DAY OF THE WEEK EFFECT AND BOND MARKET RETURNS AT THE NAIROBI SECURITIES EXCHANGE

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NOVEMBER 2014
DECLARATION

This research project is my original work and has never been presented for the award of a degree in any other university.

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

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DEDICATION

This project is dedicated to my dear parents Mr. and Mrs. Murigu, my brothers George and Brian and to all my friends. I am indeed indebted for the invaluable support and encouragement during the course of my studies.
ABSTRACT

The objective of the study was to find out whether there exists a relationship between bonds returns and the day of the week at the Nairobi Securities Exchange (NSE). It also sought to determine if there is a significant difference in bond returns for all the five trading days. The relationship between information and bond prices is explained by the market efficiency. By the day of week effect, the investor will consider the mean of return for different days. In a decision making process, a rational financial decision maker must take into account not only returns but also the variance and volatility of returns. The underlying constituents of the bond market are based on Kenyan Government Securities quoted on the NSE with maturity levels of more than one year and notional amounts above KES5 billion. The bonds market in Kenya involves both the treasury and corporate bonds. The study was based on the corporate bonds issued at the Nairobi Securities Exchange. A descriptive research design was used in the study. It involved gathering daily bond prices from the Nairobi Stock Exchange and analyzing the data statistically 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 data comprised of the daily bond prices. The results show that there is a significant relationship between the dependent variable which is the bond market return and independent variables which are the five days of the week. From the analysis, we can conclude 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. The research findings also indicate that there is little bond return volatility at the NSE as judged by the distribution. The findings support that there is potential advantage to investors due to the day of the week effect anomaly is present in the Kenyan bond market.
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LIST OF ABBREVIATIONS

CAPM  Capital Asset Pricing Model
CMA  Capital Markets Authority
EMH  Efficient Market Hypothesis
FR  Floating Rate
FRN  Floating Rate Notes
FTSE  Financial Times Stock Exchange Index
FXD  Fixed Coupon Rates
GARCH  Generalized Auto Regressive Conditional Heteroskedasticity
IFB  Invitation for Bids
IPO  Initial Public Offer
M&A  Mergers and Acquisitions
MTN  Medium Term Notes
NASI  NSE All Share Index
NSE  Nairobi Securities Exchange
PE  Price Earning
SDB  Savings Development Bond
TURDEX  Turkish Derivatives Exchange
CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Fama (1970) defined an efficient market as one in which prices fully reflect all available information. Thus, it would be difficult for an investor to continuously make an abnormal return. According to efficient market hypothesis, markets are rational and prices of stocks fully reflect all available information. The securities prices quickly adjust to new information as readily as that information is available.

According to behavioral finance, this kind of efficient market cannot explain the observed anomalies in Markets. Behavioral finance is the paradigm where financial markets are studied using models that are less narrow than those based on Von Neumann-Morgenstern expected utility theory and arbitrage assumptions (Soares, Herling, Lima and Moritz (2013)). There is a lot of psychology literature documenting that people make systematic errors in the way that they think: they are overconfident, they put too much weight on recent experience, etc. Their preferences may also create distortions. Behavioral finance uses this body of knowledge, rather than assuming that it should be ignored. Limits to arbitrage refer to predicting in what circumstances arbitrage forces are effective, and when they won't be. Behavioral finance uses models in which some agents are not fully rational, either because of preferences or because of mistaken beliefs.

Anomalies have been discovered which contradict the efficient market hypothesis. One of the anomalies is the day of the week effect. Research findings have documented that
stock returns are high on Fridays and low on Mondays (Nyamosi (2011)). This anomaly is however not explained by any of the assets pricing models like the Capital Asset Pricing Model. Patell and Wolfson (1984) observed that prices adjust fast when new information becomes available. They found that, when a firm publishes its latest earnings or announces a dividend change, the major part of the adjustment in the price occurs within five to ten minutes of the announcement.

Studies by Kendall (1953) and Fama (1965) on testing weak form efficiency carried out on the developed market, generally agree with the weak-form efficiency of the market considering a low degree of serial correlation and transaction cost. The studies supported the proposition that price changes are random and past changes are not useful in forecasting future price changes particularly after transaction costs are taken into account.

1.1.1 Day of the Week Effect

Poshakwale (1996) defined day of the week effect as the existence of a pattern on the part of stock returns, whereby these returns are linked to a particular day of the week. He noted that such a relationship has been verified mainly in USA, 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. Cross (1973) noted that 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.

Following the seminal paper of Fields (1931), various studies have confirmed the day of the week effect, where returns are significantly higher on some days of the week.
According to Bailey, Alexander and Sharpe (1999), seasonal patterns in stock returns should be quite minor (if they exist at all), because they are not suggested by traditional asset pricing models. It is often assumed that the expected daily returns on securities are the same for all the days of the week. That is, the expected return on a given stock is the same for Monday as it is for Tuesday as it is for Wednesday as it is for Thursday and as it is for Friday.

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 (EMH), the expected daily returns on stocks are the same for all days-of-the-week. The study by Gibbon and Hess (1981) established that the daily seasonal effect is strong and that there are persistent negative mean returns for stocks and below average returns for bills on Mondays.

1.1.2 Bonds Returns

Jordan and Fischer (2002) defined return as the motivating force and the principal reward in the investment process and it is the key method available to investors in comparing alternative investments. They document that return has two components. The basic component is the periodic cash receipts (or income) on investments, either in the form of interest or dividends. The second component is the change in the price of the asset – commonly called capital gain or loss. This element of return is the difference between the purchase price and the price at which the asset can be sold. According to Reilly and
Brown (2003) on the other hand, return is the compensation for the time, the expected rate of inflation and the uncertainty of the return after investing in stocks. Shiller (2003) indicated that the stock market is “macro efficient but micro inefficient” since there is considerable predictable variation across firms in their predictable future dividend of interest repayments but little predictable variation in aggregate dividends or interest. Therefore, changes in securities returns among individual securities makes more sense than movement in the market as a whole.

