provides sufficient evidence that insiders profit from trading on information not already incorporated in prices.

This hypothesis implies that investors who base their decision on any important new information after it is public should not derive above average risk-adjusted profits from their transactions, considering the cost of trading because the security price already reflects all such new public information (Mishkin, 2008). Finally, in a strong form the information set is taken to be all information known to anyone at time  $t$  including even insider information such as imminent corporate takeover plans and extraordinary positive and negative future earnings announcements.

### **2.2.2 Random Walk Theory**

The efficient market hypothesis is inseparably related to the random walk theory. Proponents of the random walk theory follow the idea that stocks take a random and unpredicted path. They assert that it is impossible for an investor to outperform the market without assuming an additional risk commensurate with the abnormal gains. On the other hand, critics of the theory contend that prices do maintain a particular trend over time and it is therefore possible to outperform the market by carefully selecting the entry and exit points. The theory starts with the premise that the major security markets are efficient markets where profit maximizing participants are not only actively competing with each other but are trying to predict the future market values of individual securities, Fama (1965). The markets are assumed to be so efficient that all information is available freely to all the participants. The competition among the many intelligent participants results to a situation where the current market prices of a security are a good estimate of the intrinsic value of that particular security.

From the basis of an uncertain world, participants will not agree on the intrinsic value of a security. As such, the actions of competing participants in an efficient market should cause the market prices to wander randomly around the intrinsic value. Where the difference between the intrinsic and the actual value of a security is systematic, then the intelligent market participant's privy to this knowledge will try to take advantage of this situation consequently neutralizing the systematic behavior. Arising from this therefore is the assumption that though the uncertainty pertaining to the intrinsic value of the security will persist, the actual value will wander randomly around the intrinsic value (Lakonishok & Smidt, 1988).

Bachelier (1964) put forward the idea that security prices follow random walk where random walk is used to refer to successive price changes being independent of each other so that past price movements cannot be used to predict future prices. This in itself implies that no trend can be derived from observing security prices over time.

### **2.2.3 Purchasing Power Parity**

This theory was founded on the law of one price which is held to be true in the absolute version. Purchasing Power Parity (PPP) states that exchange adjusted price levels should be identical worldwide, that is a unit of home currency should have the same purchasing power around the world. The theory basis its prediction of exchange rate movements on the changing patterns of trade due to different inflation rates between countries.

Mishkin, (2008) argue that exchange rates tend to move to levels at which the cost of goods in any country is the same in the same currency. If PPP holds for exchange rates, all goods cost the same in the same currency in all countries therefore there is no net saving from buying goods in one place rather than in another. The absolute form of PPP is based on the notion that without international trade barriers and transport costs, consumers shift their demand to wherever prices are low; suggesting that prices of the same basket of products in two different countries should be equal when measured in a common currency.

If one currency is undervalued, goods produced in that country tend to cost less than similar goods produced elsewhere therefore growing exports and diminishing imports unless trade barriers, transportation costs or the perishability of products makes it feasible for people to buy the same products in various places. It is in effect the application of the law of one price to national levels.

## **2.3 Determinants of Foreign Exchange Rates**

Like any price, exchange rate deviates from the valuation basis - the purchasing power of currencies - under the influence of demand and supply of currency. The correlation of such supply and demand depends on several factors (Choi & Prasad, 1995).

### **2.3.1 Interest Rates**

Inflation and interest rates are highly correlated. Higher inflation generally means higher interest rates in an economy. Hence, high interest rate also becomes a factor for the changes in exchange rate. Interest rate is the tool used by the central bank of a country to keep a check on any major currency fluctuation. The central bank can also try to keep the exchange rate under a targeted range by manipulating the interest rates. Higher interest rates bring in more investment from overseas as the returns are higher than countries with low interest rates (Bowe & Saltvedt, 2004).

An increase in interest rate is necessary to stabilize the exchange rate depreciation and to curb the inflationary pressure and thereby helps to avoid many adverse economic consequences (Calvo & Reinhart, 2000). The high interest rate policy is considered important for several reasons.



Firstly, it provides the information to the market about the authorities' resolve not to allow the sharp exchange rate movement that the market expects given the state of the economy and thereby reduce the inflationary expectations and prevent the vicious cycle of inflation and exchange rate depreciation. Secondly, it raises the attractiveness of domestic financial assets as a result of which capital inflow takes place and thereby limiting the exchange rate depreciation. Thirdly, it not only reduces the level of domestic aggregate demand but also improves the balance of payment position by reducing the level of imports (Devereux & Engel, 2003).

The three major explanations of inflation include fiscal, monetary, and balance of payments aspects. While in the monetary aspect inflation is considered to be due to an increase in money supply, in the fiscal aspect, budget deficits are the fundamental cause of inflation in countries with prolonged high inflation. However, the fiscal aspect is closely linked to monetary explanations of inflation since government deficits are often financed by money creation in developing countries. In the balance of payments aspect, emphasis is placed on the exchange rate. Simply, the exchange rate collapses bring about inflation either through higher import prices and increase in inflationary expectations which are often accommodated or through an accelerated wage indexation mechanism (McCallum & Nelson, 2000).

### **2.3.2 Inflation**

A low inflation rate scenario will exhibit a rising currency rate, as the purchasing power of the currency will increase as compared to other currencies (Duarte & Stockman, 2002). Generally, the inflation rate is used to measure the price stability in the economy.

Conceptually, the inflation can be divided into two sides, namely: demand side inflation (demand pull inflation) and supply side inflation (cost push inflation). For open-economy countries, inflation comes from domestic factors and also overseas factors. The sources of external factors are the increase in the world commodity prices or exchange rate fluctuation. The influence of exchange rate towards inflation itself depends on the choice of exchange rate regime in the country. Exchange rate system has an important role in reducing or minimizing the risk of fluctuations in exchange rates, which will have an impact on the economy. Any changes in exchange rates will have a great impact on the economy (Eichengreen, 2004).

According to Engle (1993) in the system of floating exchange rates, exchange rate fluctuations can have a strong impact on the level of prices through the aggregate demand and aggregate supply. On the aggregate supply, depreciation of domestic currency can affect the price level directly through imported goods that domestic consumers pay. However, this condition occurs if the country is the recipient countries of international prices. Non direct influence from the depreciation of currency against the price level of a country can be seen from the price of capital goods imported by the manufacturer as an input. The weakening of exchange rate will cause the price of inputs more expensive, thus contributing to a higher cost of production.

Inflation is the term used to describe a rise of average prices through the economy. It means that money is losing its value. The underlying cause is usually that too much money is available to purchase too few goods and services, or that demand in the economy is outpacing supply. In general, this situation occurs when an economy is so buoyant that there are widespread shortages of labour and materials. People can charge higher prices for the same goods or services.

Inflation can also be caused by a rise in the prices of imported commodities, such as oil. However, this sort of inflation is usually transient, and less crucial than the structural inflation caused by an over-supply of money (Fraga, Goldfajn & Minella, 2003).

Generally, the inflation rate is used to measure the price stability in the economy. Conceptually, the inflation can be divided into two sides, namely: demand side inflation (demand pull inflation) and supply side inflation (cost push inflation). For open-economy countries, inflation comes from domestic factors (internal pressure) and also overseas factors (external pressure). The sources of external factors are the increase in the world commodity prices or exchange rate fluctuation. The influence of exchange rate towards inflation itself depends on the choice of exchange rate regime in the country. Exchange rate system has an important role in reducing or minimizing the risk of fluctuations in exchange rates, which will have an impact on the economy. Any changes in exchange rates will have a great impact on the economy (Fung, 2002).

