EFFECT OF MARKET LIQUIDITY AND THREE FACTOR ASSET PRICING MODEL ON EXCESS RETURNS IN NAIROBI SECURITIES EXCHANGE, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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This thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

This thesis is dedicated to my wife Gorrety and my lovely children Genevieve, Gerald and Gabriel who have been patient enough throughout my studies.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey-Fuller (ADF)
ADLM	Autoregressive Distributed Lag Model
AMEX	American Express Company
AIC	Akaike Information Criterion
ARCH	Autoregressive Conditional Heteroskedasticity
ATS	Automated Trading System
CAPM	Capital Asset Pricing Model
CARRA	Coefficient of Relative Risk Aversion
CBK	Central Bank of Kenya
CDS	Central Depository Settlement
CHU	Complaint Handling Unit
CMA	Capital Market Authority
ECN	Electronic Communication Network
EMH	Efficient Market Hypothesis
FISD	Financial Information Services Division
GDP	Gross Domestic Product
HML	High Minus Low
IFRS	International Financial Reporting Standard
IPO	Initial Public Offer
IPS	Im, Pesaran and Shin
JB	Jarque-Bera
LCAPM	Liquidity Capital Asset Pricing Model
NASDAQ	National Association of Securities Dealers Automated Quotation Exchange
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
OECD	Organization of Economic Co-operation and Development

OTC	Over the Counter
PP	Philip and Peron
REE	Rational Expectation Equilibrium
SMB	Small Minus Big
SIIA	Software and Information Industry Association
SSA	Sub-Sahara Africa
USA	United State of America

DEFINITION OF KEY TERMS

Depth: refers to transaction dimensions (abundant number of orders and order volume) that can be absorbed by the market without causing sharp changes in price, (Cornelia et al, 2014).

Excess Return: A return that is larger than some benchmark, especially the risk-free return, (Farlex Financial Dictionary, 2012).

Equity risk premium: The expected return on stocks in excess of the risk-free rate is a fundamental quantity in all of asset pricing, both for theoretical and practical reasons, (Duarte, 2015).

Immediacy: refers to the time needed for an order to be processed; it considers the time elapsed between the moment one order was placed until it was settled, (Cornelia, Maria & Iustin, 2014).

Market maker: liquidity provider is a company, or an individual, that quotes both a buy and a sell price in an instrument or commodity held in inventory, hoping to make a profit on the *bid-offer spread*, or *turn*, (O'Hara, 1995).

Market liquidity: Market liquidity is the ability to rapidly execute sizable securities transactions at a low cost and with a limited price impact, (IMF, 2015).

Market microstructure: Market microstructure is a branch of finance concerned with theoretical, empirical, and experimental research on the securities markets (O'Hara, 1995)

Market resiliency: Market resiliency can be described in general as the ability to execute a transaction with a minimum influence on price while taking into account the elasticity of supply and demand of the market. (Gabrielsen, Marzo & Zagaglia, 2011)

Portfolio: is a collection of financial securities held by an investor. (Farlex Financial Dictionary, 2012).

Resiliency: refers to the market capacity to absorb random shocks by correcting order imbalances and/ or dissipating price fluctuations with the highest speed possible, (Cornelia et al, 2014)

Tightness: refers to the cost efficiency of any transactions; the lower the cost, the higher the liquidity, (Cornelia et al, 2014)

ABSTRACT

Market liquidity is an important aspect in the well-functioning of the financial markets. It represent the degree to which an asset or securities can be traded without affecting the price of the securities and at the shortest time possible. It is a multidimensional concept which constitute market depth, market breath, market tightness, market resiliency and which requires different measures to capture liquidity. The general objective of the study was to establish the effect of market liquidity and three factor model on excess return in Nairobi Securities Exchange. Specifically the study was to establish the effect of Bid Ask spread, Trading Volume, Price impact, Market resiliency and the three factor model on Excess return in Nairobi Securities Exchange. The research adopted quantitative research design. The population was comprised of all the 64 companies in Nairobi Securities Exchange (NSE). The data was obtained from Nairobi Securities Exchange (NSE) and the Central Bank of Kenya (CBK) publication for 10 years between the years 2006 to 2015. The study found that the variables considered had significant effect on market returns. In particular the market premium variable was found to be significant across all the six portfolios considered. The Value premum High minus Low (HML) and size pemium, Small minus Big (SMB) were found to be significant in most of the portfolios apart from a few. All the other variables as used to measure liquidity were found to have mixed effects across the market. The study concluded that the three factor asset pricing variables are quite significant in pricing the security and the market liquidity factors are also important for pricing the securities. The study recommends that the policy makers should initiate policies aimed at increasing on market liquidity. These policies should strive to lower transaction cost, increase volume of trade and increase the number of companies trading in Nairobi Securities Exchange (NSE). The study suggest the future research can look at the Macroeconomic effects on excess returns

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Liquidity is an important aspect in the success of companies, financial assets or securities and the financial market. The conceptualization of liquidity dates back to 1930 as provided by Keynes in his "Treaties on money" where he referred to bills and call loans of banks and he described them as more liquid than investment that is more certainly realizable at short notice without loss. (Gabrielsen, Marzo & Zagaglia, 2011) argue that asset liquidity in modern financial market is key but elusive concept. A market is liquid when the prevailing structure of transactions provides a prompt and secure link between the demand and supply of the asset and thus delivering low cost of transaction. Arnold (2005) describes liquidity as the degree to which an asset can be sold quickly and easily without loss in value. Harris and Piwowar (2003) describes liquidity as the ability to trade large size quickly, at low cost, when you want to trade in an asset.

Market liquidity is the ability to rapidly execute sizable securities transactions at a low cost and with a limited price impact, (IMF, 2015). In a liquidity market is possible at any time, and its independent of the transaction size, it does not induce fundamental unjustified price changes. These descriptions encompasses a number of dimensions, this includes time, quantity and price. Time looks at how long does it take to liquidate a position, quantity looks at how large positions can be liquidated, and the price is how high discount on the fair value has to be accepted at liquidating.

Market liquidity is an important feature of capital assets and it greatly affects their pricing. Investors prefer to commit capital to liquid investment which can be traded quickly and at lower cost whenever the need arises. Investments with less liquidity must

offer higher expected return to attract investors. Market liquidity is a key element of well-functioning of stock market as it has repercussions from traders, and the trading venues that is the stock exchange or the alternative trading system. Market liquidity is an essential condition of the normal functioning of the financial market and the financial system. Liquid markets facilitate distribution of financial risk to market participants who are most able and willing to bear them and enable investors to hedge risk as well as adjust their portfolio effectively and enable the effective generation and dissemination of issuer's specific information. Deep and liquid financial markets are also important to financial stability, PWC, (2015).

IPF (2015) contends that market liquidity is multidimensional concept and research should consider several dimensions of this risk. The main characteristics of market liquidity was identified as tightness, depth, resiliency, breadth and immediacy. Kyle (1985) identifies its three main components which are breadth, depth and resiliency. In addition to the three dimensions (Marcato, 2015) increases the other dimensions of market liquidity such as tightness and immediacy.

Harris (1990) defines market breadth as the situation in which there exist orders, either actual or easily uncovered, both above and below the price at which a security is actually trading, Kyle (1985) defines tightness as the cost of turning around a position over a short period of time. Fernandez (1999) breath is the distance from the mid-market prices to it, breath is understood as the distance between the sellers and the buyers with respect to the valuation of the assets traded in the market. Market depth is based on the number of market participant ready to trade rather than on their readiness to pay. Depth either as the availability of counteroffers, or as the quantities quoted by market makers or the maximum trading volume not affecting the prices (Kyle, 1985).

Harris (2003). Market liquidity from the point of market depth refers to finding a trading partner offering an acceptable price. This is relatively easier in market on which numerous traders are active simultaneously than in markets with very few active traders. Persaud (2002) noted that the size of the market though highly important is not sufficient for market liquidity. It must be accompanied by sufficient diversity of traders to realize its effect. If both sides of the market are balanced, more depth leads to higher liquidity. In normal times, this balance is ensured by the activity of noise traders. While insider or information traders act upon their future O'Hara (1997). While the former ones become active only if the current market price drift away from the fair valuation of the assets, the latter one buy and sells independently of the market price level. A market with full information and without noise, no matter how big, would be extremely illiquidity Black (1986). If prices fell below the fair value, everybody would like to sell and with prices at the fair level nobody would have an incentive to trade. The existence of investors who trade for exogenous reasons provides the necessary diversity and consequently the depth of the market. Thus noise trading is essential for market liquidity. The practical relevance of market depth lies not only in the possibility of finding a buyer or seller for a single unit of an asset but also in the ease of trading larger quantities of assets. An investor willing to accomplish an unusually large transaction, e.g. a sale of large stock holding, is forced to fall back on buyers offering less favourable prices.

Kim & Kim (2015) argue that resiliency is characterized as the speed of price recovery that reverts to its fundamental value from the prior transitory price impact driven by informed trader. It is a liquidity feature where the market is less prone to market impact but also react more quickly to trade activity. Harris (2003) specifies that resiliency is how quickly prices revert to fundamental values driven by value traders after price changes in response to large order flow imbalances initiated by liquidity demander or uninformed trader. This mechanism can only work if investors can learn about the unjustified price change and its background quickly enough. It requires that channel

exist through which such information can be forwarded to interested market participants. While it is not a problem in organized market in which prices and trading volumes are quoted publicly, it might be a problem in non-organized market. Without a central source of information system some investors who would be interested in trading at the favorable price will not be able to do so simply because they will not learn about the order imbalance on time. In effect the traders on the underrepresented side of the market are forced to either postpone their transaction or to accept the unfair prices. Thus, what distinguishes resiliency from other aspect of liquidity is the role of the flow of information among market participants.

Asset pricing is the core element of financial economics, which mainly studies how the future price and return of financial asset changes under the uncertain conditions. Traditional asset pricing theory builds on a series of strict hypothesis, especially assuming that security trading is frictionless. The assumption is that all assets are liquid and easily tradable by economic agents. In reality the assets are not completely liquid, so the agents cannot buy and sell them immediately longstaff, (2004).

Amihud (2002) argues that excess return which is the return in excess of risk free rate includes an illiquidity premium. This assertion is that in determining excess return liquidity is very important. (Pastor and Stambaugh, 2003) found that stocks liquidity beta plays a significant role in determining excess return. Stocks with low liquidity should have a higher expected return to compensate the cost due to holding the stock. The stock with a higher liquidity beta should have a higher return.

1.1.1 Developed Market

As opposed to emerging markets, developed markets refer to nations that have a greater degree of economic development judged on economic size, income and the maturity of capital markets. They are relatively more open to foreign ownership and enjoys ease of capital movement, efficiency of market institutions, high level of industrialization, a

high standard of living and a large amount of widespread infrastructure. Some developed markets you can immediately name include Western Europe, the United States, Japan, Australia, Canada, Singapore, and of course, Hong Kong.

Liquidity and sophistication of capital markets are the most important characteristics of developed markets, which still have more than 80 per cent of the world's stock market capitalization. As of 2013, the developed markets still represented about 90 per cent of global, which was up 9 per cent in 2012. The US grew at 9 per cent and Europe increased by 8 per cent. So as you can see, investing in developed markets carries lower level of risk than investing in emerging markets. Because their economies are well established, developed markets offer safer, more stable investment opportunities relative to emerging markets.

1.1.2 Emerging Market

Emerging markets are the less developed and less liquid countries. The main problem of the emerging markets impacting market liquidity are: small number of stocks with significant capitalization, small numbers of shares outstanding, infrequent and irregular trading. Additionally, there are typically short time series of past trades, lack of transparency and readily accessible information about traded companies, as well as the appearance of the so-called invisible forms of risk, where illiquidity is the most important one. Due to all these factors frontier markets suffer from the increased level of systematic risk, Latkovi'c and Barac (1999). In frontier markets, non-trading problems are particularly acute. The time period between two subsequent trades can be several weeks. Such a situation is certainly not common for traded securities in developed capital markets, Latkovi'c, (2001). Frontier markets have some specific features that cannot be found in developed markets, Latkovi'c and Barac (1999). These markets are characterized by a relatively large number of illiquid stocks, Beni'c and Frani'c (2008). Undeveloped market often features low liquidity and infrequent trading. Investors in

these markets are attracted by the high return potential but, at the same time, are scared by the liquidity risk in the market, Zhang, (2010).