Fama and French (1993) show that default and term premium are priced factors in the corporate bond market. Gebhardt, Hvidkjaer, and Swaminathan (2005) show that default betas are significantly related to the cross-sectional variation of average bond returns. Furthermore, yield-to-maturity remains the only significant characteristic after controlling for default and term betas, suggesting that systematic risk factors are important for pricing corporate bonds. Lin, Wang, and Wu (2011) argue that market-wide liquidity risk is also a factor in the cross-section of corporate bonds as implied by their finding of a positive and significant relation between average bond returns and liquidity beta which is robust to including default and term betas. Acharya, Amihud, and Bharath (2013) also show that time-varying liquidity risk matters for corporate bonds.

1.1.3 Day-of-the-Week Effect and Bonds Returns

The day of the week effect is a phenomenon that develops a form of anomaly of the efficient market theory. According to Soares et al. (2013), this phenomenon explains that average daily returns vary at different days but the same can be considered under the efficient market theory. It is very important for an investor to understand the working of
capital markets. The relationship between information and bond prices is explained by the market efficiency. By the day of week effect, the investor will consider the mean of return for different days. In a decision making process, a rational financial decision maker must take into account not only returns but also the variance and volatility of returns. It is very important to identify the return and also the relationship between the returns (Hussain, Hamid, Akash and Khan (2011)).

Bailey, Alexander and Sharpe (1999), observed that seasonal patterns in securities returns should be quite minor because they are not suggested by traditional asset pricing models. It is often assumed that the expected daily returns on securities are the same for all the days of the week. That is, the expected return on a given security is the same for Monday as it is for Tuesday as it is for Wednesday as it is for Thursday and as it is for Friday. The fact that these effects exist for such a long period of time is itself an anomaly as according to efficient market hypothesis all these effects should disappear once they are studied by researchers and explained to the traders.

However, studies by Polwitoon and Tawatnuntachai (2008) show that these anomalies still exits, while on the other hand Arize and Nippani (2007) show that on the developed markets some of these effects are disappearing or losing power.

Johnston, Kracaw and McConnell (1991) provide a comprehensive study of weekly seasonal effects in T-bond, T-note, and T-bill futures returns. Two distinct patterns are found in returns on T-bond and T-note contracts, while no day of the week effect is noted for T-bill futures. A negative Monday effect is found for T-bond contracts. A positive Tuesday effect is found on T-bond and T-note contracts. The evidence indicates that the
significance of day of the week effect depends in an important way on the time period studied. The negative Monday effect occurs only in the data before 1982, while the positive Tuesday effect is present only after 1984. In addition, we find that both seasonal phenomena occur only during months prior to a delivery month. This effect appears to be related to the calendar month. More specifically, the Monday effect is apparently concentrated during February, while the Tuesday effect is concentrated during May.

1.1.4 Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE Handbook (2010)) was constituted as Nairobi Stock Exchange in 1954 as a voluntary association of stockbrokers in the European community registered under the Societies Act. It provides services for stock brokers and traders to trade stocks, bonds, and other securities. The Securities Exchange provides companies with the facility to raise capital for expansion through selling shares and securities to the investing public. The NSE plays an important role in the economy of bringing the borrowers and lenders of money together at a low cost. The typical ownership identities at the NSE are by the government, foreigners, institutions, individual and diverse ownership forms.

The FTSE NSE Kenyan Shilling Government Bond Index is designed to measure the average performance of eligible government bonds with differing maturity bands. The underlying constituents are based on Kenyan Government Securities quoted on the NSE with maturity levels of more than one year and notional amounts above KES5 billion. The bonds market in Kenya involves both the treasury and corporate bonds. Treasury bonds were introduced as early as mid-1980s while corporate bonds came into the market
in 1996 during the reform period. Despite the early initiation of treasury bonds in the market, the market remained almost stagnant, with the government using treasury bills to finance domestic debt. It was not until 2001 when the government took a deliberate effort to develop the market that activities of the treasury bonds market increased (Mbewa, Ngugi & Kithinji (2007)). The Corporate bonds traded at the NSE as at 31st December 2013 are issued by 11 companies which trade both in stocks and bonds (Appendix 1).

1.2 Motivation for the Study

While there have been many studies on equity market, much less effort has been dedicated to examination anomalies on the fixed-income side in the Kenyan securities market. A comparison of trading volumes of the financial markets indicates that bonds are vital for every financial system. A study of bonds price behavior will give the opportunity to compare return patterns of bonds and therefore help in finding the causes and explanation of this phenomenon.

1.3 Research Problem

The movement of stock market prices is an important determinant of returns. 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. 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). The predictability of stock return is a feature of inefficient stock market.
While various research studies have been undertaken on the day of the week effect on stocks at the NSE, the same has not been done on bonds. By comparing the findings with the earlier studies it was therefore possible to compare the findings and thus draw conclusions based on both stocks and bonds returns. According to Mykhailo (2009), the empirical analysis for the bond markets show clear signs of Tuesday effect for most countries. This fact was confirmed by regression on dummies and bootstrap analysis. At the same time, stock markets show no evidence for any day-of-the-week-effect as a result of application of mentioned methods.