### **2.3.3 Current Account Deficits**

The current account is the balance of trade between two countries. It reflects all payments and receipts between the two countries for goods, services, interests and dividends. A negative balance of payment or a deficit in the current account shows that the country is importing or spending more on foreign trade than it is exporting or earning from abroad. This means that the country requires more foreign currency than it receives from its exports. This excess demand for foreign currency lowers the country's exchange rate (Taylor, 2001).

A country can reduce its current account deficit by increasing the value of its exports relative to the value of imports. It can place restrictions on imports, such as tariffs or quotas, or it can emphasize policies that promote exports, such as import substitution industrialization or policies that improve domestic companies' global competitiveness. The country can also use monetary policy to improve the domestic currency's valuation relative to other currencies through devaluation, since this makes a country's exports less expensive (Taylor, 2001).

### **2.3.4 Unemployment Rate**

The unemployment rate is another factor that can influence the exchange rate. A relation that can reveal a connection between the unemployment rate and the exchange rate is given by the number of available workplaces. If the number of available workplaces is consistent, then this represents a signal of the economic growth, thus the companies need to hire more personnel to handle the consumer needs (Shambaugh, 2004).

Rising unemployment rates tend to decrease investor sentiment and consumer confidence. Unemployment is one of the most important economic indicators, and it correlates to a wide variety of measures. When unemployment rates increase, consumers begin to cut spending and slow down on investing. Businesses react to a decline in spending by reducing costs by not expanding or hiring. In some cases, they may let go of workers. All of these should be examined to gain a better understanding of the health of the labor market (Shambaugh, 2004).

## **2.4 Review of Empirical Studies**

French (1980) demonstrated empirically that Monday yields were lower than Friday ones for the Standard & Poor (S&P) 500 Index. His findings revealed that both lowest mean return and highest variance occur on Monday offering a poor risk–returns relationship compared to those of the other days of the week. He compared Monday, Friday and weekly average returns for the same index. He observed that Monday returns were lower than the average while Friday returns were greater than the average.

Flannery and Protopapadakis (1988) detected the presence of the day of the effect in the stock and bond markets. Using daily S&P 500 and Treasury security closing price (yield) data from mid-1977 through mid-1984, the two authors investigated the extent to which intra-week seasonality existed and whether its pattern was uniform across three stock indices and Treasury bonds with seven different maturities. They found out that intra-week seasonality continues to be significant and that its pattern was not uniform, either between the stock indices and the Treasury bonds or even among the bonds alone.

Tang (1997) investigated the interaction between diversification and day-of-the-week effects on exchange risks in six foreign currencies. He found that different days in week have significant impact on the diversification of foreign currency risk, especially on skewness and kurtosis. According to his results, both the skewness and kurtosis are unsystematic and they keep on changing, in both value and sign over different days in the week.

Yamori and Mourdoukow (2003) investigated the day of the week effect for the Japanese Yen (YEN)/US dollar exchange rate. They reported the presence of the day of the week effect for the 1973–1989 periods. They further argued that the day of the week effect disappeared in the 1990s, an occurrence they ascribed to the financial deregulation in Japan that increased the efficiency of the financial markets.

Mokua (2003) sampled 43 companies listed in the Nairobi Securities Exchange (NSE) continuously for 5 years from 1<sup>st</sup> April 1996 to 31<sup>st</sup> March 2001. Secondary data was obtained daily on transaction prices extracted from NSE records. The data collected was analyzed using linear regression and comparison of mean done under independent sample t test. His study concluded that Monday returns are not significantly lower than the other days nor are Friday returns significantly higher than the other days of the trading week.

Muhoro (2005) examined the presence of locational and triangular arbitrage in the currency market. Muhoro used data in form of daily closing counter foreign exchange rates for six banks and fifty seven bureaus. The data was analyzed using chi- square and line graphs. The research concluded that the foreign exchange market was not efficient due to the existence of arbitrage opportunities for both bureaus and banks.

Elima (2007) studied the reverse weekend effect in the Nairobi stock exchange market. The data for the study consisted of daily stock returns of 32 sampled companies listed on the NSE from 1st January 2001 to 31st December 2005. The data was split into two sub samples for large and small companies and analyzed using regression analysis. The study found out that Monday returns are highly significant though their coefficient was not positive, hence there was no day of the week effect at the Nairobi stock exchange market.

Onyuma (2009) investigated the presence of the day of the week effect and month of the year effects on the Kenyan Stock Market returns. Data on prices and adjusted returns were derived from the NSE 20 index for the period 1980 to 2006 and analyzed using regression analysis. Results indicated that Mondays produced the lowest negative returns, while Friday and January produced the largest positive returns thus confirming the day of the week effect in the NSE.

Al-Jafari (2011) investigated the impact of the global financial crisis on the monthly effect of returns of Bahrain stock market. The study employed daily returns of Bahrain All Share Index from 1 January 2003 to 31 July 2011. The sample was tested by using the equality for means tests (F-test, Chi-square test, and Kruskal-Wallis test) and the equality for variance tests (Bartlett test, Levene test, and Brown- Forsythe test). The results showed that there were no significant differences of the monthly effect for daily returns of the Bahrain stock market before the occurrence of the global financial crisis and during the period of the financial crisis.

Mwambi (2012) conducted a study to assess the day of the week effect in the Kenya Shilling Versus Us Dollar foreign exchange market using data over the period, July 2, 2007 and June 29, 2012. The study used the GARCH (1, 1) framework to estimate the presence of such day of the week effect in the mean and volatility of the foreign exchange returns. The study revealed that the average returns and standard deviation on each day of the week varied. The results further revealed absence of the day-of-the-week effect in both the exchange rate return and volatility equation. However, there were signs of Tuesday effect in the volatility equation.

Murigu (2014) carried out a study on the relationship between bond returns and the day of the week at the Nairobi Securities Exchange. Daily bond prices from the Nairobi Stock Exchange were analyzed and their mean returns used to determine the existence of the day of the week effect on bond returns at the NSE. The population of interest in the study consisted of eleven firms which had issued bonds at the NSE as at 31st December 2013. Their mean returns were used to investigate the relationship between the day of the week and bond returns at the NSE. The results showed a significant relationship between the bond market return and the five days of the week. The study further concluded that Tuesday had the highest return than any other day of the week. Wednesday on the other hand had the lowest negative return compared to other days.

Rutto (2014) conducted a study at the Nairobi Securities Exchange to establish the existence of the Monday effect on stock returns. The study sampled the counters constituting the 20 share index owing to their 80% contribution to total volumes trading at the NSE. The study adopted the descriptive study methodology and employed the logarithmic mean to establish the average returns. The daily stock closing prices were used in computing the mean returns while the daily average returns were used in the comparison of the performance of each day. Basic descriptive statistics such as the mean, median, standard deviation, kurtosis and skewness was used in analyzing the behaviour of stock prices during days of the week. The results of the study showed that the lowest returns are recorded on Tuesdays while the highest returns are recorded on Fridays. The recorded trend showed that the stock prices hit the highest price on Fridays, and recorded a dip on Mondays. The results further showed that the daily returns between Monday and other days of the week are statistically significant.



## **2.5 Summary of Literature Review**

It has been well documented in finance literature that any predictable pattern in returns may be exploitable and judged as evidence against the Efficient Market Hypothesis. One statistically significant pattern in exchange rates stems from seasonality. As such, these effects in currency markets have attracted much interest and numerous researchers have studied daily seasonal anomalies in the foreign exchange market.