Hacibedel (2007) listed some of the major differences between emerging and developed markets: difference in the level of information efficiency that is the cost of information, and asymmetry of information between domestic and foreign investors, difference with respect to the investor base, distinction between foreign and local investors in emerging markets, both in terms of risk taking behavior and weight, difference in terms of level of homogeneity of the assets, difference is the stock liquidity, and difference in the level of integration with the world markets.

As suggested by (Zivkovi'c and Minovi'c, 2010) there are many risks associated with investing in emerging and frontier markets. They showed that market illiquidity and its volatility significantly varies over time on the Serbian market. In these smaller frontier markets unpredictability of liquidity is also important source of risk. The simple fact is that for periods of time, there may be no market for a stock in a frontier market company. The regulatory scheme within these countries varies and often provides far less oversight than in more developed countries.

Lesmond (2005) Emerging markets are experiencing explosive growth. Not only did the total value of shares traded increase, but the total market capitalization rose. The growth in emerging markets is, in part, fueled by foreign investments that the World Bank estimates exceeded $47 billion in 2000 from a mere $0.1 billion in 1985. The increasing investment interest in emerging markets can yield spectacular returns that can easily exceed 90% in any given year. These returns, while substantial, are subject to increased risk and volatility; they are significantly reduced by the increased illiquidity of trading stocks in emerging markets relative to more developed markets.

Sub-Saharan Africa's equity markets are generally small and with the notable exceptions of South Africa and the three North African countries of Egypt, Morocco and Tunisia account for a mere 10.78% of the continents market capitalization. Furthermore South Africa alone accounts for 74.70% of the continents capitalization and alongside the North African markets features prominently in emerging markets investors inventories. The marginalization of smaller Sub-Saharan African (SSA) equity markets in portfolio allocation is noted in a World Bank report which finds that in 2003 the region only attracted 3.5% of the total $14.3 billion worldwide foreign equity portfolio investment (African Business, 2005).

Apart from a few prominent exceptions, most notably that of South Africa and Botswana, the size of stock markets in relation to rest of economy, indicated by the market capitalization to GDP ratio, is low. South Africa's 232.7% ratio of market capitalization to GDP is in line with ratios prevailing in many Organisation of Economic Co-operation and Development (OECD) countries. However traded turnover ratios, relating traded value to market capitalizations, across the continent are depressed and with one exception are generally less than 45%. This provides further evidence of liquidity being a pervasive problem across Africa's securities markets, Hearns and Piesse (2005).

Hearns, (2009) noted that lack of liquidity in Africa's markets and consequent high premiums and high costs of equity plays a major role in rendering market based equity finance uncompetitive in the face of cheaper alternative forms of finance. These can take the form of bank-based finance, which is more common in Francophone countries adhering to French civil code, or various forms of internal finance such as remittances between family members and transfer pricing. Generally Africa's markets demonstrate low levels of primary market activity, with the few IPOs undertaken being small and

infrequent suggesting political factors may play a more significant role in motivating firms to list.

In Kenya, dealing in shares and stocks started in the 1920's when the country was still a British colony. The Nairobi Stock Exchange marked the first day of automated trading in government bonds through the Automated Trading System (ATS) in November 2009. The automated trading in government bonds marked a significant step in the efforts by the NSE and CBK towards creating depth in the capital markets by providing the necessary liquidity , NSE (2005).

1.2 Statement of the Problem

Investors all over the world wish to be able to price excess returns in the stock market without any problems. They want a situation where everyone is aware and informed of the effects of various factors on the excess return and how they can increase their expected return. This can be achieved by getting an asset pricing model that can capture all the factors and accurately price excess return. The derivation of an accurate pricing model is what some academics and practitioners have been striving to achieve in financial economics for over a half century (Basiewicz & Auret, 2010). However there is currently no perfect valuation model that has been able to accurately capture fully the actual behaviour of asset prices in emerging markets and explain excess returns in a complete manner (Riro and Wambugu 2015).

For a longtime several models of asset pricing have been developed to help determine a stock return this includes Sharpes (CAPM 1954) and Fama French (1973) models. Riro and Wambugu (2015) argued that although these models can explain the expected return of an asset with risk to some degree, there is no model that can explain the expected return in a complete manner. Muriu and Achola (2015) argue that it is probable that these models were mainly developed using data from highly efficient stock market like

NYSE, AMEX, and NASDAQ and they may not hold in market classified as emerging such as Kenya. An emerging market has unique characteristics like lower market liquidity, inexperienced market participants, shorter history, and domination by institutional investor's and concentration of trade in a few stocks.

Several studies have been conducted on market liquidity and its effects on asset pricing especially on more developed economies. Pastor and Stambaugh, (2003) showed that liquidity is priced in the United States of American market, Machado and De Medeiro, (2011) found that liquidity is priced in the Brazilian market and Chan and Faff (2005) obtained similar results in the Australian market. Despite the importance of market liquidity and its effects on asset pricing there is scanty of research on the same in the African context and indeed in Kenya. Hearns (2009) captured liquidity in the Kenyan market by augmenting CAPM with liquidity. Miriu and Achola (2015) looked at three factor model of Fama and French. However none of the studies looked comprehensively at the effects of various measures of market liquidity and asset pricing model factors on excess return.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study is to establish the effect of stock market liquidity and three factor asset pricing model on excess return Nairobi Securities Exchange, Kenya.

1.3.2 Specific Objectives

1. To determine the effect of three factor asset pricing model variables on excess return in Nairobi Securities Exchange
2. To examine the effect trading volume on excess return in Nairobi Securities exchange

3. To establish the effect of price impact on excess return on Nairobi Securities Exchange
4. To examine the effects of market resiliency on excess return in Nairobi Securities Exchange
5. To determine the effect of bid ask spread on excess return in Nairobi Securities Exchange
6. To examine the effects of market immediacy on excess return in Nairobi Securities Exchange

1.4 Hypothesis

H_{01}: There is no significant effect between three factor asset pricing model variables on excess return in Nairobi Securities Exchange

H_{02}: There is no significant effect between trading volume and excess return in Nairobi securities exchange

H_{03}: There is no significant effect between price impact and excess return in Nairobi Securities Exchange.

H_{04}: There is no significant effect between market resiliency and excess return in Nairobi Securities Exchange

H_{05}: There is no significant effect between bid ask and the excess return in Nairobi Securities exchange.

H_{06}: There is no significant effect between market immediacy and excess return in Nairobi Securities Exchange

1.5 Significance of the Study

This study is of great value to the Government, it forms the basis of reviewing the securities market policies and carrying out an evaluation of their effectiveness. A review of the current securities market policies can aid in increasing market liquidity and

boosting of the investors' confidence and eventually strengthening of economic development.

This study is useful to both the potential and actual investors in understanding the workings of Nairobi Securities Exchange and how market liquidity is priced. This can help them in making informed decisions especially in determining on the investment horizon to invest for.

The researchers will have a basis for further research by adopting a different research methodology or extending the period of analysis. The report forms a reference for future studies for the academicians where it can be incorporated in the area of market microstructure in advanced finance studies.

To the private equity investors this study will assist in making decisions that will increase the value of their investment and help to fuel growth. The private investors need to understand the best combination of business and investment portfolio that will maximize the value of its investment.

The study is also useful to the stock brokerage firms or market makers as they are interested in providing the efficient flow of the market by providing the underlying liquidity for buy and sell transaction, infusing capital into the markets to provide the supporting stability needed for orderly execution of the markets. Market makers give quotes for bid ask spread for financial stocks and make a profit on the spread. They also provide liquidity in the market and are compensated by the profits they make.

1.6 Scope of the Study

This study focused on market liquidity and asset pricing of Nairobi Securities Exchange (NSE) of all the listed company in Kenya from 2006 up to 2015. The ten year period has had significant changes in the Nairobi Securities Exchange with growth in that is useful

for analysis. The period is considered appropriate as it is characterized by political and economic regime.

The period is also characterized by a lot of changes on the NSE such as the introduction of Automated trading system (ATS), changes of accounting system to International Financial Reporting Standards (IFRS), conversion of the NSE from company limited by guarantee to company limited by shares, and the NSE becoming a member of the Financial Information Service Division (FISD), all this is to meet international standards of performance and efficiency, (NSE, 2015)

1.7 Limitations of the study

The study covered a ten year period from 2006 to 2015 wich might be considered inadequate to provide in-depth and exhaustive understanding of the effect of market liquidity and three factor model on excess returns. Further the result of the study mainly depend on secondary information analyses which are subject to limitation of the reported results by Nairobi Securities Exchange.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter attempts to summarise the views of other researchers who had carried out their research in the same area of market liquidity and asset pricing. The study specifically covers both the theoretical and empirical literature, as well as the conceptual framework.

2.2 Theoretical Literature Review

The theory of market liquidity looks at six imperfections, summarized by Vayanos and Wang (2012) from various literatures.

2.2.1 Transaction Costs Theory

Transaction cost theory was first introduces by Ronald Coase in 1937 wher he postulated that every company will expand as long as the company,s activities can be performed cheapl within the company, than by outsourcing the activitie to external providers in the market. Transaction cost theory tries to explain why companies exist, and why companies expand or source out activities to the external environment. The transaction cost theory supposes that companies try to minimize the cost of exchanging resources with the environment, and that companies try to minimize the bureaucratic cost of exchanges within the company Williamson (1981).

In the financial markets transaction cost theory was first introduced by (Constantinides, 1986). Constantinides (1986) who derives the optimal investment policy of an infinitely lived agent, who can trade in a risk free and a risky asset. The return of the riskless asset is constant over time, and that of the risky asset is independent and identically

distributed. The risky asset carries transaction costs, which are proportional to the dollar value traded. Because the agent has Coefficient of Relative Risk Aversion (CARRA) preferences, the optimal policy in the absence of transaction costs is to maintain a constant fraction of wealth invested the risky asset. In the presence of transaction costs, the agent instead prevents this fraction from exiting an interval. When the fraction is strictly inside the interval, the agent does not trade. The agent incurs a small utility loss from transaction costs, even though he trades infinitely often in their absence. Intuitively, the derivative of the utility at the optimal policy is zero, and hence a deviation from that policy results in a second-order loss.

While Constantinides (1986) and the subsequent literature mainly emphasize portfolio optimization, they also explore implications for equilibrium asset prices. They do this by giving the agent a choice between two economies: one in which the risky asset carries transaction costs, and one in which it does not but its expected return is lower. They interpret the reduction in expected return that would make the agent indifferent between the two economies as an equilibrium effect of transaction costs.

Amihud and Mendelson (1986) build an equilibrium model, in which agents are risk neutral and have different investment horizons. Upon entering the economy, agents can invest in a set of assets that differ in transaction costs. Agents must sell their assets when they exit the economy, and exit rates are independent of age but can differ across agents. Assets with high transaction costs trade at a lower price in equilibrium. Moreover, they are held by agents with long investment horizons who can amortize the costs over a longer period. Each agent holds only one asset, the one maximizing expected return net of transaction costs amortized over the agent's horizon. The effect of transaction costs on asset prices is concave. Indeed, the price differential between one asset and its next closest in terms of transaction costs is determined by the "marginal" investor who is indifferent between the two assets. Since the marginal investor in the case of assets with

high transaction costs has a long horizon and hence is less concerned about costs, the price differential between these assets is smaller than for low-cost assets.

Vayanos (1998) re-examines the effects of transaction costs in a setting with multiple risky assets and risk averse agents. Agents hold a diversified portfolio at all times, but when they need to reduce their risk exposure they sell disproportionately more of the assets with low transaction costs. Moreover, because transaction costs make agents less willing not only to buy but also to sell an asset, assets with high costs can trade at higher prices than assets with low costs.