Mokua (2003), in his study on the weekend effect on the stocks at the NSE concluded that weekend effect does not exist in Nairobi Securities Exchange. Makokha (2012) results obtained show that Tuesday has the highest positive return and Wednesday has the highest negative return. Stock return volatility is highest on Tuesday and lowest on Friday. The study concludes that there is no day of the week effect at the Nairobi Securities Exchange. Muthama and Mutothya (2013) suggest that a random walk model cannot be a good description of successive price returns at the Nairobi stock exchange. This implies that there are anomalies in existence at the NSE and thus it would be possible to take advantage of differing stocks returns in the securities market. Kulavi (2013) indicates that there is existence of day of the week effect in the Nairobi Securities Exchange and the highest volatility is experienced on Monday and lowest volatility is experienced on Thursday.

In the studies by Kulavi (2013), Makokha (2012), Muthama and Mutothya(2013) the findings were based on trading in equity and therefore it is inconclusive if the same
would apply in the trading of bonds at the NSE. These findings therefore lead to the research problem: *Does the day of the week effect exist at the NSE and what is its effect on bonds trading returns?*

1.4 Objective of the Study

To determine the relationship between of day of the week and bonds trading returns at the Nairobi Securities Exchange.

1.5 Value of the Study

1.5.1 Academicians

The study is aimed at filling the existing knowledge gap. The study will also benefit the students as a basis of reference for any future study in the field of market efficiency. Thus to academicians who want to contribute to the body of knowledge, this research will help in opening up opportunities for doing further research.

1.5.2 Investors

The study will benefit the investor in the sense that, information gathered on day of the week trends will enable them to take advantage of the regular shifts in the market. The investor was in a position to take advantage of different rates of return during different days of the week while trading in bonds in the stock market.

1.5.3 Securities Market Regulators

The study will enable monitoring of the activities of the securities market with respect to the changes in the day of the week hence was able to measure the performance of the stock market which is a signal of economic stability in the country.
1.5.4 Securities Brokers and Dealers

The knowledge of such crucial information on day of the week and may assist the stock brokers to plan well when to trade. It will also enable them to know how to get supernormal returns that is by buying the securities on the day of the week when prices are low and selling them on the day when prices are high. It will enable them to maximize on their returns.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter includes an analysis of the Efficient Market Hypothesis as an explanation of different returns in different securities markets. It then explains behavioural finance as a factor in explaining why markets experience irrational influences. The study will then explain the determinants of bonds returns. It continues by focusing on the empirical studies which have been carried out in the recent past. One of the anomalies that has been extensively discussed in this chapter is the day of the week effect in relation to bond returns. The chapter ends by summarizing what has already been established in previous research studies and thus the research gap which this study seeks to fill.

2.2. Efficient Market Hypothesis

According to Fama, Fisher, Jensen and Roll (1969) EMH is an investment theory which states that it is impossible to “beat the market” because stock market efficiency causes existing securities prices to always incorporate and reflect all the relevant information. According to the EMH, this means that stocks trade at their fair value and thus it is impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices.

Fama (1970) divided market efficiency into three categories, these are: Weak form, Semi-strong form and Strong form of market efficiency. The strong form suggests that
securities prices reflect all available information including private information. This means that even corporate insiders cannot make abnormal profits by using inside information. The semi-strong form of EMH asserts that securities prices reflect both past and present information i.e. all publicly available information. The weak form of the EMH states that it is impossible to predict future stock prices by analyzing prices from the past. The current price is a fair one that considers any information contained in the past price data and therefore charting techniques are of no use in predicting stock prices.

The EMH has provided the theoretical basis for much of the financial market research during the seventies and the eighties. In the past, most of the evidence seems to have been consistent with the EMH (Seyhun (1986)). Prices were seen to follow a random walk model and the predictable variations in equity returns, if any, were found to be statistically insignificant. While most of the studies in the seventies focused on predicting prices from past prices (Malkiel (1977)).

2.3 Behavioral Finance Theory

Behavioral finance seeks to supplement the standard theories of finance by introducing behavioral aspects to the decision making process (Ndungu, (2012)). Behavioral finance deals with individuals and how they gather and use information. It seeks to understand and predict systematic financial market implications of psychological decision processes. In addition, it focuses on the application of psychological and economic principles for the improvement of financial decision making (Olsen, (1998)). Market efficiency, in the sense that market prices reflect fundamental market characteristics and that excess returns on the average are leveled out in the long run, has been challenged by behavioral finance.
Some market anomalies cannot be explained with the help of standard financial theory, such as abnormal price movements in connection with IPOs, M&A, stock splits and spin-offs.

In the recent past, statistical anomalies have continued to appear which suggests that the existing standard finance models are probably incomplete. Investors have been shown not to react “logically” to new information but to be overconfident and to alter their choices when given superficial changes in the presentation of investment information (Olsen (1998)). During the past few years there has, for example, been a media interest in technology securities. Most of the time there has been a positive bias in assessments especially in the media which might lead investors in making incorrect investment decisions. These anomalies suggest that the underlying principles of rational behavior underlying the efficient market hypothesis are not entirely correct and that there is need to look, as well, at other models of human behavior as have been studied in other social sciences (Shiller (1998)).

2.4 Determinants of Bonds Returns

2.4.1 Issue Size

Size should have a significant positive impact on bond liquidity, as dealers can more easily manage their inventory of larger issues. While studies using yield spreads to proxy for liquidity find little support for this hypothesis, Hong and Warga (2000) show that larger issues have significantly tighter bid-ask spreads. Alexander, Edwards, and Ferri
(2000) find that larger issues do have higher trading volume, thus attracting a higher return on the bonds.

2.4.2 Age of Bonds

Alexander, Edwards, and Ferri (2000) and Warga (1992) argue that as a bond becomes more seasoned it becomes less liquid, as inactive portfolios absorb progressively more of the original issue and less is available to trade. Prior evidence shows that yield spreads increase as the bond ages (Sarig and Warga (1989), Warga (1992)), bid-ask spreads increase (Chakravarty and Sarkar (2003), Hong and Warga (2000), Schultz (2001)), and trading volume decreases (Alexander, Edwards, and Ferri (2000)).