For a long time such effects were noted but largely dismissed as anomalies; deviations or departures from the norm. It was not until prospect theory of Kahneman and Tversky (1979) found its way to the financial economics literature that an alternative logic of investors' behavior has been seriously contemplated and tested. This literature is referred to by its practitioners as behavioral finance.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter sets out the research methodologies that were used to meet the objectives of the study. This includes the research design, population, data and data collection, data analysis, data validity and reliability.

### **3.2 Research Design**

Research design constitutes the basis for collection, measurement and analysis of data. The study took the form of a descriptive research design. Kombo and Tromp (2006) stated that descriptive studies are not only restricted to fact findings, but may often result in the formulation of important principles of knowledge and solution to significant problems.

The design serves a variety of research objectives such as descriptions of the characteristics associated with the subject population, measurement, classification, analysis, comparison and interpretation of daily foreign exchange rate returns. The descriptive research design enabled an easy analysis of the huge data from the Central bank website by reducing the ambiguity of the research evidence and ensuring that the evidence answers the research question.

### **3.3 Data and Data Collection**

The study used secondary data on the daily mean Kenyan Shilling/Dollar exchange rates from January 1, 2011 to December 31 2014 downloaded from the Central Bank of Kenya's website as

the US dollar is the most traded currency on the spot market and is the denominator of most business transactions and asset valuations.

### **3.4 Data Analysis**

The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study. The quantitative data collected was summarized and analyzed by using cross tabulations and descriptive statistics.

The results of data analysis is presented by the use of tables to display information that is obtained from the CBK. The study has used tests of significance tools mainly Analysis of Variance, Coefficient of determination ( $R^2$ ), Correlation coefficient (R) and the F statistic to test the different relationships between the variables in the study.

According to Lanterback and Ungar (1995), the lognormal returns follow the normal distribution more closely than the arithmetic mean.

The natural log of daily mean exchange rate was used to measure daily returns as follows:-

$$R_t = \log(e_t/e_{t-1}), \quad (1)$$

Where  $R_t$  is the return on the exchange rate at time  $t$ ,

$e_t$  is the closing mean Kenyan shilling /dollar exchange rate at time  $t$  and

$e_{t-1}$  represent opening mean Kenyan shilling/dollar exchange rate at time  $t - 1$ .

Regression analysis was used to regress Tuesday to Friday against the remaining day of the week, to determine the positive and negative returns in the days of the week.

$$R_t = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \varepsilon_t \quad (2)$$

Where:

$R_t$  is the return day  $t$  calculated using equation (1) above,

$\beta_0$  = Intercept that is the value of  $R_t$  when all predictor variables take the value of zero

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  = the mean return for each day of the week

$D_1 - D_5$  = Are dummy variables such that

$D_1 = 1$  if  $t$  is a Monday and  $D_1 = 0$  for all other days

$D_2 = 1$  if  $t$  is a Tuesday and  $D_2 = 0$  for all other days

$D_3 = 1$  if  $t$  is a Wednesday and  $D_3 = 0$  for all other days

$D_4 = 1$  if  $t$  is a Thursday and  $D_4 = 0$  for all other days

$D_5 = 1$  if  $t$  is a Friday and  $D_5 = 0$  for all other days

$\varepsilon_t$  = Error term at time  $t$

## **CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION**

### **4.1 Introduction**

This chapter sets out analysis and findings of the study as set out in the research objectives and methodology. The study findings are presented on for the analysis on whether the day of the week effect exists in the Kenya shilling versus United States dollar foreign exchange market. The chapter discusses the descriptive statistics, the correlation analysis and the regression results from ordinary least squares estimates. The analysis was done in sections 4.4, 4.5 and 4.6 below.

### **4.2 Response Rate**

The study used the mean exchange rate downloaded from the Central Bank of Kenya for the period of four years (2011 to 2014). All the data needed for the study was obtained hence the response rate was 100% and was sufficient for the study.

### **4.3 Data Validity**

Data validity refers to the correctness and reasonableness of the data. All the data was collected from the Central Bank of Kenya hence accurate and valid.

### **4.4 Descriptive Statistics**

The study analysis established the descriptive statistics shown in table 4.1.

**Table 4.1: Descriptive Statistics**

	<i>D1</i>	<i>D2</i>	<i>D3</i>	<i>D4</i>	<i>D5</i>
Mean	0.0001	0.0001	0.0002	0.0002	0.0002
Standard Error	0.0008	0.0008	0.0009	0.0009	0.0008
Median	-0.0007	-0.0008	-0.0008	-0.0008	-0.0006
Standard Deviation	0.0111	0.0119	0.0127	0.0124	0.0118
Kurtosis	8.4508	12.0383	11.8308	9.4464	8.3626
Skewness	1.5134	1.2145	1.3018	1.9689	1.5724
Minimum	-0.0367	-0.0604	-0.0618	-0.0398	-0.0422
Maximum	0.0624	0.0633	0.0660	0.0671	0.0588

**Source: Research Findings**

The findings revealed that the data used had little variations as shown in the table above. In particular, the mean was 0.0001 for Monday and Tuesday, 0.0002 for Wednesday, Thursday and Friday during the period of study.

The standard deviation was 0.0111, 0.0119, 0.0127, 0.0124 and 0.0118 for Monday to Friday. The study also showed that mean values for the variables Monday, Tuesday, Wednesday, Thursday and Friday were all higher than their medians thereby indicating substantial concentration in a subset of firms with Monday. The low values for skewness and kurtosis for Monday, Tuesday Wednesday, Thursday & Friday, were deemed acceptable for normal distribution. The positive kurtosis reported indicates a flatter distribution than the normal distribution.

An investor should not only be concerned about variations in asset returns but also on the variances in the returns. The standard deviation for all reported days of the week shows a variance of the possible rates of return around the expected rate of return.

Thursday had the highest standard deviation of 0.0127 while the lowest standard deviation was reported on Monday at 0.0111. The results also show that late days of the week had higher standard deviation compared to earlier days of the week. Again, the signs of the findings are in line with the day of the week effect on the return variance.

#### 4.5 Correlation Analysis

The study analysis conducted correlation analysis. Table 4.2 shows the correlation relationship between the study variables.

**Table 4.2: Correlation Analysis**

	<i>D1</i>	<i>D2</i>	<i>D3</i>	<i>D4</i>	<i>D5</i>
D1	1				
D2	0.13798	1			
D3	0.12117	0.90592	1		
D4	0.10274	0.7791	0.87167	1	
D5	0.09702	0.59632	0.68702	0.82281	1

**Source: Research Findings**

In table above, the findings showed that the foreign exchange returns and day of the week are positively correlated with correlations coefficient at about 0.13798, considered low correlation. The result from control variables, Tuesday 0.13798, Wednesday 0.12117, Thursday 0.10274 and Friday 0.09702 suggested that there was positive correlation between them and the independent variable, Monday.

#### 4.6 Regression Analysis and Hypothesis Testing

In addition to the above analysis, the researcher conducted a multiple regression analysis so as to test the relationship among independent variables. The researcher applied the excel regression to aid in computation of the measurements of the multiple regressions for the study.

This indicated that other factors apart from the day of the week affect foreign exchange rates.

The findings are as shown in the table below.