Huang (2003) assumes stochastic liquidation needs and two riskless assets, one of which carries transaction costs. He shows that transaction costs can generate a strict preference for diversification even though the assets are riskless. This is because returns net of transaction costs are risky: investing in the less liquid asset yields a low payoff if an agent needs to sell on short notice, and a high payoff otherwise.

Lo et al. (2004) assume that agents trade to share risk and have access to a riskless asset carrying no costs and a risky asset carrying fixed costs, such as, independent of transaction size. They show that transaction costs hinder risk sharing, as and this causes the price of the risky asset to decrease. Because agents in their model have high-frequency trading needs, small fixed costs have a strong effect on the price and the expected return of the risky asset. More recent work on transaction costs emphasizes the time variation in these costs and in the liquidity premia per unit of the costs.

Vayanos (2004) explores time variation in investor horizons, assuming constant transaction costs. He assumes that investors are fund managers subject to withdrawals when their performance drops below a threshold, and that the volatility of asset dividends is time-varying. During volatile times, fund managers' horizons shorten because their performance is more likely to drop below the threshold. This causes

liquidity premia per unit of transaction costs to increase. Transaction cost is expressed in the bid and ask spread of the measure of market liquidity.

Acharya and Pedersen (2005) assume that investors have a one-period horizon and transaction costs are stochastic. They show that part of the costs' price effect is through a risk premium. This is because transaction costs impact the covariance between an asset's return net of costs and the net return of the market portfolio. For example, if an asset's transaction costs increase when the costs of the market portfolio increase or when the market portfolio's dividends decrease, this adds to the asset's risk and causes the asset price to decrease. Beber et al. (2012) examine the effects of stochastic transaction costs when investors differ in their horizons.

In addition to costs of market participation, agents typically pay costs when executing transactions. Transaction costs drive a wedge between the buying and selling price of an asset. They come in many types, such as brokerage commissions, transaction taxes, and bid-ask spreads. Some types of transaction costs can be viewed as a consequence of other market imperfections, while other types, such as transaction taxes, can be viewed as more primitive. Vayanos and Wang (2012).

The relevance of transaction cost theory provides and explanation of the bid and ask spread and the price impact. Transaction cost is expressed in the bid ask spread as a measure of liquidity. Agents pay cost when executing transactions such as taxes, brokerage, commissions, exchange fees and bid-ask spread supply and demand of immediacy with the market makers. The compensation of this immediacy is the bid and ask spread by the investors and its effects on excess return.

2.2.2 Participation costs Theory

The idea of participation cost in the financial market was first introduced by Demsetz (1968). He argued that participation cost is very high studied provision of immediacy,

where he argued that supplying immediacy, is costly but there is a demand for it. Since supplying immediacy is costly only a subset of agents will choose to supply it, and they will be compensated from the price concessions they will earn from the demanders of immediacy. He identified the suppliers of immediacy with the market makers, and their compensation with the bid-ask spread.

Stoll (1978). The suppliers of immediacy were identified as market makers, and their compensation with the bid-ask spread. The market makers are assumed to be the only suppliers of immediacy and to receive an exogenous Participation Costs flow of orders from the demanders of immediacy. The bid-ask spreads chosen by market makers as a function of the process of order arrival, the degree of competition between market makers, and the inventory and risk aversion of market makers.

Grossman and Miller (1988), Modeled Market liquidity as being determined by demand and supply of immediacy. Market makers supply immediacy by their continuous presence and willingness to bear risk during the time period between the arrival of final buyers and the sellers. In the long run the number of market makers adjust to equate the supply and demand of immediacy and this determines the equilibrium level of liquidity risk in the market. Grossman and Miller (1988) emphasize additionally that the bid-ask spread has drawbacks as a measure of liquidity, and suggest the use of price reversal instead. They show that price reversal increases in participation costs.

Duffie (2010) and Suominen and Rinne (2011) model a similar effect in a centralized market. They assume that some agents arrive into a market infrequently with liquidity shocks. These shocks are absorbed by market makers present in the market in all periods, and by other infrequent traders arriving in future periods who can trade with market makers.

Huang and Wang (2009) found out that participation costs affect both the demand for immediacy, they assume that liquidity shocks are opposite across agents and so do not affect the price in the absence of participation costs. Participation costs lower the price because sellers are more willing to participate than buyers. The sellers receive a larger risky endowment, and are hence more concerned about the risk that an additional shock will leave them with a large risk exposure. Huang and Wang (2010) showed that the market can provide less liquidity than the social optimum.

Vayanos and Wang (2012) argued that in the perfect-market benchmark, all agents are present in the market in all periods. Thus, a seller, for example, can have immediate access to the entire population of buyers. In practice, however, agents face costs of market participation, such as monitor market movements and be ready to trade. They modeled market participation by assuming that agents must incur a cost to trade after they have bought assets. This cost is interpreted as entry cost where the agent is learning about the asset. The entry cost has the effect of under investing and under-diversifying, which typically reduces the asset prices.

This theory provides and explanation of the market immediacy. The number of market makers supply and demand of immediacy. Market makers supply immediacy by their continuous presence and willingness to bear risk during the time period between the arrival of final buyers and sellers.

2.2.3 Asymmetric Information Theory

Certain investors or corporate insiders can have superior information (or information processing ability) about the fundamental value of securities. In his paper referred to as market for lemons Arkelof (1970) explains the information asymmetry problem. His paper relate to buyers who are imperfectly informed about the quality of products in the market. In case of market uncertainty. Sellers of high quality products may withdraw

their products from the market because the quality of their product is not recognized by others. This creates an adverse selection problem: informed traders with bad news are likely to sell, and informed traders with good news have an incentive to buy (Akerlof, 1970).

Akerlof (1970) applied the lemon theory in the case of automobile markets where there are good cars and bad cars (lemons) either new or used cars. The individuals in this market do not know the quality of this car until they own it for a specific period. An asymmetry in available information exists between sellers and buyers. The bad cars sell at the same price as good cars since it is impossible for a buyer to tell the difference between good and bad cars because only the seller knows. The good cars may be driven out of the market by the lemons. The author concluded that the difficulty of distinguishing between good and bad quality is inherent in the business world and this may indeed explain many economic institutions and may be an important aspect of uncertainty.

Glosten and Milgrom, (1985) argue that the bid-ask spread results when Market Makers trade with insiders. The assumption is that investors have seen private signals that are unobservable to Market Makers. Hence, sales are triggered due to the knowledge that the price is going to decrease, whereas purchases are driven by the conviction that prices are going to increase. The Market Maker anticipates the price movements and therefore sells for a higher and buys for a lower price than the price with symmetric information. Without these price corrections, he would suffer from systematic losses and would be forced to exit the market. As the trades reveal information, spreads tend to decline with each trade. The bid-ask spreads widen, if the insider information becomes better or the number of insiders increases. (Kyle, 1985), Market Makers have only a passive function. The model is a sequential auction model, such as noise traders determine their quantities first and insiders learn about the ex post liquidation value of the asset afterwards.

Insiders determine their quantity to trade, whereas they must make rational conjectures about market liquidity variables (measured by tightness, depth, resiliency) to choose optimal quantities to trade. In the sequential set up, tightness is an increasing function in how quickly a position has to be turned. Depth increases in the number of noise traders and resiliency is only established by insiders.

Easley and O'Hara, (2004) asymmetric information can exist because some agents have access to private information (not observable by others) or information is obtained from different sources or processed differently. This situation will lead to a liquidity premium when agents want to invest in markets with a high proportion of private information (O'Hara 2003). It can also cause spillover effects in other assets/markets because of information inefficiencies. Cespa and Foucault (2014). This market imperfection is especially important for markets with scarce and thin information such as real estate, where a greater difference between offer prices can be observed than in more efficient markets, such as those for publicly-traded equities or bonds.

O'Hara (2003) and Easley and O'Hara (2004) show in a multi-asset extension of Grossman and Stiglitz (1980) that prices are lower and expected returns higher when agents receive private signals than when signals are public. This comparison, however, is driven not by asymmetric information per se but by the average quality of agents' information. Indeed, while prices in their model are lower under asymmetric information than when signals are public, they are higher than under the alternative symmetric-information benchmark where no signals are observed. Garleanu and Pedersen (2004) show in a model with risk-neutral agents and unit demands that asymmetric information can raise or lower expected returns, with the effect being zero when probability distributions are symmetric as is the case under normality, an assumption used in much of the literature. Thus, both the bid–ask spread and the market impact are measures of market illiquidity that can result from information asymmetry.

2.2.4 Funding Constraint Theory

Funding Constraint was first introduced by Bernanke and Gertler (1989) where they argued that adverse shocks to economic activity depresses the collateral value of productive assets and reduces lending and amplifies the drop in activity. This theory can be applied to the financial markets. Funding constraints in financial markets emphasize the idea that some traders rely on external capital, which is costlier than internal capital, and this affects liquidity and asset prices.

A number of papers link the tightness of funding constraints to the volatility of the collateral. Hart and Moore (1994, 1995) show that uncertainty about assets' liquidation values impairs agents' ability to borrow. Shleifer and Vishny (1992) endogenize liquidation values and the ability to borrow in market equilibrium. Geanakoplos (1997, 2003) defines collateral equilibrium, in which agents borrow to buy financial assets and post the assets as collateral. The amount of collateral is determined endogenously in equilibrium, and is increasing in asset volatility. Moreover, if volatility increases following adverse shocks, funding constraints tighten, and this causes agents to sell assets, amplifying the shocks.

Gromb and Vayanos (2002) link market liquidity to the capital of financial intermediaries and their funding constraints which explains the price impact of liquidity. Investors are subject to liquidity shocks and can realize gains from trade across segmented markets by trading with intermediaries. Intermediaries exploit price discrepancies, and in doing so supply liquidity to investors, they buy low in a market where investors are eager to sell, and sell high in a market where investors are eager to buy, thus supplying liquidity to both sets of investors. Intermediaries fund their position in each market using collateralized debt, and face a funding constraint. Shocks to asset prices that trigger capital losses by intermediaries, tighten the intermediaries' funding

constraints and force them to reduce their positions. This lowers market liquidity and amplifies the shocks.

In Gromb and Vayanos (2002) and Kondor (2009), intermediaries have one investment opportunity, which is a long–short position involving assets trading in segmented markets. Some papers study the effects of funding constraints when intermediaries have multiple investment opportunities. Brunnermeier and Pedersen (2009) show in a static setting that funding constraints generate not only amplification but also contagion, whereby shocks to one investment opportunity are transmitted to otherwise unrelate opportunities through changes in intermediaries' positions. Moreover, a tightening of funding constraints has the largest impact on the prices of more volatile opportunities because these require more collateral. Gromb and Vayanos (2011a, b) derive the joint dynamics of intermediary capital, asset volatility, correlations and liquidity. They show that amplification and contagion are stronger when intermediary capital is neither too high nor too low.

Agents' portfolios often involve leverage, which are borrowed cash to establish a long position in a risky asset, or borrow a risky asset to sell it short. In the perfect market, agents can borrow freely provided that they have enough resources to repay the loan. But as the Corporate Finance literature emphasizes, various frictions can limit agents' ability to borrow and fund their positions. These frictions can also influence the supply of liquidity in the market. The literature on funding constraints emphasizes the idea that some traders rely on external capital, which is costlier than internal capital, and this affects liquidity and asset prices. External capital can take the form of collateralized debt, or other forms such as equity. Funding constraints can give rise to price discrepancies between assets with identical payoffs, even in the absence of market segmentation. When liquidity shock is large, price reversal is higher when capital is scarce than when it is abundant, price impact is also larger because it measures the price impact per unit of volume.

2.2.6 Search Cost Theory

Early work modeling search frictions in asset markets and their implications for equilibrium prices includes Burdett and O'Hara (1987), Pagano (1989b) and Keim and Madhavan (1996). These papers focus on the market for large blocks of shares (known as the "upstairs" market in the New York Stock Exchange).