2.4.3 Interest Rate Risk

Alexander, Edwards, and Ferri (2000) show that bonds with higher interest-rate risk have a stronger speculative trading component. The theoretical literature (Harris and Raviv (1993), Kandel and Pearson (1995)) suggests that differences in investors' forecasts should lead to more speculative trading in the highest duration issues.

2.4.4 Credit Risk

Uncertainty concerning value is likely to be higher for lower credit quality issues. Speculation about changes in the bond's credit quality, which are more likely for lower grade bonds, should induce more trading. Hotchkiss and Ronen (2002) show that lower grade bonds are more likely to reflect firm specific information. Alexander, Edwards, and Ferri (2000) document more trading in high-yield bonds with higher credit risk.
2.4.5 Equity Trading Volume and Return

Firm-specific news should affect trading in both the equity and debt of a firm. Based on high-yield bond data from, Hotchkiss and Ronen (2002) find support for the hypothesis that bond and stock returns react jointly to common factors. In contrast, Kwan (1996) finds that only past stock returns are correlated with current bond yield changes. For bonds of companies with publicly traded equity, we expect stock activity and bond liquidity to be positively related.

2.4.6 Equity Market Conditions

Financial market conditions influence bond trading as investors optimize and rebalance their portfolios in light of new information. The literature on the relationship between market volatility and liquidity is divided. Gallant, Rossi, and Tauchen (1992) observed a positive correlation between market volatility and trading volume of NYSE-traded stocks.

2.5 Empirical Review

2.5.1 Calendar Anomalies in Fixed Income Instruments

Cross (1973) in his study of calendar anomalies found out that Monday had a negative return while Friday had a positive return. He analyzed the Standard and Poors composite index from 1953 to 1970. Cross, further indicated that the performance on Monday was dependent on Friday’s performance. French (1980) had results that were consistent with those of Cross (1973). French studied the Standard and Poors composite index from 1953 to 1977. He observed that returns remained dependent on the day of the week. Further
tests revealed that Monday mean returns over the study period were significantly negative while Wednesday through Friday returns were significantly positive. On the other hand Aggrawal and Tandon (1994) also found a day-of-the-week effect in 18 equity markets.

Independent studies conducted by French (1980) and Gibbons and Hess (1981) found evidence consistent with the hypothesis that there are significant differences in the expected percentage changes for stocks depending on the day of the week. The study covered more than 4,000 trading days from 1962 through 1968. The expected percentage change on Mondays appeared to be negative and the expected percentage change on Wednesdays and Fridays appeared to be larger than on Tuesdays and Thursdays.

Gibbons and Hess (1981) found evidence of a significant negative Monday return in US Treasuries between 1962 and 1968. However, Jordan and Jordan (1991) conducted seasonality tests for corporate bonds on the Dow Jones composite bond average for the period 1963-1986. There was no significant difference in mean daily returns for fixed income securities. Kohers and Patel (1996), Adrangi and Ghazanfari (1996) all detected various degrees of daily seasonality. Oduncu (2012) examined the day of the week effect on the Turkish Derivatives Exchange and his study concluded that the day of the week effect is not present at TURKDEX.

Mykhailo (2009) investigated the existence of calendar effects on the bond market of selected emerging countries and conducted comparative analysis of these effects on the stock and bond markets. The empirical analysis for the bond markets show clear signs of Tuesday effect for most countries. This fact was confirmed by regression on dummies and bootstrap analysis. At the same time, stock markets showed no evidence for any day-
of-the-week-effect as a result of application of the mentioned methods. Day-of-the-month effect, on the other hand, was found significant for both stock and bond markets: returns for the end of the month are higher than for the rest of the month. As it was expected the size of this effect was bigger for the stock market as equity is associated with higher risk.

Klesov (2008), researched on calendar effects for stock markets of selected developing countries. According to his work, intraweek effect (Friday effect) was found for most countries with the usage of bootstrap approach, while Monday effect was found only for a couple of countries using GARCH approach. The evidence for day-of-the-week and month-of-the-year was partly significant due to the relatively small size if the dataset.

Polwitoon and Tawatnuntachai (2008), examined the behavior of U.S.-based emerging market bond funds over a period from 1996 to 2005, the top six holding countries were Argentina, Brazil, Mexico, Philippines, Russia and Venezuela (almost all bonds are denominated in dollars). This paper analyzed only month-of-the-year effect for the bond funds and found positive effect in November and December. This is most likely caused by common reason of end-of-the-year activity bursts on the capital markets.

Marrett and Worthington (2011) examined month of the year effect in the Australian daily market returns using a regression-based approach. The results indicated that the returns are significantly higher in April, July and December combined with evidence of a small cap effect with systematically higher returns in January, August, and December. The analysis of the sub-market returns was also supportive of disparate month of the year effects.
2.5.2 Calendar Anomalies at the Nairobi Securities Exchange

Muthama and Mutothya (2013) carried out an investigation on whether stock prices at the NSE follow a random walk theory. The study employed serial correlation tests and runs tests to analyze daily price returns for eighteen companies whose stocks constituted the NSE 20 share over the period July 2008 to June 2011. The findings suggest that random walk model cannot be a good description of successive price returns at the Nairobi stock exchange.

Makokha (2012) conducted an investigation in the Kenyan stock market to test whether the day of the week anomaly exists. Daily market capitalization was used to compute the stock return and carry out multiple regression from January 2008 to December 2011. The results obtained show that Tuesday has the highest positive return and Wednesday has the highest negative return. Stock return volatility is highest on Tuesday and lowest on Friday. The study concludes that there is no day of the week effect at the Nairobi Securities Exchange.