**Table 4.3: Regression Statistics**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.1423							
R Square	0.0203							
Adjusted R Square	0.0001							
Standard Error	0.0111							
Observations	199.0000							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	4.0000	0.0005	0.0001	1.0031	0.4071			
Residual	194.0000	0.0238	0.0001					
Total	198.0000	0.0243						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.0001	0.0008	0.0959	0.9237	-0.0015	0.0016	-0.0015	0.0016
D2	0.1518	0.1574	0.9644	0.3360	-0.1586	0.4622	-0.1586	0.4622
D3	-0.0124	0.1880	-0.0662	0.9473	-0.3833	0.3584	-0.3833	0.3584
D4	-0.0544	0.1674	-0.3251	0.7455	-0.3847	0.2758	-0.3847	0.2758
D5	0.0561	0.1183	0.4745	0.6357	-0.1772	0.2895	-0.1772	0.2895

**Source: Research Findings**

**DEPENDENT VARIABLE..Monday mean return exchange rate**

D2, D3, D4, D5 are variables representing Tuesday, Wednesday, Thursday, Friday mean returns regressed against Monday returns. From the above table, the regression equation can be re-written as follows.

$$R_t = \beta_0 + \beta_1 D1 + \beta_2 D2 + \beta_3 D3 + \beta_4 D4 + \beta_5 D5 + \varepsilon_t$$

$$R_t = -0.026 + -0.005D2 + -0.090D3 + 0.018D4 + 0.073D5$$



Where:

$R_t$  is the average daily return,

$\beta_0$  = Intercept that is the value of  $R_t$  when all predictor variables take the value of zero

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  = the mean return for each day of the week

$D_2 = 1$  if  $t$  is a Tuesday and  $D_2 = 0$  for all other days

$D_3 = 1$  if  $t$  is a Wednesday and  $D_3 = 0$  for all other days

$D_4 = 1$  if  $t$  is a Thursday and  $D_4 = 0$  for all other days

$D_5 = 1$  if  $t$  is a Friday and  $D_5 = 0$  for all other days

The dummy variable  $D_1$  taking value of 1 if the day is a Monday was excluded from the Model since the same was found not to determine the daily return.

From the model above, taking all factors (Monday, Tuesday, Wednesday, Thursday and Friday) constant at Zero, the foreign exchange rates return would be 0.0001. Further, holding all other factors constant, a unit increase in Tuesdays' returns in the Kenya Shillings vs United States Dollar market would lead to a 0.1518 growth in foreign exchange mean return, while a unit increase on Wednesday would lead to 0.0124 decline in the mean return. A unit change in forex market on Thursday would lead to a 0.0544 decline in mean returns while a unit change in Friday operations in the forex market would have an effect of 0.0561 in growth on the mean exchange rate returns.

The coefficient of determination is a measure of how well a statistical model is likely to predict future outcomes. It measures the proportion of the variability in the dependent variable about the origin explained by regression. In this particular study, the R<sup>2</sup> was 0.0203 way below the expected 0.80 for a good model. This implies that only 2.03% of the average daily return is explained by the day of the week.

Predictors: Tuesday, Wednesday, Thursday and Friday at 95% confidence interval are not significant at 0.3360, 0.9473, 0.7455 and 0.6357 respectively as its indicative from the P-values and F-statistic indicates that the overall fit of the model is poor at 0.4071, greater than 0.05. This therefore means that the days of the week do not affect the foreign exchange rate returns. This is consistent with the earlier results of Mwambi (2012) whose results revealed absence of the day-of-the-week effect in both the exchange rate return and volatility.

The estimated coefficient for Tuesday is 0.1518, its p-value is  $0.3360 > 0.05$  hence the study coefficient is not significant. The results showed that Wednesday coefficient was negative 0.0124, its p-value  $0.9473 > 0.05$ , Thursday also reported negative coefficients 0.044, its p-value is  $0.7455 > 0.05$ , Friday had positive coefficient of 0.0561, with its p-value  $0.6357 > 0.05$ . This meant that the results were not significant to the study confirming the absence of the day of the week effect in the exchange rate return of the Kenya Shilling Vs Us Dollar.

## **4.7 Discussion of Research Findings**

The performance of the exchange rates is affected by various factors. However the performance of day one of the week, in this case Monday has no effect on the performance of other days of the week. The study used both descriptive and inferential statistics (correlations and regression) to undertake data analysis. The findings in this study indicate that there is no significant relationship between the return on Monday and the performance of the other days of the week. The positive beta coefficient for Tuesday and Friday may be attributed to other factors not linked to day one effect.

This is consistent with random walk theory which stated that stocks take a random and unpredicted path. The proponents asserted that it is impossible for an investor to outperform the market without assuming an additional risk commensurate with the abnormal gains. This negative coefficient further suggests that Wednesday performance is independent of Monday, hence not affected by Monday performance. This can be attributed to the fact that in foreign exchange market, other factors apart from the day of the week change thus affecting the market returns differently. The performance of Friday is not consistent with French (1980) who demonstrated empirically that Monday yields were lower than Friday ones for the Standard & Poor (S&P) 500 Index.

The study further found that the beta coefficient increased on Monday, Tuesday and Wednesday. This may be attributed to the fact that the market matures slowly. The beta coefficient decreases on Friday due to reduced market activity in the Forex market and uncertainty about the following week.

This is consistent with the findings of Fama (1970), who posits that an efficient market is a market where prices fully reflect the information available, such that an unusual profit cannot be earned through this information set (informational efficiency). The stable beta coefficients are a manifestation that the foreign exchange prices fully reflect all the available information in the market.

In general, the study has demonstrated that the performance of Monday in the Kenyan foreign exchange markets has insignificant effect on the performance of other days of the week in the Kenya Shillings vs United States Dollar foreign exchange market. This has been shown by the low positive beta coefficient on the five days of the week. Since the beta coefficients for Monday, Tuesday, Wednesday, Thursday and Friday are more than 0.05 shows that the results are not significant at 95% confidence level. The results indicate that the returns on the foreign exchange movement are not affected by the day of the week.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter provides the study summary and the conclusions from the study. It also provides the limitations for the study and recommendations for further research.

### **5.2 Summary of Findings**

The study examines the existence of the day of the week effect in the Kenya shilling/ Us Dollar foreign exchange market. The study is descriptive in nature describing whether the Kenya shilling Vs Us Dollar Foreign Exchange Market exhibits the day of the week effect over the period from January 2011 to December 2014. The day of the week effect in the foreign exchange rate return was assessed by estimating the foreign exchange return using the log different method. The data was sourced from the Central Bank of Kenya website to ensure that it is free from errors. The US dollar has been selected as a representative to foreign currencies since it is the most traded currency on the spot market and is the denominator of most business transactions and asset valuations.

### **5.3 Conclusion**

The primary objective of this paper was to test the existence of the day-of-the-week effect in the Kenya Shillings/United states Dollar foreign exchange market. The study concludes that the day of the week does not exist and therefore it does not affects the mean return for each day of the week in the Kenya shilling Vs Us Dollar Foreign Exchange. The day of the week effects are presented in mean equation and the evidence presented in this study suggests that the returns on

each day of the week are different with Wednesday associated with the lowest returns while Tuesday associated with the highest returns.

From regression results, it can be shown that the day one effect; Monday has no significant effect on Tuesday, Wednesday, Thursday and Friday. Wednesday and Thursday had a negative relationship with Monday suggesting that other factors outside the model are responsible for the performance of the Kenya shilling against the dollar.

The study results also confirm that all of the differences between the mean returns of each trading day are not significantly different from zero, which are supportive of the absence of the day-of-the-week effect. On volatility, Thursday reported the highest standard deviation, while Monday reported the lowest volatility. This shows that there was no sufficient evidence supporting the day of the week effect thus the conclusion that the day of the week does not exist in the Kenya Shillings vs United States Dollar foreign exchange market.