Duffie et al. (2002, 2005, 2008) model price formation in asset markets building on the search framework of Diamond (1982), Mortensen (1982) and Pissarides (1985), in which a continuum of agents negotiate prices in bilateral meetings over an infinite horizon and continuous time. Duffie et al. (2002) focus on the repo market, where traders can borrow or lend assets. In a centralized market with no frictions, lenders of positive-supply assets would compete their rent down to zero. Indeed, equilibrium requires that some agents hold the assets, and hence would be willing to lend them as long as they earn any non-zero rent. With search frictions, however, lenders can earn a rent because they can extract some of the borrowers' surplus when bargaining in bilateral meetings. The rent is an additional payoff from holding the assets and raises their price in the spot market.

Duffie et al. (2008) focus on the spot market and assume that the valuation of agents for a risky asset switches over time between high and low. Agents with high valuation who do not own the asset seek to buy it. Conversely, agents with low valuation who own the asset seek to sell it. The equilibrium prices that emerge in the bilateral meetings depend not only on the measures of buyers and sellers, as in a centralized market, but also on their relative bargaining power.

Duffie et al. (2005) introduce market makers who intermediate trade. Market makers differ from other agents, who we term investors, because they can be contacted more easily. If investors are better able to contact each other, then market makers face more

competition and post lower bid-ask spreads. Moreover, if investors are heterogeneous in their ability to contact market makers, then market makers post lower spreads for investors with higher such ability. Weill (2007) studies the dynamics of an intermediated search market away from steady state. He shows that following a positive shock to the measure of sellers, market makers build up inventories, which they gradually unload to buyers.

Market makers acquire the asset despite having lower valuation for it than other agents because they are more efficient in passing it to the buyers. Vayanos and Wang (2007) and Weill (2008) extend the analysis to multiple assets, and show that search frictions can generate price discrepancies between assets with identical payoffs. Buyers choose one of two assets to search for, and then can only meet sellers of that asset. In equilibrium, they can locate one asset more easily, and are hence willing to pay a higher price for it. The asset that is easier to locate has a higher number of sellers either because it attracts endogenously high-turnover agents in Vayanos and Wang (2007), or because it is in larger supply in Weill (2008). Note that one-asset models, such as Duffie et al. (2008), yield the opposite prediction that assets in larger supply trade at lower prices.

Search models emphasize the idea that matching buyers and sellers takes time which emphasizes the market immediacy dimension of market liquidity. In their work on participation costs, Grossman and Miller (1988) model a related idea: a liquidity shock experienced by some agents is absorbed first by a small set of market participants and then by a larger set of agents who gradually arrive in the market. The market participants who first absorb the shock act as intermediaries, building up inventories and then unwinding them. Search models provide a natural setting to study the process through which assets are reallocated across agents via the temporal variation in intermediaries' inventories.

This is done, for example, in Weill (2007), where intermediaries are modeled as a special class of agents who can be contacted more easily than others. It is also done in Afonso and Lagos (2011), where agents engage endogenously in intermediation when they meet others with large liquidity shocks: they absorb more than their final share of a shock knowing that they can unload it to others in future bilateral meetings. Duffie and Strulovici (2011) model the process through which new agents slowly become informed about liquidity shocks in one market and bring their capital into that market. Mitchell et al. (2007) and Duffie (2010) emphasize the idea that capital moves slowly across markets in response to profitable investment opportunities.

2.2.7 Liquidity Asset Pricing Model

This includes the modified standard asset pricing models to explain Amihud-Mendelson liquidity premium model, Jacoby-Fowler-Gottesman model and Acharya-Pedersen model.One of the earliest theoretical contributions which relates market liquidity and equilibrium expected rates of return is the model of Amihud and Mendelson (1986). Amihud and Mendelson consider a setting with risk neutral investors who differ in the time horizons over which they wish to hold risky assets. The assets in this model vary in their liquidity, where liquidity is modelled as a fixed bid-ask spread. Their principal theoretical result is that there are clientele effects in asset holdings in which investors with short horizons prefer to hold assets with small bid-ask spreads and investors with long horizons prefer to hold assets with larger spreads. As a result of the clientele effects, assets with larger transaction costs are shown to earn larger gross returns, suggesting that asset illiquidity is priced. It is important to stress that the transaction costs in the Amihud and Mendelson model are deterministic, not stochastic. To examine whether there are systematic components to liquidity, and whether these components are priced, a model with stochastic liquidity is required.

An alternative proposal is made by Acharya and Pedersen (2005) that is known as the liquidity-adjusted capital asset pricing model (LCAPM). It is derived from a framework similar to CAPM in that risk-averse investors maximise their expected utility under a wealth constraint. They do this by replacing the cost-free stock price, $P_{i,t}$ with a stochastic trading-cost-adjusted stock price, $P_{i,t} - \Psi_{i,t}$ where $\Psi_{i,t}$is a trading cost of absolute amount, in an overlapping-generations economy.

The LCAPM is presented as

$$E_t\left(R_{it} - R_{ft}\right) = E\left(C_{i,t}\right) + \lambda_t \frac{COV_t\left(R_{i,t+1} - C_{i,t+1}, R_{m,t+1} - C_{m,t+1}\right)}{Var_t\left(R_{m,t+1} - C_{m,t+1}\right)} \qquad (i)$$

where R_i is a gross return of stock i, the coefficient λ_t is the risk premium for covariance with the market return, R_m is a gross market return, R_f is a gross risk free rate, and$C_{i,t}$ is a trading cost per price at time t$C_{i,t} = \frac{\Psi_{i,t}}{P_{i,t}}$. Subscript t in the operators denotes that these operators are conditional on the information set available up to time t.

As a result of adjusting price by stochastic liquidity, the LCAPM has three covariance terms related to stochastic trading costs in addition to traditional market risk. It is easy to see that without the trading cost term, LCAPM is equivalent to the traditional capital asset pricing model.

By assuming constant conditional variance or constant premia, the unconditional version of the model is derived as;

$$E_t\left(R_{it} - R_{ft}\right) = E\left(C_{i,t}\right) + \lambda\beta_i + \beta_i^2 - \beta_i^3 - \beta_i^4 \qquad (ii)$$

The risk premium is defined as $\lambda = E(\lambda_t) = E\left(R_{m,t} - C_{m,t} - R_{f,t}\right)$. $\beta_i^1$is similar to the traditional market premium of CAPM except for the terms related to trading cost. $\beta_i^2$is liquidity risk arising from the co-movement of individual stock liquidity with market liquidity (commonality in liquidity). This is expected to be positively related to asset returns because investors require compensation for stock whose liquidity decreases

when market liquidity goes down. β_i^3Captures the liquidity risk. If stock market liquidity unexpectedly decreases, a potential wealth reduction may follow for investors who hold stocks that are highly sensitive to market-wide liquidity. β_i^4Is shown to be negatively related to asset returns in the model because stocks that become more liquid in a down market are traded at a premium. Hence, the negative sign for β_i^4 is due to investors' willingness to accept low returns on such stocks

2. 3 Conceptual Framework

A conceptual Framework is a graphical or diagrammatical representation of the relationship between the variables being investigated by the study (Myers, 2013). When clearly articulated, a conceptual framework has the potential usefulness as a tool to assist a researcher to make meaning of subsequent findings. Based on the theoretical literature discussed above, the interrelationship between variables discussed above were presented were presented in the conceptual framework model shown in Fig 2.1.

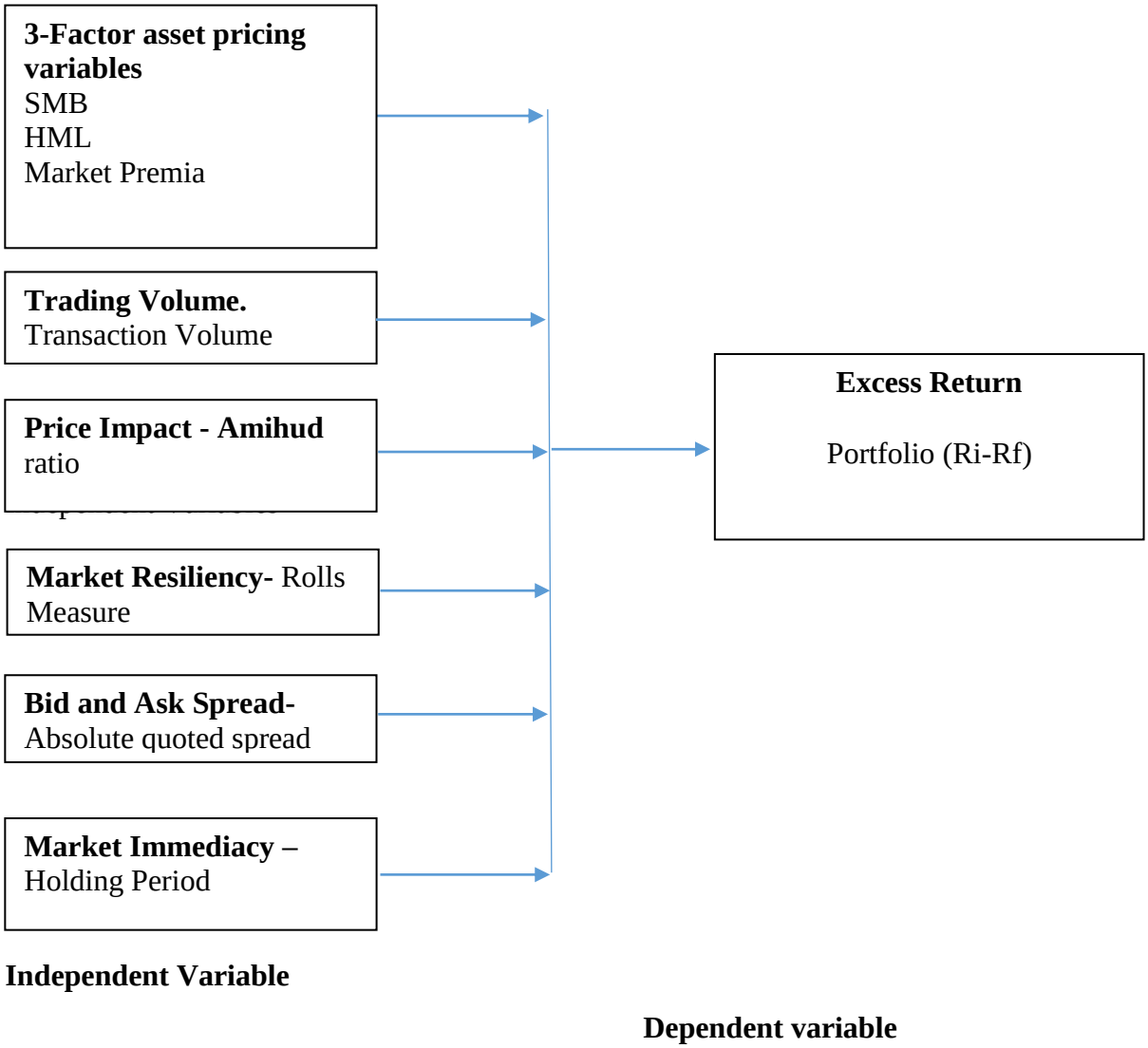

Figure 2.1 Conceptual Frame work

Figure 2.1 shows the conceptual framework pf the study and depicts the interrelationship between the study variables. Excess return was used as a dependent variable as it measures the expected return from any risky securities. Excess return was calculated as the difference between the portfolio return and risk free rate. The independent variable is market liquidity and three factor model. Market liquidity and three factor model are

represented by six variables: Bid ask spread, trading volume, price impact, resiliency, immediacy and three factor model

In the study, the depedent variable excess return is operationalized by the difference between portfolio return and the risk free rate. Bid ask spread was measured by the absolute values of quoted spread. This is the absolute value of the best bid and offer prices. Trading volume was measured by the transaction volume multiplied by the selling price. Price impact is measured by Amihud ratio which reflects how much the market adjusts prices to reflect the information content of trades. Market resiliency is measured by Rolls measure which uses serial covariance of share prices. Market immediacy is measured by the holding period which represent the time between the purchase and the sales date for that asset. The three factor asset pricing variable consist of the market premium, Small minus big which represent the size premium and representation of value premium high minus low.