In testing the existence of January effect at the NSE, Nyamosi (2011) carried out a descriptive research. The population of interest in the study consisted of fifty two firms listed for equity stocks at the NSE for the period 2001 to 2010. Their mean returns were used to investigate the existence of January effect at the NSE. The data comprised of the monthly share prices and returns. Regression analysis of beta co-efficients of the model showed negative co-efficients between the average dependent variable for the months of
February through December and an average positive dependent variable for January. This confirmed higher returns in January compared to the other months.

Onyuma (2009) in determining the existence of daily and monthly seasonal anomalies in the NSE used stock returns in his study. He used regression analysis in analyzing the Data on prices and adjusted returns derived from the NSE 20 index. The study covered a period of twenty six years from 1980 to 2006. It confirmed that both the daily and monthly seasonal anomalies do exist in the NSE.

2.6 Conclusion

This chapter has reviewed the various studies on day of the week effect in different markets in the world involving both stocks and bonds. The findings have different conclusions based on the location of the market and the timing of the study. There have been different explanations for this day of the week anomaly. Some researchers have attributed the anomaly to new negative information originating from the long weekend. Other researchers have not been able to provide any information. The findings of this research hopefully will add to the available literature on day of the week effect in the Kenyan bond market.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives a description of the research methodology employed in achieving the objectives of this study. The chapter presents the research design, target population and sampling procedure, data collection procedures, and data analysis.

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 served a variety of research objectives such as descriptions of the characteristics associated with the subject population, estimates of proportions of a population that have these characteristics and discovery of associations among different variables. It involved measurement, classification, analysis, comparison and interpretation of daily bond prices from the NSE statistically to determine the relationship between the day of the week and bond prices at the NSE. The descriptive research design enabled an easy analysis of the huge data obtained from the NSE by reducing the ambiguity of the research evidence and ensured that the evidence answered the research question unambiguously.
3.3 Population

The population of interest for this research was composed of all the 11 listed companies that have issued bonds at the Nairobi Securities Exchange. The data from all the 11 companies was used based on availability and access.

3.4 Data Collection

The data for this study was collected from the NSE. Secondary data for the daily market capitalization from January 2009 to December 2013 (5 Years) was used. The data series comprised of the daily market index, daily prices of the 11 firms which have issued bonds at the NSE.

3.5 Data Analysis

To meet the objective, the data was analysed and tested to yield conclusions on the existence of Day of the Week Effect on bond returns at the NSE. The study adopted the regression model used by Makokha (2012). The period of the study was from January 2nd, 2009 to December 31st 2013. The daily bond prices for each company were used to compute daily returns, Rt.

\[ R_t = \ln \left( \frac{C_t}{C_{t-1}} \right) \times 100\% \]

Where:

\( \ln \) is the natural logarithm operator,

\( C \) is the daily price for each individual bond.
Daily returns computed this way were then continuously, compounded, and percentage returns from day to day calculated. Initially, the research employed dummy variable regression to determine the day-of-the-week effect at the NSE. A linear regression was run where each day is represented by a dummy variable equal to one if the return is for the day and equal to zero if the return is for another day.

\[ R_d = D_{MRM} + D_{TRT} + D_{WRW} + D_{RRR} + D_{FRF} + \epsilon_t \]

Where:

\( R_d \) is the bond return,

\( D_{MR}, D_{TR}, D_{WR}, D_{RR}, D_{FR} \) represent the dummy variables for Monday, Tuesday, Wednesday, Thursday, and Friday respectively

\( R_{MR}, R_{TR}, R_{WR}, R_{RR}, R_{FR} \) represent the return for Monday, Tuesday, Wednesday, Thursday, and Friday respectively

\( \epsilon_t \) is an error term

This model assumed that the error terms and variances are constant across time. In addition, Wooldridge (2003) shows that multiple linear regression assumes that the parameters are linear, the sample is random, the error terms are mean zero, none of the variables are perfectly collinear, and the regression coefficients are unbiased.

The research used five dummy variables as independent variables and the bonds return as a dependent variable. The t-test was used to test if there is a significant difference in bonds returns across the five days of the week. The research also used the F-test to test
the extent to which the deviations of these daily bond returns are different. Most past research works on daily market anomalies have used the method of regression using dummy variables. This is the reason why this research adopted the same methodology. This made it easy to compare the results with the earlier findings.
CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter focuses on the results of data analysis and discussion of findings. The aim was to document the day of the week effect on bond returns. The data was collected from the 11 companies that had issued corporate bonds and covered the period 2009 – 2013. The study used both descriptive and inferential statistics to analyze the data found. It addresses issues such as the: descriptive statistics; regression results; and correlation coefficients among the variables. Data analysis results were presented using tables.

4.2 Descriptive Statistics

This sub-section gives the summary statistics of the main variables that have been included in the model including: minimum, maximum, mean, standard deviation, skewness, kurtosis and tests for normality.