## **5.4 Recommendations**

The study strongly concludes that the day of the week does not affect the stock return. This implies that there is no day of the week effect in the Kenya Shillings vs United States Dollar foreign exchange market. Investors should focus on their investment strategies and should not allow the day of the week to distort their decisions. The study recommends that Companies as well as the individual investors should not factor the days of the week in their trading transactions in seeking to maximize their returns.

The phenomenon has been known for a long time, and further studies should be undertaken on the Day of the week in other markets for comparison. Studies should be carried out in fixed income instruments to find out if the day of the week effect anomaly exists. Trading in fixed income instruments like Treasury Bills and Treasury Bonds is different from the way foreign currencies are a traded. The study therefore cannot 100% conclude that that there is no day of the week without carrying out a similar study in fixed income instruments.

Though the Wednesday and Thursday negative return are not significant, a research should be carried out to find out why yielded negative return. It should also find out why Tuesday and Friday had a positive beta despite being insignificant to the model and the study. This will lead to a more significant and conclusive results to affirm the absence of the day of the week effect in the Kenyan foreign exchange market.

## **5.5 Limitations of the Study**

Descriptive research design employed in this study may not have the potential for drawing powerful inferences. A descriptive study, thus, does not explain why an event has occurred or why the variables interact the way they do, because that is beyond the bounds of the statistics employed. The study therefore conducted inferential analysis using regression analysis to confirm the descriptive results found.

The study used one variable- the day of the week effect to test the existence of the day of the week of the foreign exchange market in Kenya in general yet there are other factors which could contribute. Fridays for example will generate more returns because most transactions are made to avoid inconveniences during the weekend where financial institutions will be closed.

The researcher restricted his study to the Kenya Shillings/United states Dollar foreign exchange market. Each market has its unique characteristics and as such, it is not possible to generalize the results to other foreign currencies or to the global context. In this regard, there is need to examine the effect in other currency denominations say the Great British Pound, Sterling Pound, the South Africa Rand for comparison.

## **5.6 Suggestions for Further Research**

The study looked at the day of the week effect in the Kenya shilling Vs US Dollar data, there is need to examine the effect in other currency denominations in the Kenyan market. The day of the week pattern can also be conducted in other foreign exchange markets so as to ascertain if similar findings can be obtained. This can be extended to other exchange markets in the East and Central Africa.

The study focused on a specific seasonality that is the day of the week effect. Similar study should be done to investigate all the seasonality's in the Kenyan foreign exchange market such as the turn of the month effect, January effect, the holiday effect.



Further, a comparison of selected micro variables could also be done to investigate the relationship between the foreign exchange rate volatility and the selected micro economic variable such as micro economic variables which include stock market performance, interest rate, and inflation.

The study data covered the period of four years. It is possible that a shorter period could have an impact on the findings of this study. A longer period of more than four years could be employed which will give a longer period to model the financial data. It is important to conduct a similar study that covers a longer period example fifteen years.

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## APPENDIX: MEAN EXCHANGE RATE DATA

DEPENDENT VARIABLE		INDEPENDENT VARIABLES							
<u>MODAY(D1)</u>		<u>TUESDAY(D2)</u>		<u>WEDNESDAY(D3)</u>		<u>THURSDAY(D4)</u>		<u>FRIDAY(D5)</u>	
Mean Exc. Rate	Mean Return	Mean Exc. Rate	Mean Return	Mean Exc. Rate	Mean Return	Mean Exc. Rate	Mean Return	Mean Exc. Rate	Mean Return
86.6675		86.9611		86.9583		86.8228		86.8722	
86.5472	0.0014	86.2344	0.0084	86.2806	0.0078	86.4372	0.0045	86.6306	0.0028
86.5611	-0.0002	85.8806	0.0041	85.8792	0.0047	85.4572	0.0114	85.8972	0.0085
86.8278	-0.0031	85.9611	-0.0009	85.8278	0.0006	85.8125	-0.0041	85.5333	0.0042
86.8375	-0.0001	86.3361	-0.0044	86.5839	-0.0088	86.5519	-0.0086	86.2361	-0.0082
86.9292	-0.0011	86.1922	0.0017	86.1875	0.0046	86.0569	0.0057	86.0611	0.0020
87.0917	-0.0019	86.2575	-0.0008	86.3431	-0.0018	86.3569	-0.0035	86.3778	-0.0037
87.6847	-0.0068	86.4083	-0.0017	86.2458	0.0011	86.1611	0.0023	86.1033	0.0032
87.8569	-0.0020	86.3839	0.0003	86.3875	-0.0016	86.2758	-0.0013	86.3264	-0.0026
87.5722	0.0032	86.3861	0.0000	86.4844	-0.0011	86.5111	-0.0027	86.5194	-0.0022
87.6972	-0.0014	86.5417	-0.0018	86.4861	0.0000	86.4667	0.0005	86.4444	0.0009
87.5367	0.0018	86.5853	-0.0005	86.5725	-0.0010	86.6167	-0.0017	86.5014	-0.0007
87.4756	0.0007	86.4264	0.0018	86.4000	0.0020	86.4414	0.0020	86.5333	-0.0004
87.8278	-0.0040	86.5889	-0.0019	86.6042	-0.0024	86.6586	-0.0025	86.5819	-0.0006
87.8589	-0.0004	86.9042	-0.0036	86.7053	-0.0012	86.6264	0.0004	86.5572	0.0003
87.7447	0.0013	86.8736	0.0004	86.9208	-0.0025	87.0806	-0.0052	86.8958	-0.0039
87.8597	-0.0013	86.8944	-0.0002	86.8667	0.0006	86.8711	0.0024	86.8572	0.0004
87.8042	0.0006	87.1222	-0.0026	87.0322	-0.0019	86.9653	-0.0011	86.9594	-0.0012
87.8783	-0.0008	87.5333	-0.0047	87.3892	-0.0041	87.3211	-0.0041	87.2208	-0.0030
88.0769	-0.0023	87.8289	-0.0034	87.8583	-0.0054	87.8319	-0.0058	87.8042	-0.0067
88.2761	-0.0023	87.7389	0.0010	87.7972	0.0007	87.8164	0.0002	87.8400	-0.0004
88.3786	-0.0012	87.5500	0.0022	87.5014	0.0034	87.5069	0.0035	87.5056	0.0038
88.6789	-0.0034	87.9200	-0.0042	87.8889	-0.0044	87.8319	-0.0037	87.7639	-0.0029
88.7433	-0.0007	87.3785	0.0062	87.4308	0.0052	87.4056	0.0049	87.6094	0.0018
89.2681	-0.0059	87.6361	-0.0029	87.6269	-0.0022	87.6828	-0.0032	87.6083	0.0000
89.0986	0.0019	87.8919	-0.0029	87.8792	-0.0029	87.8250	-0.0016	87.7222	-0.0013
89.3611	-0.0029	87.7083	0.0021	87.6306	0.0028	87.6486	0.0020	87.7750	-0.0006
89.2253	0.0015	87.7994	-0.0010	87.7958	-0.0019	87.7706	-0.0014	87.7069	0.0008
89.3322	-0.0012	87.7444	0.0006	87.6903	0.0012	87.7997	-0.0003	87.8039	-0.0011
89.1278	0.0023	87.8197	-0.0009	87.8042	-0.0013	87.8244	-0.0003	87.8400	-0.0004
89.3556	-0.0026	87.9864	-0.0019	87.9514	-0.0017	87.9031	-0.0009	87.8728	-0.0004
89.7125	-0.0040	88.3039	-0.0036	88.1850	-0.0027	88.1194	-0.0025	88.0361	-0.0019
90.0656	-0.0039	88.3500	-0.0005	88.5828	-0.0045	88.3261	-0.0023	88.3144	-0.0032
90.1472	-0.0009	88.6269	-0.0031	88.5167	0.0007	88.4306	-0.0012	88.3944	-0.0009
90.1344	0.0001	88.6319	-0.0001	88.6181	-0.0011	88.6289	-0.0022	88.6378	-0.0027