2.4 Empirical Literature Review

2.4.1 Three Factor Asset Pricing Model Variables and Excess Return

Market Premium

Trimech *et al.* (2009), while investigating the market-factor effect in Tunisia, saw that all estimated market coefficients were statistically significant at the 1 per cent level. The point estimates displayed only positive values. It was noticed that the market effect was nearly the same across the constructed portfolios with the coefficients' values lying in the range 0.898 (SM) − 0.917 (SL). Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of value premium was positive and close to the pre-expected value of one.

De Pena, Forner and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks.

Size Premium

Trimech *et al.* (2009) in Tunisia, note that the size factor represented by Size Premium (SMB), significant positive relationships can be observed for all portfolios. The estimated size effect is more pronounced for small portfolios than for big ones. Moreover, estimation results show that the sensitivities to size risk for the big portfolios decrease when the book-to-market ratio for theses portfolios decrease. Adami *et al. (*2014) in UK, revealed that the SML coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression

in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks.

Value Premium

Trimech *et al.* (2009), in Tunisia note that, the value risk factor proxies by the explanatory variable Value Premium (HML) (book-to-market ratio had a non-negligible impact on the stock returns regardless of the portfolios as the value coefficients were highly significant. In terms of their signs, the results showed a clear pattern. They note that, for two small-value stock portfolios (SL and BL) estimated coefficients were negative, whereas for the portfolios characterized by large and medium ratio, HML regression coefficients were of positive signs. Adami *et al.* (2014), in UK revealed that , HML coefficients were negative for most deciles, confirming that growth stocks outperformed values stocks for the period examined. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

2.4.2 Trading Volume and Excess Return

Trading volume has had mixed empirical results as a proxy for market liquidity. Fleming (2001) finds that trading volume is negatively correlated with the bid-ask spread and positively correlated with trade size, which suggests that a higher trading volume is associated with greater liquidity. He also finds, however, that trading volume is negatively correlated with quote size and positively correlated with the price-impact coefficient and the on-the-run/off-the-run yield spread, which implies that a higher trading volume is associated with lower liquidity.

Jun, Marathe and Shawky (2003) look into the relationship between returns and liquidity measures such as turnover ratio, trading volume and turnover-volatility ration for 27 emerging markets from 1992 until 1999. They show that stock returns in emerging markets are positively correlated with liquidity measures. In general, these studies demonstrate the existence of a relationship between liquidity and returns using different proxies in order to emphasise the role of liquidity in stock markets. This is an important determinant for companies, investors, regulators and the market itself.

Trade size is another measure of market depth. Although it does not reveal the depth of liquidity faced by market participants ex ante, as an ex post measure of realized depth it may be a more appropriate indicator if participants do not reveal their true trading intentions in their posted quotes. Trade size reflects the amount that was actually traded at the bid or asks, and includes any negotiations over size that may have taken place once the initial quote was hit or lifted. A comparison of the excess trade size and excess quote size for particular securities may indicate the relative importance of this practice.

Closely related to trading volume, trade frequency, or the number of trades observed per unit of time, is another indirect measure for liquidity. High trading frequency may reflect a more liquid market, but it may also be associated with increased price volatility, which

is in turn associated with reduced liquidity. Since it does not include any effects from changes in trade size, however, we might think of trade frequency as a "purer" measure of market activity than trading volume. Huang, Cai, and Wang (2001) find that trade frequency is more highly correlated with Treasury volatility than is trading volume. Fleming (2001) notes that trading volume has little incremental explanatory power over trade frequency in explaining price changes.

Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship is valid for developed markets only as the emerging markets show a positive relationship.

2.4.3 Market Resiliency and Excess Return

Following Kyle (1985), resiliency is defined as the rate at which pricing errors caused by temporary order-flow shocks are corrected in the market. In this context, the observed mean-reversion parameter in the pricing-error process is used to empirically measure a stock's resiliency. Market resiliency has been examined in the extant empirical literature only by looking at extreme events. Bhattacharya and Spiegel (1998) analysed the "resiliency" of the New York Stock Exchange in terms of its ability to absorb high volatility shocks without suspending trade.

Coppejans, Domowitz, and Madhavan (2004) and Gomber, Schweickert, and Theissen (2015) both look at large liquidity shocks. Coppejans, Domowitz, and Madhavan (2004) are the first to analyse the time variation of order book depth, and thereby document depth resiliency, but they do so with a focus on cross-effects with time-varying returns and time-varying volatility. Gomber, Schweickert and Theissen (2015) focus on time variation in their exchange liquidity measure (which is a measure of the transaction costs

for one fixed trade size) in response to the hundred largest trades. Degryse *et al.* (2005) and Large (2007) build a picture of market resiliency by focusing on "aggressive orders", such as, orders that demand more liquidity than is available at the best prices. Large (2007) estimates a continuous time impulse response functions using data of a single stock

.

2.4.4 Price-Impact and Excess Return

Kyle (1985) develops a model to address the strategic aspects of informed trading in a market microstructure model. Informed traders in the model can be thought of as information monopolists who act to exploit this advantage. The model is able to characterize how an informed trader would choose to transact in order to maximize the value of private information. The price impact coefficient in the model reflects how much the market adjusts prices to reflect the information content of trades. It measures "the rise (fall) in price that typically occurs with a buyer-initiated (seller-initiated) trade" (Fleming 2001). Kyle's price-impact coefficient can be used to characterize liquidity in financial markets. It is generally felt that liquid markets are those that accommodate trades with the least impact on prices. The intuition is that One-way trades was associated with a larger movement in prices when markets are illiquid (such as, market depth is lower).

Hu (2013) estimated price impact parameters based on four different models using the intra-day order flow data for a set of NYSE/AMEX listed stock. He adjusted the stock returns against the Fama and French (1993) three factor as well as momentum factor. He found that the price impact has a decreasing trend over time and that the impact as a measure of illiquidity is a priced attributed in the cross-section of stock-return. The coverage spans a period of 27 years for more than 2,000 NYSE and AMEX-Listed stock.

Avramov et al. (2006) studies NYSE-AMEX stock over the period 1962 to 2002 and found that while there are reversals, in weekly and monthly stock exhibit higher negative serial correlations than low turnover stock. The evidence show that Liquidity has a robust effects on stock return autocorrelations even after controlling for trading volume. Watanabe and Watanabe (2008) using Amihud (2002) measure studied time-varying liquidity risk that arises because investors are asymmetrically informed about each other preferences. This shows that time varying liquidity betas are significantly priced in the cross-section of stock return.

Karolyi et al. (2012) used Amihud (2002) liquidity measure to examine commonality in liquidity and how it varies across countries and over time in ways related to supply determinants and demand determinants of liquidity. He found out that commonality in liquidity is greater in countries with and during times of high market volatility, greater presence of international investors and more correlated trading activities.

Acharya and Pedersen (2005) employed Amihud liquidity measure to capture systematic liquidity risk and commonality of liquidity among stock while investigating the role of liquidity on asset prices and Avramov, Chordia and Goyal (2006) used Amihud liquidity measure to analyses the relationship between liquidity and short-run stock return reversal.

2.4.5 Bid ask spread and Excess Returns

The bid-ask spread, or the difference between the best bid and offer prices, is a commonly used measure for market liquidity. A market that has very low transaction costs is characterized as liquid. In this sense, the bid-ask spread is a relatively direct measure of market liquidity. Fleming (2001) identifies the bid-ask spread as one of the most appropriate liquidity indicators for the U.S. Treasury market due to its high degree

of correlation with other (perhaps more sophisticated) measures, such as price impact and benchmark/non-benchmark yield spreads.

Amihud and Mendelson (1986) analyze the effect of bid ask spread or illiquidity on asset pricing. They found a positive relationship between bids-ask spread and returns. The focus of the study was to explore the area of market microstructure in order to determine asset returns. Their model predicts that higher spread assets yield higher expected returns, net of trading costs. Investors hold high spread assets for longer holding period because of the clientele effect. Amihud and Mendelson (1989) examined whether adding bid-ask spreads to betas helped better explain differences in returns across stocks in the U.S.26 in their sample of NYSE stocks from 1961-1980, they concluded that every 1% increase in the bid-ask spread (as a percent of the stock price) increased the annual expected return by 0.24-0.26%.

Eleswarapu (1997) empirically examines the liquidity premium predicted by the Amihud and Mendelson (1986) model using NASDAQ data over the 1973-90 period. The results support the model and are much stronger and confirmed this finding by showing a positive relationship between returns and spreads for NASDAQ stocks.

Marshall and Young (2003) studied the nature of return-liquidity relationship in Australian Stock Market. They defined three liquidity measures; relative bid-ask spread, rotating ratio and amortised bid-ask spread. They show that there is a negative relationship between return and the spread. In addition, the authors highlight a negative and significant relationship between rotation ratio and financial assets returns, whereas amortised bid-ask spread does not represent no significance.

Chekili, and Abaoub (2013) studied the impact of liquidity on stock return on Tunisian stock exchange where they sampled 20 listed securities. The study found that bid- ask

spread is priced in Tunisian Stock Market. Bid-Ask spread is a measure of liquidity degree in the Tunisian market while rotating ratio is a measure of liquidity. The new measure of Amihud (2002), ILL, is an invalid instrument to measure the Tunisian market and liquidity premium is not an attribute of the month of January only.

Jun, Marathe, and Shawky (2003) studied data for 27 emerging equity markets for the period January 1992 through December 1999, and documented the behavior of liquidity in emerging markets. They found that stock returns in emerging countries are positively correlated with aggregate market liquidity as measured by bid ask spread. The results hold in both cross-sectional and time-series analyses, and are quite robust even after controlling for world market premium, market capitalization and price-to-book ratio. The positive correlation between stock returns and market liquidity in a time-series analysis is consistent with the findings in developed markets. However, the positive correlation in a cross-sectional analysis appears to be at odds with market microstructure theory that has been empirically supported by studies on developed markets.

Brennan and Subrahmanyam(1996), using the Fama and French (1993) three factor model, did not find a concave relationship between the fixed costs of transacting and investment horizons for NYSE stocks, which is inconsistent with Amihud & Mendelson's horizon clientele effect.

2.4.6 Market Immediacy and Excess Return

Chordia and Swaminathan (2000) show that, after controlling for firm size, price reaction speed is positively related to trading activity level. Further, stocks with lower bid-ask spreads offer greater incentives for arbitrage and informed trading, which would raise their average price adjustment speed. Studies by Jennings and Stark (1985) and Woodruff and Senchack (1988) document a positive correlation between price reaction speed to earnings announcements and the size of the earnings price reaction. Mech

(1993) reports that larger announcement effects are more rapidly incorporated into stock returns.

Porter and Weaver (1998) find that over our time period large price movements on NASDAQ are not always reported in a timely manner, while Schultz (2000) documents that in very active periods, NASDAQ trade reporting is delayed by several minutes. These two reporting problems can also slow the observed price reaction speed of NASDAQ stocks.

Lo and Mackinlay (1990) find that returns of larger firms tend to lead those of smaller firms based on weekly data. Chan (1993) interprets this as evidence that larger firms react faster to economy-wide information due to greater media coverage and more timely information reporting.

2.5 Critique of the Existing Literature

Review of literature indicates that majority of past empirical studies have only analysed the effect of Fama French three factor model on excess return. This leaves out the effect of other factors such as market liquidity on excess return. Studies such as Riro and Wambugu (2015) only used the three factor models to analyse excess returns.

It is also evident from empirical studies that there is no comprehensive studies on pricing of securities in Kenya in the presence of liquidity. Hearns and Piesse (2005) augmented the Fama and French (1993) three factor model to take account of company size and liquidity levels. However in liquidity measurement they only used price impact as measured by Amihud (2002) equation. Price impact only captures one dimension of market liquidity and thus additional measures are necessary to capture the other dimensions of liquidity such as market tightness, market depth, market resiliency and market immediacy.