Table 4.1: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Bond Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Mean</td>
<td>0.0129</td>
<td>0.0130</td>
<td>0.0049</td>
<td>0.0020</td>
<td>0.0072</td>
<td>0.0057</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.1184</td>
<td>0.1239</td>
<td>0.1003</td>
<td>0.0927</td>
<td>0.0094</td>
<td>0.0650</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.645</td>
<td>0.675</td>
<td>0.803</td>
<td>0.867</td>
<td>1.144</td>
<td>0.644</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.894</td>
<td>1.487</td>
<td>2.425</td>
<td>3.065</td>
<td>3.023</td>
<td>1.936</td>
</tr>
</tbody>
</table>
The results showed that the Monday bond return had a mean of 0.0129 with a minimum of -0.304, a maximum of 0.3732, skewness 0.645 and kurtosis of 1.894. Tuesday bond return had a mean of 0.0130, minimum of -0.2983, maximum of 0.3918, skewness of 0.675 and kurtosis of 1.487. Wednesday bond return had a mean of 0.0049, minimum of -0.2158, maximum of 0.3458, skewness of 0.803 and kurtosis of 2.425. Thursday bond return had a mean of 0.0020, minimum of -0.2211, maximum of 0.3207, skewness of 0.867 and kurtosis of 3.065. Friday bond return had a mean of 0.0072, minimum of -0.0120, maximum of 0.0401, skewness of 1.144 and kurtosis of 3.023. Overall bond return had a mean of 0.0057, minimum of -0.1630, maximum of 0.1929, skewness of 0.644 and kurtosis of 1.936.

Analysis of skewness shows that Monday, Tuesday, Wednesday and Thursday are asymmetrical to the right around its mean. Additionally, Thursday and Friday is highly peaked compared to other regressors.

4.3 Normality Test

Jarque-Bera, Doornik-Hansen and Shapiro-Wilk tests are test statistics for testing whether series are normally distributed. They measure the difference of the skewness and
kurtosis of the series with those from the normal distribution using the null hypothesis of a normal distribution. They hypothesize that:

\[ H_0: \text{Sample follows a Normal distribution.} \]
\[ H_a: \text{Sample does not follow a Normal distribution.} \]

When the p-value is greater than the alpha value (\(\alpha \leq .05\)), then one fails to reject the null hypothesis and don’t accept the alternative hypothesis. From the results, the null hypothesis of normal distribution is rejected as the computed p-value is less than the significance level alpha=0.05.

**Table 4.2: Normality Test**

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Bond Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig</td>
<td>0.0247</td>
<td>0.0611</td>
<td>0.0107</td>
<td>0.00277</td>
<td>0.00585</td>
<td>0.0222</td>
</tr>
<tr>
<td>Shapiro-Wilk test</td>
<td>0.9457</td>
<td>0.9580</td>
<td>0.9376</td>
<td>0.9080</td>
<td>0.8771</td>
<td>0.9349</td>
</tr>
<tr>
<td>Sig</td>
<td>0.0194</td>
<td>0.0641</td>
<td>0.00896</td>
<td>0.00069</td>
<td>0.00007</td>
<td>0.00697</td>
</tr>
<tr>
<td>Sig</td>
<td>0.0113</td>
<td>0.0299</td>
<td>0.00065</td>
<td>0.00002</td>
<td>0.000027</td>
<td>0.00995</td>
</tr>
</tbody>
</table>

The study results are in consistence with various scholarly views; (Fama (1965), Gibbons and Hess (1981), Lakonishok and Levi (1982), Keim and Stambaugh (1984), and Aggrawal, Mehdian and Perry (2003)). Jaffee and Westerfield (1985a) found that the mean returns are significantly higher on Fridays relative to other days and found a negative Monday effect in Canada and the U.K., but a negative Tuesday effect in Japan and Australia. Condoyanni, Hanlon and Ward (1987) confirm these findings on the Japanese and Australian markets.

Kato and Schallheim (1985) also found that the Tuesday return is negative and Wednesday and Saturday returns are strongly positive in Japan. Jaffe and Westerfield
(1989) wrote a significant paper providing international evidence. Bad-Friday effect, which refers to a decline of the market on Fridays, usually precedes Monday with increased stock selling pressure.

4.3.1 Multicollinearity – Correlation Matrix

Correlation matrix indicates a linear association of the explanatory variables and helped in determining the strengths of association in the model, that is, which variable best explained the relationship between day of the week and bond returns. It also helped in deciding which variable(s) to drop from the equation. This helped test the hypothesis:

H₀: there is no significant relationship between day of the week and bond returns

Hₐ: there is a significant relationship between day of the week and bond returns

Table 4.3: Correlation Matrix

<table>
<thead>
<tr>
<th>Day</th>
<th>Bond Return</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Pearson Correlation</td>
<td>.968**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>Pearson Correlation</td>
<td>.973**</td>
<td>.989</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Pearson Correlation</td>
<td>.866**</td>
<td>.872</td>
<td>.893</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.091</td>
<td>.070</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>Pearson Correlation</td>
<td>.399</td>
<td>.009</td>
<td>.006</td>
<td>-.216</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.158</td>
<td>.948</td>
<td>.969</td>
<td>.124</td>
</tr>
<tr>
<td>Friday</td>
<td>Pearson Correlation</td>
<td>.490</td>
<td>.015</td>
<td>.007</td>
<td>-.101</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.527</td>
<td>.915</td>
<td>.962</td>
<td>.478</td>
</tr>
</tbody>
</table>
From the Table 4.3, it can be deduced that there was a positive correlation between bond returns and day of the week. The first three days of the week exhibited strong, positive and significant linear relationship with bond returns: Monday ($R = .968; p < .001$), Tuesday ($R = .973; p < .001$), and Wednesday ($R = .866; p < .001$). Thursday ($R = .399; p = .158$) and Friday ($R = .490; p = .527$) had positive but insignificant relationship with bond returns.

However, the independent variables had low collinearity owing to their correlation value between them. According to Babak (2012), the limitation of Pearson correlation coefficient is that though it indicates the strength of a linear relationship between two variables, its value generally does not completely characterize their relationship, thus, the subsequent analysis.