90.2222	-0.0010		88.9894	-0.0040	88.7944	-0.0020	88.8167	-0.0021	88.7961	-0.0018
90.5672	-0.0038		89.1250	-0.0015	88.9114	-0.0013	88.5856	0.0026	88.9456	-0.0017
90.4811	0.0010		89.3275	-0.0023	89.2794	-0.0041	89.1417	-0.0063	89.1250	-0.0020
90.7083	-0.0025		89.3014	0.0003	89.3231	-0.0005	89.3231	-0.0020	89.3306	-0.0023
86.4264	0.0484		89.2639	0.0004	89.1167	0.0023	89.0475	0.0031	89.0903	0.0027
86.6844	-0.0030		88.9083	0.0040	89.1083	0.0001	88.9792	0.0008	89.1694	-0.0009
86.8531	-0.0019		89.1250	-0.0024	89.4131	-0.0034	89.4028	-0.0047	89.3375	-0.0019
87.5828	-0.0084		89.6178	-0.0055	89.6144	-0.0022	89.4150	-0.0001	89.3522	-0.0002
87.5669	0.0002		90.0083	-0.0043	89.8172	-0.0023	89.8808	-0.0052	89.7308	-0.0042
87.5681	0.0000		90.1083	-0.0011	89.9575	-0.0016	89.9028	-0.0002	90.2181	-0.0054
87.4108	0.0018		90.3069	-0.0022	90.2156	-0.0029	90.1792	-0.0031	90.0503	0.0019
87.4764	-0.0008		90.3294	-0.0002	90.2431	-0.0003	90.1878	-0.0001	90.1792	-0.0014
86.0375	0.0166		90.4583	-0.0014	90.3917	-0.0016	90.3261	-0.0015	90.2917	-0.0012
85.5889	0.0052		90.4500	0.0001	90.5947	-0.0022	90.6283	-0.0033	90.5317	-0.0027
85.8083	-0.0026		90.5686	-0.0013	90.5017	0.0010	90.3756	0.0028	90.4289	0.0011
85.8486	-0.0005		86.4417	0.0466	86.3569	0.0469	86.0769	0.0487	90.5978	-0.0019
84.8569	0.0116		86.6722	-0.0027	86.6053	-0.0029	86.5242	-0.0052	86.4775	0.0465
84.1861	0.0079		86.8653	-0.0022	86.7042	-0.0011	86.6989	-0.0020	86.6853	-0.0024
83.8200	0.0044		87.5206	-0.0075	87.4694	-0.0088	87.3794	-0.0078	86.9792	-0.0034
83.7944	0.0003		87.5828	-0.0007	87.6111	-0.0016	87.5861	-0.0024	87.5906	-0.0070
83.7164	0.0009		87.5539	0.0003	87.6133	0.0000	87.6025	-0.0002	87.5775	0.0001
83.8609	-0.0017		87.4194	0.0015	87.3428	0.0031	87.4519	0.0017	87.5756	0.0000
83.8375	0.0003		87.5419	-0.0014	87.5964	-0.0029	87.6336	-0.0021	87.6094	-0.0004
84.4261	-0.0070		86.1403	0.0161	86.2361	0.0157	87.2319	0.0046	87.3194	0.0033
85.1281	-0.0083		85.8236	0.0037	86.1639	0.0008	86.5833	0.0075	86.1667	0.0133
84.8806	0.0029		85.6014	0.0026	85.6361	0.0061	85.3400	0.0145	85.3222	0.0098
85.6083	-0.0085		85.8258	-0.0026	85.7628	-0.0015	85.7250	-0.0045	85.7139	-0.0046
85.8875	-0.0033		84.9903	0.0098	84.9833	0.0091	85.6386	0.0010	85.8083	-0.0011
85.8347	0.0006		84.3039	0.0081	84.6792	0.0036	84.7917	0.0099	84.8639	0.0111
86.6831	-0.0098		83.7933	0.0061	83.8989	0.0093	83.8781	0.0108	83.9889	0.0104
87.2364	-0.0064		83.7681	0.0003	83.7833	0.0014	83.8836	-0.0001	83.8831	0.0013
87.0808	0.0018		83.7553	0.0002	83.7950	-0.0001	83.8208	0.0007	83.8131	0.0008
87.2361	-0.0018		83.7250	0.0004	83.7917	0.0000	83.8989	-0.0009	83.8906	-0.0009
87.3731	-0.0016		83.7972	-0.0009	83.8242	-0.0004	83.8069	0.0011	83.8361	0.0006
87.6083	-0.0027		84.3700	-0.0068	84.4764	-0.0078	84.2597	-0.0054	83.8508	-0.0002
87.5389	0.0008		85.1236	-0.0089	84.9042	-0.0051	85.2861	-0.0121	84.9833	-0.0134
87.5250	0.0002		84.9500	0.0020	85.1806	-0.0033	85.0972	0.0022	85.2208	-0.0028
87.5178	0.0001		85.3878	-0.0051	85.3531	-0.0020	85.0539	0.0005	85.0528	0.0020
87.4792	0.0004		85.7375	-0.0041	85.6772	-0.0038	85.7236	-0.0078	85.7103	-0.0077
87.5361	-0.0007		86.0075	-0.0031	86.0269	-0.0041	86.0250	-0.0035	86.0603	-0.0041
87.4611	0.0009		86.2583	-0.0029	86.2000	-0.0020	85.9897	0.0004	85.8561	0.0024