Empirical evidence and result of various studies also show mixed trends on the effect of market liquidity on excess return. This is evident even in situations where similar indicators of market liquidity has been employed. Some of the studies have postulated significant or insignificant negative relationship. Empirical findings show that there is a positive relationship between bid-ask spread and returns Amihud and Mendelson (1986) and Jun, Marathe, and Shawky (2003) Other studies show a negative relationship between stock returns and liquidity these include Datar, Narayan, and Radcliffe (1998). The lack of convergence implies that the studies did not establish a clear relationship between market liquidity and excess return.

The reviewed studies seems not to recognize the long run relationship of variables under study. Most of the studies carried out the analysis using the ordinary least squares (OLS) or the long run relationships, which assumes that the mean and variances are intact. In this study Autoregressive Distributed Lag (ARDL) is used. ARDL cointegration technique or bound cointegration technique. Duasa (2007) further established that with the ARDL, it is possible that different variables have different optimal lags which is impossible with the standard cointergration test.

2.6 Research Gap

From the foregoing reviews of literature, it is clear that research in the area of market liquidity, and its effect on excess return using asset pricing model has not been comprehensively done. The current study has a wider coverage of the various factors used to price excess return such as variables affecting market liquidity. This makes this study more comprehensive. From survey of relevant literature, it has been found that there are few studies specific to Kenya that studies the effect of asset pricing model Fama and French (1993) three factor model on excess return and more so to look at the effect of market liquidity on the same in Kenya. This study therefore intended to fill the

gaps in literature by adding other market liquidity variable such as bid ask spread, trading volume, price impact, market immediacy, market resiliency and its effect on excess return in Kenya. The study also uses Autoregressive Distributed Lag Model (ARDL) which combines both the stationary and non-stationary time series data by selecting the optimal lag structure of the dependent and independent variables. Hence this study sought to fill the existing gap by establishing the effect of market liquidity and three factor model on of excess return of companies in Nairobi Securities Exchange.

2.7 Summary

Review of literature has shown that the subject of market liquidity has attracted significant interest among the financial scholars. This has led to many market liquidity theories that seeks to explain how excess return is priced. There is however no conclusion on a universal theory that has been adopted to date.

There is lack of consensus as to wether and how market liquidity affects excess returns. Empirical literature have investigated the effect of market liquidity and on excess returns based on a number of liquidity variables such as bid ask spread, trading volume, price impact, market resiliency and market immediacy but they seem to provide conflicting results. (Amihud and Mendelson, 1986) analysed the effect of bid and ask on excess return and found a positive effect while (Marshall and young, 2003) found a negative relationship between spread and excess return. The three factor model was also found to be very important in pricing excess return.

The literature review provided literature gaps that provided that provided a basis for this study. It provided that majority of studies on excess returns only use asset pricing models such as Fama French three factor model by Riro and Wambugu (2015) but does not include the effects of market liquidity. Empirical evidence show mixed effects on market liquidity where by some studies show significant or insignificant positive

relations while othes show negative relations. Further, literature is still incomplete with regards on how market liquidity is affecting excess return in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that was adopted to assist in achieving the research objectives. According to Newing (2011), a research methodology is concerned with what will actually be done in order to address the specific objectives and research questions that have been developed. This involves deciding the research design structure, choosing the specific methods and developing a sampling strategy. It often also involves describing what analyses were carried out. This chapter covers research paradigm, research design, population, sampling technique, sample size, instruments, pilot test and data analysis.

3.2 Research Paradigm

The research paradigms dominantly used include positivism, interpretivism and critical science. Positivism is an epistemological position that advocates the application of methods of natural sciences to the study of social reality. Positivists believe that knowledge is arrived at through gathering of facts that provide the basis for laws (the principle of inductivism). Interpretivism is a term given to a contrasting epistemology to positivism. It is predicated upon the view that a strategy is required that respects the difference between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action. Positivism and interpretivism share a view that subject matter of the social sciences people and their institutions are fundamentally different from that of the natural sciences. Realism shares two features with positivism: a belief that the natural and social sciences can and should apply the same kinds of approach to the collection of data and to explanation. Therefore this study falls within the positivists' paradigm.

3.3 Research Design

This section addresses the plan, structure, and strategy of investigation of market liquidity and is effects on excess return. Creswell (2014) states that a research design is the entire process of research from conceptualization of a problem to writing of a research questions, and onto data collection, analysis, interpretation, and report writing.

The research study employed a Quantitative research design to analyses the effect of market liquidity, Fama-French three factor variables on excess returns in Nairobi Securities Exchange during the period 2006 to 2015. Time Series research design was used to show the effect of market liquidity and three factor model on excess return. This approach is useful for this kind of data where longitudinal characteristics of the units being analysed constitute an important ingredient of the study (Gujarati, 2003).

3.4 Target Population

A population is a total collection of elements about which the researcher wishes to make inferences (Cooper and Schindler, 2014). It is the mass of individuals, cases, events to which the statements of the study will refer and which has to be delimited unambiguously beforehand with regard to the research question.

The target population of this study was the companies in Nairobi Securities Exchange (NSE). According to NSE (2015) there were sixty four (64) listed companies in the main segment of NSE by December 2015 (Appendix I).

3.5 Sampling Frame and Census

The sampling frame for this study comprised of all the 64 companies listed in Nairobi Securities Exchange. A census study was conducted for all the listed companies. According to Mugenda and Mugenda (2003), a census is preferred where the population is small and manageable.

3.6 Data Collection instrument

Secondary data was used to construct the estimates for the function parameters. The data was extracted from the NSE records for ten years from 2006 to 2015. A secondary data colletion instrument specified in Appendix II was used.

3.7 Data collection procedure

The study involved collection of secondary data from the Nairobi Securities Exchange (NSE), Capital Market Authority (CMA) and from the Central Bank of Kenya (CBK). Collection of data involved getting published financial statements for 10 years from CMA of all the listed companies in NSE. Data was also collected for the daily securities prices from NSE and treasury bills rate for 10 years was collected from the Central Bank of Kenya research department. Using the data collection instrument the information on specific components was keyed in on a daily basis. The data was then used to construct portfolios that were keyed in excel program ready for analysis.

3.8 Data processing and Analysis

Data processing first involved the cleaning of the raw data to ensure that it is consistent with the requirements for estimating and evaluating excess returns. The resultant data was then subject to hypothesis testing based on models identified in this section and the variable defined. The data was organized and computed using excel program inorder to obtain the study variables. The data was collected and analysed quantitatively using regression equations, which were solved using statistical tool E-VIEWS version 9.0 software.

Six portfolios were formed based on Fama-French three factor model (1993) as shown in table 3.1. The portfolios were formed from the listed companies which were listed from the duration of January 2006 to December 2015. A firm qualified to be in the portfolio

on the basis of having continuous listing over the years under study. This is because the effects of market liquidity is a long-term study.

Table 3. 1: Portfolio Formation

	Size of company (market value of equity)	
Ratio of book value of equity to it market value (Book-to–market value of equity)	Small companies Small size/Low value companies (S/L) (portfolio one)	Big companies Big/ low value (B/L)(portfolio Four)
	Small size/ Medium value (companies)(S/M) (portfolio two)	Big size/ medium value (B/M)(portfolio Five)
	Small size/High value companies (S/H) (portfolio three)	Big size /high value (B/H) (portfolio Six)

3.8.1 Measurement of the study variables

Bid Ask Spread To establish the effects of Bid and Ask spread on asset pricing in Nairobi Securities Exchange (NSE) in Kenya. Bid and Ask spread is used to measure market tightness and effective spread is used as it gives a better representation according to Bacidore *et al.* (2002)

$$Seff_t = |p_t^A - p_t^m| \quad (3.1)$$

Where: $Seff_t$ is the bid ask spread

p_t^A is the Ask price

p_t^m is the quoted mid point

$$U_t^B = \frac{1}{D_n}\sum_{d=1}^{D_n} RES_{d,t,} \qquad (3.2)$$

where $RES_{d,t.}$ is a daily excess relative effective spread, defined as the excess of the absolute value of the difference between each transaction price and the midpoint of the most recent quote. Increasing spreads are associated with decreasing liquidity, therefore the leading negative sign is added so that smaller values of the indicators are associated with lower liquidity, consistent with other measures.

Trading Volume

To establish the effects of trading volume on asset pricing in Nairobi Securities Exchange (NSE) in Kenya. Porter (2003) presents two following measures of market breadth:

$$V0l_t = \sum_{t=1}^{n} P_{it}Q_{it} \qquad (3.3)$$

Where $V0l_t$ is the total trading volume.

P_{it} is the price of securities i and

Q_{it} is the quantity of securities i

Price impact

To establish the effects of price-impact on asset pricing in Nairobi Securities Exchange (NSE) in Kenya. The proxy for measuring market depth is the impact per unit of trading volume

Amihud (2002) and Porter (2003) estimate price impact measures based on the excess price impact per unit of trading volume. When market price impact is low, price concessions required from market makers are larger per unit of volume than when price impact is high. Porter (2003) calculates his measure as follows:

$$\gamma_t^D = \frac{1}{D_n}\sum_{d=1}^{D_n}\frac{|r_{d,t}|}{V_{d,t}} \qquad (3.4)$$

Where γ_t^D is the Amihud Ratio (2002)

D_n is the number of trading days

$r_{d,t}$ is absolute value of return

$V_{d,t}$ is the trading volume in shillings

Market resiliency

To establish the effects of market resiliency on asset pricing in Nairobi Securities Exchange (NSE) in Kenya. Muranaga (1999) suggested that measuring the widened bid-ask spread caused by trade executions and the period of time required for the spread to be restored to the state existing immediately before the execution as follows:

$$S = 2 * \sqrt{-COV(\Delta P_t \Delta p_{t-1})} \qquad (3.5)$$

Where $-COV(\Delta P_t \Delta p_{t-1})$ is the covariance of change of prices in the current period and the change in prices in the previous period.

Market Immediacy

To establish the effects of immediacy on asset pricing in Nairobi securities Exchange. Immediacy looks at the time that has elapsed between transactions or the time required to trade on an asset once a decision to buy or sell is made. The proxy is the Holding period and the time required to transact.

$$HP = \frac{S_t * P_t}{Vol_t} = \frac{1}{Turn_n} \qquad (3.6)$$

Where HP is the holding Period

Vol_t is the trading volume

$Turn_n$ is the turn over

3.8.2 Model specification and diagnostic tests

A time-series asset-pricing tests based on individual stock's realized returns was ran. An adjusted Fama and French (1993) three factor model methodology was used to run the time-series asset-pricing tests with liquidity measures as indicated in equation 3.1.

Brennan and Subrahmanyam (1996) use similar time-series asset-pricing test methodology to analyses relation between their liquidity measures and market return based on monthly returns. An Autoregressive Distributed Lag Model, which combines both stationary and non-stationary time-series data by selecting the optimal lag structure of the dependent and the independent variables and t-statistic was used to determine the relative importance or sensitivity of each explanatory variable in affecting the asset pricing.