**Table 4.4: Multicollinearity Test**

<table>
<thead>
<tr>
<th></th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>.320</td>
<td>3.121</td>
</tr>
<tr>
<td>Tuesday</td>
<td>.317</td>
<td>3.157</td>
</tr>
<tr>
<td>Wednesday</td>
<td>.148</td>
<td>6.742</td>
</tr>
<tr>
<td>Thursday</td>
<td>.718</td>
<td>1.394</td>
</tr>
<tr>
<td>Friday</td>
<td>.894</td>
<td>1.118</td>
</tr>
</tbody>
</table>

Variance Inflation Factors (VIF) shows that there is low collinearity amongst the independent variables as the VIF values were below the critical value of 10: Monday (3.121), Tuesday (3.157), Wednesday (6.742), Thursday (1.394), and Friday (1.118). Besides, tolerance values were above the critical values of 0.1. As stated by Studenmund
(2006), the variance (the square of the estimate's standard deviation) of an estimated regression coefficient is increased because of collinearity.

4.4 Regression Analysis

The regression method used for this study was the least square method. This was used to determine the line of best fit for the model through minimizing the sum of squares of the distances from the points to the line of best fit. Through this method, the analysis assumed linearity between the dependent variable and the independent variables.

Table 4.5: Model Summary

<table>
<thead>
<tr>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>.719a</td>
<td>.517</td>
<td>.498</td>
<td>.00314319</td>
<td>1.973</td>
</tr>
</tbody>
</table>

R value in Table 4.5 denotes the correlation coefficient between dependent and independent variables; that is, if there is a linear relationship and the nature of the relationship if at all exists. Coefficient value of 0.719 was established. This illustrates a good relationship between days of the week and bond returns. R-square values present the strength of the relationship between the variables. From the adjusted determination coefficients, a strong linear relationship was established between dependent and independent variables. Adjusted R-square value of 0.498 was established. Their R-squared is high reflecting the increased explanatory power of model.

The study also used Durbin Watson (DW) test to check that the residuals of the models were not autocorrelated since independence of the residuals is one of the basic hypotheses of regression analysis. Being that the DW statistics were close to the
prescribed value of 2.0 (DW = 1.973) for residual independence, it can be concluded that there was no autocorrelation.

Table 4.6: Analysis of Variance

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>.215</td>
<td>5</td>
<td>.043</td>
<td>4347.188</td>
<td>.000b</td>
</tr>
<tr>
<td>Residual</td>
<td>.000</td>
<td>46</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.215</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analysis of Variance’s (ANOVA) f-test was used to make simultaneous comparisons between two or more means; thus, testing whether a significant relation exists between variables (dependent and independent variables); thus, helping in bringing out the significance of the regression model. Table 4.6 presents f-value 4347.188 at p < .001. It can be concluded that the regression model was significant.

Table 4.7: Model Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-.002</td>
<td>.001</td>
<td>-</td>
<td>-4.108</td>
</tr>
<tr>
<td>Monday</td>
<td>.197</td>
<td>.026</td>
<td>.359</td>
<td>7.581</td>
</tr>
<tr>
<td>Tuesday</td>
<td>.186</td>
<td>.027</td>
<td>.354</td>
<td>6.762</td>
</tr>
<tr>
<td>Wednesday</td>
<td>.190</td>
<td>.011</td>
<td>.293</td>
<td>16.643</td>
</tr>
<tr>
<td>Thursday</td>
<td>.172</td>
<td>.006</td>
<td>.245</td>
<td>30.675</td>
</tr>
<tr>
<td>Friday</td>
<td>.248</td>
<td>.050</td>
<td>.036</td>
<td>4.999</td>
</tr>
</tbody>
</table>

The established regression equation for year 2005:

\[
\text{Bond Return} = -0.002 + 0.197\times\text{Monday} + 0.186\times\text{Tuesday} + 0.190\times\text{Wednesday} + 0.172\times\text{Thursday} + 0.248\times\text{Friday} \\
p < .001
\]
From the finding in the above table the study found that holding Monday – Friday returns at zero, the overall bond returns was -0.002. Holding other factors constant, the study found that a unit increase in Monday returns will lead to an increase in bond returns by 0.197 (p < .001), a unit increase in Tuesday returns will lead to an increase in bond returns by a factor of 0.186 (p = .002), a unit increase in Wednesday returns will lead to 0.190 (p = .040) increase in bond returns, a unit increase in Thursday returns will lead to 0.172 (p < .001) increase in bond returns, and a unit increase in Friday returns will lead to 0.248 (p = .031) increase in bond returns. Table 4.6 shows that the regression coefficients of independent variables were significant at 95% confidence level. Figure 4.1 shows that the models residuals are normally distributed.

The study findings are also supported by results in Asian markets, the-day-of-the-week effect on stock has also been evidenced in several Asian stock markets before the Asian financial crisis, 1997. These markets were characterized as having very high returns, high volatility in returns, and high illiquidity. East Asian markets in the post-crisis years still remains of great interest because of high economic growth rates that lead to high market returns. Wong and Ho (1986) reported evidence of day-of-the-week and seasonal effect in the Singapore market.

The pattern was similar to that of the US market. One difference noted is that, in Japan and Australia, mean return is negative on Mondays and the highest positive return occurs on Fridays. The mean daily return in January is higher than that for other months, although the end-of-year effect is not significant at all. Aggarwal and Rivoli (1989) noted day-of-the-week effect in Hong Kong, Korea, Taiwan, Japan, and Singapore, while Ho’s (1990) paper finds strong, seasonality effect – an evidence against the EMH - in ten
Asia-Pacific markets, further confirming the day-of-the-week effect in Singapore, Malaysia, Hong Kong, and Thailand. Chen, Kwok, and Rui (2001) reported day-of-the-week effect in China, showing negative Tuesdays after 1995 and highlighting that this anomaly disappears once non-normality and spill-over from other countries is taken into account.