86.1478	0.0151		87.1725	-0.0105	86.8556	-0.0076	86.8972	-0.0105	86.7969	-0.0109
85.2583	0.0104		87.1583	0.0002	86.8919	-0.0004	86.7875	0.0013	86.9986	-0.0023
84.9944	0.0031		87.4028	-0.0028	87.4056	-0.0059	87.3431	-0.0064	87.1697	-0.0020
84.7850	0.0025		87.4075	-0.0001	87.3978	0.0001	87.2797	0.0007	87.2333	-0.0007
85.1667	-0.0045		87.3858	0.0002	87.3908	0.0001	87.3983	-0.0014	87.3844	-0.0017
85.3736	-0.0024		87.4711	-0.0010	87.4997	-0.0012	87.5906	-0.0022	87.7042	-0.0037
86.0042	-0.0074		87.5611	-0.0010	87.5303	-0.0003	87.4572	0.0015	87.4606	0.0028
86.3075	-0.0035		87.5567	0.0001	87.5967	-0.0008	87.5775	-0.0014	87.4928	-0.0004
86.8889	-0.0067		87.4028	0.0018	87.4236	0.0020	87.4986	0.0009	87.5325	-0.0005
86.7139	0.0020		87.5806	-0.0020	87.5444	-0.0014	87.5458	-0.0005	87.5158	0.0002
86.6789	0.0004		87.4194	0.0018	87.3861	0.0018	87.4542	0.0010	87.5406	-0.0003
85.8278	0.0099		86.6458	0.0089	86.9903	0.0045	87.2292	0.0026	87.4097	0.0015
86.3097	-0.0056		86.1306	0.0060	86.5236	0.0054	86.7936	0.0050	86.3722	0.0119
86.9786	-0.0077		84.9714	0.0136	85.1986	0.0154	85.3917	0.0163	84.9639	0.0164
87.4958	-0.0059		84.7194	0.0030	84.8708	0.0039	84.9736	0.0049	84.9894	-0.0003
86.0444	0.0167		85.0806	-0.0043	84.8678	0.0000	84.7431	0.0027	84.7389	0.0030
84.9167	0.0132		85.5197	-0.0051	85.4472	-0.0068	85.2714	-0.0062	85.1469	-0.0048
83.8125	0.0131		85.7000	-0.0021	85.5872	-0.0016	85.5153	-0.0029	85.3069	-0.0019
82.8125	0.0120		86.4658	-0.0089	86.4556	-0.0101	86.2819	-0.0089	86.2569	-0.0111
82.9097	-0.0012		86.6528	-0.0022	86.6842	-0.0026	86.2972	-0.0002	86.1667	0.0010
82.6519	0.0031		86.7192	-0.0008	86.6506	0.0004	86.9931	-0.0080	86.9875	-0.0095
83.2347	-0.0070		86.6511	0.0008	86.6250	0.0003	86.5589	0.0050	86.4886	0.0058
84.1483	-0.0109		86.1722	0.0055	86.0431	0.0067	86.4286	0.0015	86.5542	-0.0008
82.3472	0.0216		85.8903	0.0033	85.8164	0.0026	85.7197	0.0082	85.7208	0.0097
82.8611	-0.0062		87.0361	-0.0133	88.4403	-0.0301	85.5722	0.0017	85.0906	0.0074
83.0153	-0.0019		87.5889	-0.0063	87.4208	0.0116	87.3164	-0.0202	87.1778	-0.0242
83.0667	-0.0006		85.6778	0.0221	86.2197	0.0138	86.3331	0.0113	86.9583	0.0025
83.1611	-0.0011		85.0306	0.0076	85.3639	0.0100	85.8444	0.0057	86.1000	0.0099
83.2178	-0.0007		83.8708	0.0137	83.5861	0.0210	83.8833	0.0231	84.5875	0.0177
83.2164	0.0000		83.9278	-0.0007	82.7167	0.0105	83.1403	0.0089	83.4903	0.0131
83.2831	-0.0008		83.0722	0.0102	83.1667	-0.0054	82.9300	0.0025	82.9583	0.0064
83.9469	-0.0079		82.6986	0.0045	82.7569	0.0049	83.2944	-0.0044	83.2972	-0.0041
84.5639	-0.0073		83.2561	-0.0067	83.2625	-0.0061	82.9708	0.0039	82.7514	0.0066
85.5819	-0.0120		82.7514	0.0061	82.8292	0.0052	82.8222	0.0018	83.3625	-0.0074
85.6486	-0.0008		82.2694	0.0058	82.2686	0.0068	82.7125	0.0013	84.1483	-0.0094
85.4556	0.0023		82.8489	-0.0070	82.6344	-0.0044	82.9611	-0.0030	82.9617	0.0142
84.1556	0.0153		83.0278	-0.0022	83.1042	-0.0057	83.0324	-0.0009	83.1083	-0.0018
84.1625	-0.0001		83.1764	-0.0018	83.0694	0.0004	83.1014	-0.0008	83.0556	0.0006
84.0278	0.0016		83.3681	-0.0023	83.2541	-0.0022	83.1961	-0.0011	83.1031	-0.0006
83.9588	0.0008		83.1969	0.0021	83.1542	0.0012	83.1389	0.0007	83.1500	-0.0006
84.1794	-0.0026		83.2500	-0.0006	83.2650	-0.0013	83.2531	-0.0014	83.2293	-0.0010

84.2997	-0.0014		83.2703	-0.0002	83.2806	-0.0002	83.4053	-0.0018	83.2903	-0.0007
84.2383	0.0007		83.6764	-0.0049	83.6181	-0.0040	83.3972	0.0001	83.2958	-0.0001
83.9367	0.0036		84.9572	-0.0152	85.1625	-0.0183	84.5639	-0.0139	84.9572	-0.0197
83.9333	0.0000		85.3958	-0.0051	85.3153	-0.0018	85.2558	-0.0081	85.1625	-0.0024
83.9903	-0.0007		85.9569	-0.0065	86.1167	-0.0093	86.8250	-0.0182	85.9556	-0.0093
84.1422	-0.0018		85.2431	0.0083	84.8125	0.0153	84.6722	0.0251	85.5111	0.0052
84.3872	-0.0029		84.5250	0.0085	84.8847	-0.0009	85.1306	-0.0054	85.2667	0.0029
84.2139	0.0021		84.2519	0.0032	83.9472	0.0111	84.0125	0.0132	83.6403	0.0193
84.8275	-0.0073		84.1231	0.0015	84.1322	-0.0022	84.2333	-0.0026	84.1478	-0.0060
85.1764	-0.0041		83.9368	0.0022	84.0972	0.0004	84.5292	-0.0035	84.0347	0.0013
84.9250	0.0030		84.1889	-0.0030	84.1222	-0.0003	84.0265	0.0060	83.9292	0.0013
85.1175	-0.0023		84.2617	-0.0009	84.1917	-0.0008	84.1447	-0.0014	84.1558	-0.0027
85.0422	0.0009		84.2125	0.0006	84.2014	-0.0001	84.2011	-0.0007	84.2292	-0.0009
85.1472	-0.0012		84.0950	0.0014	84.2022	0.0000	84.2506	-0.0006	84.2264	0.0000
85.2361	-0.0010		83.8975	0.0024	84.0506	0.0018	84.0139	0.0028	84.0875	0.0017
85.4100	-0.0020		84.0056	-0.0013	83.9750	0.0009	84.0672	-0.0006	83.9833	0.0012
85.6261	-0.0025		84.1181	-0.0013	84.0961	-0.0014	84.0236	0.0005	84.0056	-0.0003
85.7097	-0.0010		84.8653	-0.0088	84.2667	-0.0020	84.1483	-0.0015	84.3208	-0.0037
85.9431	-0.0027		84.1417	0.0086	84.2403	0.0003	84.3389	-0.0023	84.4056	-0.0010
85.9889	-0.0005		84.8847	-0.0088	84.7531	-0.0061	84.3817	-0.0005	84.4042	0.0000
86.0383	-0.0006		85.0097	-0.0015	84.8444	-0.0011	84.8667	-0.0057	84.8264	-0.0050
86.0008	0.0004		84.9714	0.0005	85.1764	-0.0039	85.2764	-0.0048	85.2833	-0.0054
80.7961	0.0624		85.0978	-0.0015	85.1019	0.0009	84.9153	0.0042	84.9125	0.0044
81.1747	-0.0047		85.0342	0.0007	85.1261	-0.0003	85.1383	-0.0026	85.1339	-0.0026
80.9736	0.0025		85.2208	-0.0022	85.2328	-0.0013	85.1819	-0.0005	85.1667	-0.0004
81.0147	-0.0005		85.1775	0.0005	85.1678	0.0008	85.1692	0.0001	85.1342	0.0004
81.2722	-0.0032		85.5069	-0.0039	85.5500	-0.0045	85.4456	-0.0032	85.3083	-0.0020
81.1917	0.0010		85.6428	-0.0016	85.5283	0.0003	85.3994	0.0005	85.3778	-0.0008
81.2042	-0.0002		85.7114	-0.0008	85.7139	-0.0022	85.6597	-0.0030	85.6450	-0.0031
81.3869	-0.0022		85.9708	-0.0030	85.9903	-0.0032	85.7975	-0.0016	85.7211	-0.0009
81.8611	-0.0058		85.9417	0.0003	85.9639	0.0003	85.9111	-0.0013	85.9347	-0.0025
82.6014	-0.0090		86.0422	-0.0012	86.0522	-0.0010	85.9889	-0.0009	85.9575	-0.0003
82.8031	-0.0024		86.0472	-0.0001	86.0744	-0.0003	86.0611	-0.0008	86.0672	-0.0013
83.4667	-0.0080		86.0286	0.0002	85.9611	0.0013	85.8628	0.0023	85.9039	0.0019
85.8572	-0.0282		81.1444	0.0584	81.1322	0.0578	80.9389	0.0591	80.9950	0.0588
84.7847	0.0126		80.7431	0.0050	80.9417	0.0024	81.0708	-0.0016	81.2181	-0.0028
83.5511	0.0147		81.0764	-0.0041	81.0661	-0.0015	80.9333	0.0017	81.0708	0.0018
82.9889	0.0068		81.0250	0.0006	80.9986	0.0008	81.0031	-0.0009	81.0217	0.0006
84.7664	-0.0212		81.1472	-0.0015	81.1889	-0.0023	81.0667	-0.0008	81.1014	-0.0010
84.0736	0.0082		81.4428	-0.0036	81.3014	-0.0014	81.2375	-0.0021	81.2167	-0.0014
83.9828	0.0011		81.7936	-0.0043	81.4456	-0.0018	81.3942	-0.0019	81.3583	-0.0017