ARDL Model 1

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Bid Ask Spread, Trading Volme, Price Impact, Resiliency,Immediacy) (3.7)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficints componets of the model

α_i is the intercept

$\varepsilon\_(i,t)$ is the error term

$$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1 R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t + \sum_{i=0}^{k} b_5\ Bid\ Ask\ Spread + \sum_{i=0}^{k} b_6\, Trading\ Volme + \sum_{i=0}^{k} b_7\, Price\ Impact +$$

$\sum_{i=0}^{k} b_8\, Resiliency + \sum_{i=0}^{k} b_9\, Immediacy + \delta_{1,i} MKT_t + b\delta_{2,i} SMB_t + b\delta_{3,i} HML_t +$
$b\delta_{4,i}\, Bid\ Ask\ Spread + b\delta_{5,i} Trading\ Volme + b\delta_{6,i} Price\ Impact +$
$b\delta_{7,i} Resiliency + b\delta_{8,i} Immediacy + \varepsilon_{i,t}$ …… (3.8)

ARDL Model 2

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Bid Ask Spread)……(3.9)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

α_i is the intercept

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficints componets of the model

$\varepsilon\_(i,t)$ is the error term

$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1\, R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t +$
$\sum_{i=0}^{k} b_5\ Bid\ Ask\ Spread + \delta_{1,i} MKT_t + b\delta_{2,i} SMB_t + b\delta_{3,i} HML_t +$
$b\delta_{4,i}\, Bid\ Ask\ Spread + \varepsilon_{i,t}$ …… (3.10)

ARDL Model 3

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Trading Volme)……(3.11)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

α_i is the intercept

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficints componets of the model

$\varepsilon\_(i,t)$ is the error term

$$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1\, R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t + \sum_{i=0}^{k} b_6\, Trading\ Volme + \delta_{1,i}MKT_t + b\delta_{2,i}SMB_t + b\delta_{3,i}HML_t + b\delta_{5,i}Trading\ Volme + \varepsilon\_(i,t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (3.12)$$

ARDL Model 4

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Price Impact)………………………..(3.13)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficients componets of the model

α_i is the intercept

$\varepsilon\_(i,t)$ is the error term

$$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1\, R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t + \sum_{i=0}^{k} b_7\, Price\ Impact + \delta_{1,i} MKT_t + b\delta_{2,i} SMB_t + b\delta_{3,i} HML_t + b\delta_{6,i} Price\ Impact + +\varepsilon\_(i,t) \quad \ldots\ldots (3.14)$$

ARDL Model 5

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Resiliency)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficints componets of the model

α_i is the intercept

ε_(i,t) is the error term

$$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1\, R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t + \sum_{i=0}^{k} b_8\, Resiliency + \delta_{1,i} MKT_t + b\delta_{2,i} SMB_t + b\delta_{3,i} HML_t + b\delta_{7,i} Resiliency + \varepsilon\_(i,t) \quad \ldots\ldots (3.15)$$

ARDL Model 6

The empirical model was given by:

$R_{i,t}$=∫(MKT, SMB,HML, Immediacy)……(3.16)

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

$\sum_{i=1\ldots,z}^{k}$ represents the lagged componets of particular variables

b_i Represents the various coefficients of the dynamic components

$\delta_{1,i}$ Represents the static coefficints componets of the model

α_i is the intercept

$\varepsilon\_(i,t)$ is the error term

$$R_{i,t} = \alpha_i + \sum_{i=1}^{k} b_1 R_{i,t} + \sum_{i=0}^{k} b_{2,}\ MKT_t + \sum_{i=0}^{k} b_3\, SMB_t + \sum_{i=0}^{k} b_4\, HML_t + \sum_{i=0}^{k} b_9\, Immediacy + \delta_{1,i} MKT_t + b\delta_{2,i} SMB_t + b\delta_{3,i} HML_t + Immediacy + \varepsilon\_(i,t)\ .$$

…… (3.17)

Fama-French three factor model

To establish the effect of Fama and French three factors (1993) the model below was used.

$$R_{i,t} = \alpha_i + b_{1,i} MKT_t + b_{2,i} SMB_t + b_{3,i} HML_t + \varepsilon_{i,t} \qquad (3.18)$$

Where: MKT is the Market Premium

SMB_t is Small minus Big. Which is the return at day t on the Fama-French size factors

HML is High minus Low. Which is the return at day t on the Fama-French size factors

$R_{i,t}$is excess realized return for portfolio i at over time t.

3.8.3 Diagnostic Tests

Similarly in the study a variety of tools to test the regression result for challenges associated with econometric models namely multicollinearity, stationarity, heteroscedasticity and autocorrelation. Correlation analysis was performed on independent variable to test for multicollinearity, a phenomenon where two or more independent variable are highly correlated. If any or more variable are found to be correlate with each other one was dropped and estimation done and compared. Since the data is time series in nature, the Augmented Dickey-Fuller (ADF) was performed on all the variables stationarity in order to minimize on the cases of spurious results.

Descriptive Statistics

To assist in describing and summarizing the data, descriptive analysis was performed on all variables to establish the mean, median, maximum, minimum and standard deviation. Additionally, the Jarque-Bera (JB) test was applied on all variables to establish whether they follow the normal probability distribution by computing their kurtosis and skewness measure.

Unit root test

To test for unit root this study chose is Im, Pesaran and Shin (IPS), the Fisher-type Augmented Dickey and Fuller (ADF) and the Fisher-type Phillips and Perron (PP) tests with and without time trend. The null hypothesis was that panel data was non-stationarity. Im, Pesaran and Shin (IPS) proposed a test for the presence of unit roots in panels that combines information from the time series dimension with that from the cross section dimension, such that fewer time observations are required for the test to

have power. IPS test has been found to have superior test power by researchers in economics to analyze long-run relationships in panel data.

Correlation test

Brook (2002), assert that Multicollinearity is the problem that occurs when the explanatory variables are very highly correlated with each other. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. If the explanatory variables were orthogonal to none another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change.

Heteroscedacity test

Heteroscedacity describes a situation when the variance of the residuals from a model is not constant. Autoregressive Conditional Heteroscedacity (ARCH) was used to test the heteroscedacity problem.

Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test was performed to test for the presence of Autocorrelation of the residuals, a situation where the residual is correlated with lagged values of itself, which is not desirable. Finally, the t-statistics of the factors co-efficient was used to test the hypotheses of the study by indicating whether the relationship between dependent and independent variable is statistically significant.

Test statistics

The study employed therefore these statistics to arrive at conclusive inference. In particular the study used t-statistics and the p-value to test the significance of the null-hypothesis for any type of individual test. The F-test was used to test the null-hypothesis

jointly. Other statistics that was relevant in models selection are Durbin-Watson, adjusted R-squared and likelihood ratio.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the analysis of the data collected in line with the research design described in chapter 3. The chapter presents the descriptive statistics of the data used, regression diagnostic checks, time series data specification tests and the interpretation of the regression result.

4.2 Portfolio One Small size with Low value

Portfolio one is formed from small size with low value companies as used by Fama and French three factor model (1993).

4.2.1 Portfolio One Descriptive Statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera test were used.

Table 4. 1: Portfolio One Descriptive Statistics

	return	market	Hml	smb	P. Impact	Immediacy	T.Volume	Resiliency	spread
mean	-7.09	-7.28	-0.87	-0.17	0.48	0.07	13.53	0.03	1.39
median	-7.40	-7.32	-0.99	-0.56	0.42	0.07	13.42	0.00	0.50
maximum	47.56	8.16	16.80	12.99	2.21	0.09	18.56	2.25	8.00
minimum	-42.91	-30.19	-19.92	-12.74	0.00	0.05	10.8	0.00	0.00
std. dev.	12.02	6.06	5.45	4.95	0.41	0.01	1.20	0.21	1.95
skewness	0.73	-0.51	0.04	0.25	1.30	-0.24	1.13	9.76	1.56
kurtosis	6.35	4.65	4.40	2.81	5.26	3.97	6.57	10.0	4.80
jarque-bera	66.65	18.76	9.76	1.40	59.2	5.87	89.2	4987	65.01
probability	0.00	0.00	0.01	0.50	0.00	0.05	0.00	0.00	0.00
sum	-850.5	-873.3	-104.4	-20.08	57.4	8.94	1623	3.11	166.
sum sq. dev.	17202.	4367	3538	2916	20.2	0.00	170.	5.41	453.
observations	120	120	120	120	120.	120.	120	120	120.

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables. Table 4.1 shows the descriptive statistics for the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, volume, resiliency and bid-ask spread variables were -7.09, -7.28,-0.87,-0.17,0.48,0.07,13.53,0.03,and 1.39 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return,

market premium, hml, smb, price impact, immediacy, volume, market reiliency and bid-ask spread variables were 0.73, -0.51, 0.04, 0.25, 1.30, -0.24, 1.13, 9.76 and 1.56. These values of skewness shows that the variables are not all normally distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, volume, market reiliency and bid-ask spread variables were 6.35, 4.65, 4.40, 2.81, 5.26, 3.97, 6.57, 10.0 and 4.80. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 66.65, 18.76, 9.76, 1.40, 59.2, 5.87, 89.2, 49.87 and 65.01 respectively and the probability values of 0.00, 0.00, 0.01, 0.50, 0.00, 0.05, 0.00, 0.00 and 0.00.The probabilities of the jarque-bera are all away from the value of one(1)except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not normal and thus in further analysis this problem was considered before further analysis was executed.

4.2.2 Portfolio One Group Unit Root Test

A unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is stationarity.

Table 4. 2: Portfolio One Group Unit Root Test

Group unit root test: Summary

Series: RETURNONE, MARKET, HML, SMB, PRICE IMPACTONE, IMMEDIACYONE, VOLUMEONE, SPREADONE, RESILIENTONE

Method	Statistic	P-value	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.2824	0.0000	9	1051
ADF - Fisher Chi-square	385.765	0.0000	9	1051
PP - Fisher Chi-square	432.633	0.0000	9	1052

To test for unit root this study chose is Im, Pesaran and Shin (IPS), the Fisher-type Augmented Dickey and Fuller (ADF) and the Fisher-type Phillips and Perron (PP) tests with and without time trend. The null hypothesis was that panel data was non-stationarity.

Im, Pesaran and Shin (IPS) proposes a test for the presence of unit roots in panels that combines information from the time series dimension with that from the cross section dimension, such that fewer time observations are required for the test to have power. IPS test has been found to have superior test power by researchers in economics to analyze long-run relationships in panel data. Both the result of ADF and Phillips Perron (PP) are presented for comparison purposes. This is based on the observation by Maddala and Wu (1999) that unlike the ADF test which is parametric, the PP test is non-parametric and hence robust in presence of serial correlation in the error terms without adding lagged difference terms. In addition, the tests played a confirmatory and complementary role to the findings of LLC test.

The results from the unit root test for all the variables in in table 4.2 shows that the variables in the group are stationary. The interpretation is that a method that is able to

combine stationary and non-stationary was required. In this study thus ARDL modeling was used.

4.2.3 Portfolio One Multi-Collinearity Test

Pair-wise correlation was used to examine the level of collinearity present between explanatory variables used in the study. The correlation coefficients range from negative one to positive one. According to Guajarati (2009) if the correlation coefficients are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity. Pair-wise correlation coefficients less than 0.8 indicate that the problem of multicollinearity is not severe and is normally ignored. However, correlation coefficients in excess of 0.8 points to existence high degree of multicollinearity among the regressors and warrants a remedial action.

Table 4. 3: Portfolio One pair wise correlation analysis

	return	market	Hml	smb	volume	spread	Price Impact	Resi liency	Imme diacy
return	1.00								
market	0.34	1.00							
hml	-0.51	0.19	1.00						
smb	0.32	-0.13	-0.28	1.00					
Lturn-over	0.21	-0.08	-0.09	-0.03	1.00				
spread	0.15	0.01	-0.05	0.05	0.21	1.00			
Price Impact	0.22	0.07	-0.04	-0.02	0.05	0.22	1.00		
resiliency	-0.13	-0.21	0.01	-0.06	0.10	-0.07	-0.11	1.00	
Imme diacy	-0.22	0.09	0.11	0.03	-0.99	-0.22	-0.09	-0.10	1.00

Table 4.3 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is multicollinearity problem since the highest correlation between the independent variables was 0.99 between trading volume and immediacy and the least one was 0.01%. Thus immediacy variable was dropped from further analysis. Brook

(2002), assert that Multicollinearity is the problem that occurs when the explanatory variables are very highly correlated with each other. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. If the explanatory variables were orthogonal to none another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change.

4.2.4 Portfolio One Granger Causality

Granger (1969), note that a variable x is said to granger-cause a variable y if, given the past values of y, past values of x are useful for predicting y. This study therefore employed pairwise granger causality in order to determine the direction of causality. Granger causality also helps the researcher to know whether there is the need to introduce the lag structure in the final regression model or not.