Figure 4.1: P-P Plot

4.5 Discussions

The results show that corporate bond returns follows day of week signals. The market gave average positive returns on all days. Friday, however, had the most returns given positive returns in at least 75% of all the observations as shown in the descriptive statistics.
Figure 4.3 shows that Monday, Tuesday and Wednesday returns had the highest variability especially during mid-year and towards the year end. In NSE, the maximum average return is on Tuesday and had the highest standard deviation followed by Monday. Thus, there is a signal of Tuesday effect. However, Thursday exhibits near about zero return. This implies that the average returns vary among the days of the week. Hussain et al (2011) established a significant Tuesday effect in Pakistani Stock market during a week exhibited by high return unlike other days of the week which had constant returns. Returns on Tuesday were more volatile over other days. However, this is contrary to the Chukwuogor-Ndu (2006) findings that occurrence of the highest daily return is evenly spread across Thursday and Friday. The lowest return was experienced on Monday and Wednesday.

The value of the skewness and kurtosis suggest that the return distribution is not a normal distribution for all the days of the week. Further the null hypothesis for the Jarque-Bera test of the presence of normal distribution has been rejected at 1% level of significance.
The Efficient Market Hypothesis explains that there are constant market returns for the whole week. The day-of-the-week effect happens because perfect market do not exist. In economics, a perfect market is defined by several condition. Among these conditions are: Perfect market information, no participant with market power to set prices, no intervention by governments, No barriers to entry or exit, equal access to factors of production, profit maximization, and no externalities. True perfect competition can exist only under a set of conditions that are not possible in the real world, and so no real perfect markets exist. The concept is used in economics, not to describe any state of affairs in the real world, but as a construct to simplify thought experiments about how economies work and provide a benchmark to which real world markets can be compared.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents discussions of the key findings presented in chapter four, conclusions drawn based on such findings and recommendations there-to. This chapter is structured into summary, conclusions, recommendations and areas for further research.

5.2 Summary

The objective of the study was to determine the daily bond returns for the all five days of the week. It also sought to determine if there is a significant difference in bond returns for all the five trading days. It was then analysed using excel sheets and SPSS to compute the daily stock market returns. From the analysis, Tuesday had the highest return than any other day of the week. Wednesday on the other hand had the lowest negative return. This contradicts the observation by researchers such as Onyuma (2009) and many others who observed that Monday had the lowest negative return while Friday had the highest positive return.

5.3 Conclusion

Empirical results of this study indicate that there is a significant Monday, Tuesday and Wednesday effect in bond market during a week. On Friday there is high return. Returns on Mondays are more volatile over other days. The results show that there is a significant relationship between the dependent variable which is the bond market return and
independent variables which are the five days of the week. The research findings indicate that there is little bond return volatility at the NSE as judged by the distribution. Tuesday has the highest volatility, then Monday, Wednesday and then Friday. The study concludes that: the day of the week effect is present in mean returns for the bond market return; there is strong evidence for the day of the week effect in both return and volatility; and, it seems that bond market anomaly exists in both return and volatility.

5.4 Recommendations

The day of the week effect patterns in return might enable investors to take advantage of relatively regular market shifts by designing and implementing trading strategies, which account for such predictable patterns. The findings support that this potential advantage of investors due to the day of the week effect anomaly is present in the Kenya bond market.

5.5 Limitations of the Study

The corporate bond returns may have been affected by other market and corporate event. Macroeconomic performance such as inflation and environmental factors might also have mediated the relationship between bond returns and day of the week effect. These factors could not be isolated in the study owing to difficulty in doing so.

5.6 Suggestions for Further Research

The study suggests that similar study can be conducted on stock returns. This would produce a holistic view of the day of the week effect. This will allow for a comparison of
the findings and recommendations. Additionally, further studies can be conducted on other periods such as January effect.
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Cabello, A., & Ortiz, E. (2002). Day of the Week and Month of the Year Anomalies at the Mexican Stock Market.


Klesov, A. (2008). Calendar effects on stock market: Case of selected CIS and CEE countries.


Addison Wesley. 4, 245-273.


APPENDIX

Appendix 1: Corporate Bonds Traded at the NSE

<table>
<thead>
<tr>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centum</td>
</tr>
<tr>
<td>Consolidated Bank of Kenya Ltd</td>
</tr>
<tr>
<td>Shelter Afrique</td>
</tr>
<tr>
<td>Barclays Bank</td>
</tr>
<tr>
<td>Mabati Rolling Mills</td>
</tr>
<tr>
<td>CFC Stanbic Bank</td>
</tr>
<tr>
<td>Kengen</td>
</tr>
<tr>
<td>I&amp;M Bank</td>
</tr>
<tr>
<td>Housing Finance</td>
</tr>
<tr>
<td>Safaricom Ltd</td>
</tr>
<tr>
<td>PTA Bank Ltd</td>
</tr>
</tbody>
</table>
### Appendix 2: Average Bond Returns

<table>
<thead>
<tr>
<th>wk</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>wk2</td>
<td>0.16756</td>
<td>0.162389</td>
<td>0.108154</td>
<td>-0.0046</td>
<td>0.005118</td>
<td>0.08394</td>
</tr>
<tr>
<td>wk3</td>
<td>-0.00409</td>
<td>-0.02531</td>
<td>-0.0264</td>
<td>-0.00261</td>
<td>0.002037</td>
<td>-0.01146</td>
</tr>
<tr>
<td>wk4</td>
<td>-0.0023</td>
<td>-0.00879</td>
<td>-0.00919</td>
<td>0.003724</td>
<td>0.012195</td>
<td>-0.001</td>
</tr>
<tr>
<td>wk5</td>
<td>0.003716</td>
<td>0.008471</td>
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