83.4583	0.0063		82.3639	-0.0069	81.9992	-0.0068	81.8917	-0.0061	81.8750	-0.0063
83.5278	-0.0008		83.0833	-0.0087	83.0081	-0.0122	83.0542	-0.0141	82.9278	-0.0128
85.2222	-0.0201		86.3239	-0.0383	84.9294	-0.0229	84.6569	-0.0191	84.0447	-0.0134
86.5611	-0.0156		85.1486	0.0137	84.5917	0.0040	85.0417	-0.0045	85.8108	-0.0208
86.4208	0.0016		83.8206	0.0157	84.2944	0.0035	84.9444	0.0011	84.9931	0.0096
86.3750	0.0005		83.7325	0.0011	83.7444	0.0065	83.3722	0.0187	83.1583	0.0218
86.7514	-0.0043		83.9431	-0.0025	84.2428	-0.0059	84.1431	-0.0092	84.2917	-0.0135
87.6625	-0.0104		83.9181	0.0003	83.8417	0.0048	84.0056	0.0016	84.1472	0.0017
90.0444	-0.0268		83.4194	0.0060	83.6250	0.0026	83.5708	0.0052	83.9278	0.0026
90.4486	-0.0045		84.7056	-0.0153	84.2208	-0.0071	84.0500	-0.0057	83.6556	0.0032
89.3597	0.0121		86.2514	-0.0181	85.9333	-0.0201	86.1139	-0.0243	85.9244	-0.0268
88.6856	0.0076		86.1472	0.0012	86.1528	-0.0026	86.0261	0.0010	87.0486	-0.0130
90.2417	-0.0174		85.7044	0.0052	85.5161	0.0074	85.4417	0.0068	86.0111	0.0120
89.6847	0.0062		87.5569	-0.0214	87.7219	-0.0255	87.0422	-0.0186	86.8292	-0.0095
90.2878	-0.0067		88.9764	-0.0161	89.2361	-0.0171	89.3708	-0.0264	88.0931	-0.0145
90.9750	-0.0076		90.5597	-0.0176	91.6556	-0.0268	90.7333	-0.0151	89.8000	-0.0192
91.2111	-0.0026		89.8639	0.0077	90.0236	0.0180	90.8278	-0.0010	90.4625	-0.0074
93.7375	-0.0273		89.9389	-0.0008	89.8583	0.0018	88.9694	0.0207	88.4514	0.0225
92.8500	0.0095		89.5833	0.0040	89.4750	0.0043	89.6708	-0.0079	90.4417	-0.0223
92.8056	0.0005		89.9611	-0.0042	90.0583	-0.0065	90.1681	-0.0055	90.1861	0.0028
93.6222	-0.0088		91.1000	-0.0126	90.8444	-0.0087	90.5111	-0.0038	90.3750	-0.0021
93.6806	-0.0006		92.7667	-0.0181	92.3528	-0.0165	91.9361	-0.0156	91.5847	-0.0133
93.9903	-0.0033		92.7183	0.0005	93.2328	-0.0095	93.9131	-0.0213	94.5167	-0.0315
94.9708	-0.0104		93.0097	-0.0031	92.9028	0.0035	93.1361	0.0083	93.1431	0.0146
97.5806	-0.0271		92.8489	0.0017	92.8931	0.0001	92.4042	0.0079	92.7306	0.0044
101.2320	-0.0367		93.4597	-0.0066	94.7722	-0.0200	94.4278	-0.0217	94.1097	-0.0148
99.8319	0.0139		94.7819	-0.0140	95.4306	-0.0069	94.1111	0.0034	93.7083	0.0043
101.9470	-0.0210		96.0278	-0.0131	95.8361	-0.0042	95.1928	-0.0114	94.8056	-0.0116
101.4260	0.0051		102.0110	-0.0604	101.9490	-0.0618	99.0556	-0.0398	98.8944	-0.0422
100.1170	0.0130		100.9490	0.0105	101.7150	0.0023	101.6740	-0.0261	100.4790	-0.0159
99.7783	0.0034		104.0100	-0.0299	105.9610	-0.0409	103.9080	-0.0217	102.8110	-0.0229
99.3347	0.0045		99.7014	0.0423	99.5181	0.0627	99.1861	0.0465	100.5120	0.0226
96.9706	0.0241		99.0319	0.0067	100.6320	-0.0111	101.4430	-0.0225	100.5960	-0.0008
93.7208	0.0341		97.3819	0.0168	96.9750	0.0370	96.8097	0.0467	96.5222	0.0413
90.6722	0.0331		93.2164	0.0437	94.7989	0.0227	95.6903	0.0116	96.2694	0.0026
90.1681	0.0056		91.0417	0.0236	92.5433	0.0241	93.6806	0.0212	94.1458	0.0223
89.7208	0.0050		90.5611	0.0053	90.2681	0.0249	90.3097	0.0366	90.0611	0.0444
89.6236	0.0011		89.5467	0.0113	89.8281	0.0049	89.7125	0.0066	89.5972	0.0052
87.2792	0.0265		88.9764	0.0064	89.5500	0.0031	89.4986	0.0024	89.6669	-0.0008
83.5542	0.0436		83.5167	0.0633	83.8306	0.0660	83.6939	0.0671	84.5972	0.0582
85.0681	-0.0180		84.6667	-0.0137	83.7167	0.0014	83.6472	0.0006	83.6864	0.0108

83.8306	0.0147				83.5542	0.0019	83.7325	-0.0010	83.5542	0.0016
83.7167	0.0014				85.0681	-0.0180			85.0681	-0.0180
					83.8306	0.0147			83.8306	0.0147
					83.7167	0.0014			83.7167	0.0014