The study found that market premium has a one-way causality to the value premium as indicated in Table 4.4. This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process.

Table 4. 4: Portfolio One Granger Causality

Variables	Causality direction
Portfolio one	
Market =>hml	One-way

4.2.5 Portfolio One Regression Results (S/L)

The regression analysis shows the good of-fit statistics where **t**he value of R-squared of 0.696691 and adjusted-R-squared of 0.628931, shows that the variables included in this portfolio are able to explain about 63% of the variation in returns. The value of F-statistic of 10.28168 was also found to be statistically significant. The value of the

Durbin Watson of 1.906455 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms. The regression result for portfolio one is shown in table 4.5.

Table 4. 5: Portfolio one Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returnone(-1)	-0.051330	0.079915	-0.642303	0.5222
Returnone(-2)	0.176292	0.076333	2.309530	0.0231
Marketret	0.942598	0.152079	6.198071	0.0000
Marketret(-1)	0.227417	0.155505	1.462445	0.1470
Hml	-1.025256	0.144782	-7.081353	0.0000
Smb	0.659559	0.154080	4.280617	0.0000
Smb(-1)	0.308048	0.160681	1.917142	0.0583
Smb(-2)	0.279696	0.158764	1.761713	0.0814
Volumeone	1.896708	0.730449	2.596635	0.0109
Price Impactone	4.475713	1.814061	2.467234	0.0154
Price Impactone(-1)	-1.492887	1.924238	-0.775833	0.4398
Price Impactone(-2)	0.915274	1.916924	0.477470	0.6341
Price Impactone(-3)	3.997574	1.804667	2.215131	0.0292
Resilientone	-0.822439	0.623802	-1.318430	0.1906
Resilientone(-1)	0.436625	0.720383	0.606101	0.5459
Resilientone(-2)	1.440797	0.701783	2.053051	0.0428
Resilientone(-3)	-1.497961	0.713517	-2.099406	0.0385
Resilientone(-4)	1.117365	0.649517	1.720303	0.0887
Spreadone	-0.311962	0.411182	-0.758696	0.4499
Spreadone(-1)	-0.434284	0.403531	-1.076208	0.2846
Spreadone(-2)	-0.730389	0.399445	-1.828510	0.0706
C	-26.77406	9.772459	-2.739747	0.0074
R-squared	0.696691	Mean dependent var		-6.987983
Adjusted R-squared	0.628931	S.D. dependent var		12.11316
S.E. of regression	7.378782	Akaike info criterion		7.004109
Sum squared resid	5117.963	Schwarz criterion		7.526342
Log likelihood	-384.2383	Hannan-Quinn criter.		7.216106
F-statistic	10.28168	Durbin-Watson stat		1.906455
Prob(F-statistic)	0.000000			

4.2.6 Three Factor Asset Pricing Model and Excess Return

From the regression results in table 4.5 above the coefficient of market premium was found to be marketret 0.94 and marketret (-1) 0.23. These value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on portfolio one to increase by 0.94% in the current and 0.23 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first term coefficient was statistically significant. The t-statistic values were 6.20 and 1.462445 indicating positive coefficient of market premium. The p-value was found to be 0.0000 and 0.1470 implying that the variation between the excess return of firms in the small size and low market value portfolio and the return on the market premium was found to be statistically significant.

These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market

premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The Value Premium (HML) was found to be -1.025256. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -1.025256 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio.

The coefficient was statistically significant with a t-statistic value of -7.081353. The p -value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the small size and low market value portfolio was negative and it shows that in Kenya firms which are small size and low value are likely to get smaller returns. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. These findings are in line with those of De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The regression results in table 4.5 the coefficient of Size Premium (SMB) were found to be Smb 0.659559, Smb (-1) 0.308048 and Smb (-2) 0.279696. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to increase by 0.659559, 0.308048 and 0.279696 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio.

The first coefficient was statistically significant with a t-statistic value of 4.280617 the others, 1.917142 and 1.761713 were statistically insignificant. The p-values were found to be 0.0000, 0.0583 and 0.0814. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and SMB was positive and it shows that in Kenya firms which are small size and low value are likely to have a positive correlation with the premium for size. These findings contradict those of Estrada (2011), who by employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

These findings support those of De Pena, Forner and López-Espinosa (2010), who while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks.

4.2.7 Trading Volume and Excess Return

The coefficient of trading volume was found to be 1.896708. This value shows that holding other variables in the model constant, an increase in turnover by one percent causes the excess return of the portfolio to increase by 1.896708 percent. The positive effect shows that there is a direct relationship between the proxy for liquidity (trading volume) and excess returns of the firms in portfolio one.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 2.596635. The p-value was found to be 0.0109. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and turnover was positive and it shows that in Kenya firms which are small size and low value are likely to have positive correlation with market breath.

These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. They contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.2.8 Price Impact and Excess Return

The coefficient of price impact was found to be price impactone 4.475713, price impactone (-1) -1.492887, price impactone (-2) 0.915274 and price impactone (-3) 3.997574 as shown in Table 4.5. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by 4.475713 reduce by -1.492887 and increase by 0.915274 and

3.997574 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio one.

The first and fourth coefficients were statistically significant for portfolio one with a t-statistic values of 2.467234, -0.775833, 0.477470 and 2.215131. The p-value were found to be price impactone 0.0154, price impactone (-1) 0.4398, price impactone (-2) 0.6341 and price impactone (-3) 0.0292. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and price impact was positive and it shows that in Kenya firms which are small size and low value are likely to have positive correlation with market price impact.

4.2.9 Bid Ask Spread and Excess Return

From the regression results in table 4.5 the coefficients of spread were found to be Spreadone -0.311962, Spreadone(-1) -0.434284 and Spreadone(-2) -0.730389.These value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by -0.311962, -0.434284 and -0.730389 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio one.

The coefficients were however statistically insignificant. The respective t-statistic values were -0.758696, -1.076208 and -1.828510. The p-values were found to be 0.4499, 0.2846 and 0.0706. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and spread was positive and it shows that in Kenya firms which are small size and low value are likely to have positive correlation with market spread. These findings support those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include

Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.2.10 Market Resiliency and Excess Return

From the regression results in table 4.5 the coefficient of spread was found to be Resilientone -0.822439, Resilientone (-1) 0.436625, Resilientone (-2) 1.440797, Resilientone (-3) -1.497961 and Resilientone (-4) 1.117365. This value shows that holding other variables in the model constant, an increase in resiliecy by one unit causes the excess return of the portfolio to decrease by -0.822439 increase by 0.436625, increase by 1.440797, decrease by -1.497961 and increase by 1.117365 units respectively. The positive effect shows that there is a direct relationship between the proxy for liquidity (resiliecy) and excess returns of the firms in portfolio one.

The third and fourth coefficient were the only one statistically significant. The interpretation is that resiliency had no statistically significant effect on excess returns since only the remote effect was statistically significant. The respective t-statistic values were -1.318430, 0.606101, 2.053051, -2.099406 and 1.720303. The p-values were found to be 0.1906, 0.5459, 0.0428, 0.0385 and 0.0887. The positive effect shows that there is an inverse relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio one.

The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and resiliency was positive and it shows that in Kenya firms which are small size and low value are likely to have negative correlation with market resiliency. These findings support those of who found that resiliency had a significant effect on excess returns.

4.2.11 Portfolio One Heteroskedasticity Test

The study further embarked on post-estimation test to test for the presence of heteroscedasticity and serial correlation. In particular, autoregressive conditional Heteroskedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the test statistics; F-statistic and Observation R-square are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 6: Portfolio One Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.321458	Prob. F(1,113)	0.5719
Obs*R-square	0.326220	Prob. Chi-Square(1)	0.5679

Table 4.6 presents the result after the testing for heteroscedasticity using ARCH test. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedasticity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.2.12 Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic, Observations R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicate the absence of autocorrelation in the model.

Table 4. 7: Portfolio One Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.153250	Prob. F(2,92)	0.3201
Obs*R-squared	2.837070	Prob. Chi-Square(2)	0.2421

Table 4.7 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the bases that the p-value of the two test statistics that is F-statistic and the chi-square were statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated. Gujarati (2008), note that the advantage of using Breusch-Godfrey test is that it allows for non-stochastic repressors, such as the lagged values of the regressors and unlike a test such as Durbin-Watson that is only fit where there are no lagged terms, the second advantage is that it allows for higher-order autoregressive schemes and finally it is able to allow for simple or higher-order moving excess of white noise error terms.

4.3 Portfolio One Fama-French three factor and Individual liquidity-Measurers

4.3.1 Fama-French three factor and trade volume

The value of adjusted R-squared was found to be 0.578135 shows that the independent variables in this portfolio are able to explain about 0.578135 of the variation in returns. The value of F-statistic of 21.04249 was also found to be statistically significant. The value of the Durbin Watson of 1.899993 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 8: Fama-French three factor and trade volume

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returnone(-1)	-0.124597	0.075132	-1.658368	0.1001
Marketret	1.118666	0.144643	7.733974	0.0000
Marketret (-1)	0.331250	0.160155	2.068305	0.0410
Hml	-1.149525	0.139154	-8.260834	0.0000
Smb	0.638146	0.153043	4.169715	0.0001
Smb (-1)	0.415572	0.162517	2.557101	0.0119
Smb (-2)	0.420766	0.150518	2.795460	0.0061
Volumeone	2.617328	0.644838	4.058890	0.0001
C	-34.00366	8.653795	-3.929336	0.0001

R-squared	0.606980	Mean dependent var	-6.905771
Adjusted R-squared	0.578135	S.D. dependent var	12.04253
S.E. of regression	7.821760	Akaike info criterion	7.024902
Sum squared resid	6668.612	Schwarz criterion	7.236225
Log likelihood	-405.4692	Hannan-Quinn criter.	7.110705
F-statistic	21.04249	Durbin-Watson stat	1.899993
Prob(F-statistic)	0.000000		

4.3.2 Three Factor Asset Pricing Model on Excess Return

Table 4.8 presents the regression results. The coefficients of market premium were found to be marketret 1.118666, marketret (-1) 0.331250. These values shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.118666 and 0.331250 percent in different time horizons. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficients were also found to be statistically significant with a t-statistic values that were statistically significant 7.733974 and 2.068305 respectively. The p-values were also found to be 0.0000 and 0.0410 respectively. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and the market premium in portfolio one under CAPM was significant. These findings support those of who found that market premium had a significant effect on excess returns.

These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner and López-Espinosa (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The coefficient of Value Premium (HML) was found to be -1.149525. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -1.149525 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio one.

The coefficient was statistically significant with a t-statistic value of -8.260834. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (small size and low market value portfolio) and hml was negative and it shows that in Kenya firms which are (small size and low value) are likely to get lower returns as a result of being in this portfolio. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market.

They support those of Xu and Zhang (2014), in China who found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) were found to be smb 0.638146 Smb (-1) 0.415572, Smb (-2) 0.420766. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess returns of the portfolio to increase by smb 0.638146, Smb (-1) 0.415572 and Smb (-2) 0.420766

percent respectively for two consecutive months. The positive sign of the coefficient shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio one under Fama–French three factor model.

The coefficients were statistically significant with t-statistic values of 4.169715, 2.557101 and 2.795460. The p-value were found to be 0.0001, 0.0119 and 0.0061. The interpretation was that the variation between the excess returns of firms in the (small size and low market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and low market value are likely to have a positive correlation with the premium for size.

These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. These findings contradict those of Xu and Zhang (2014), in China who found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011),

employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.3.3 Trading Volume and Excess Return

From the regression results in table 4.8 the coefficient of trading volume was found to be 2.617328. This value shows that holding other variables in the model constant, an increase in turnover by one percent causes the excess return of the portfolio to increase by 2.617328 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (trading volume) and excess returns of the firms in portfolio one.

The coefficient was also statistically significant with a t-statistic value of 4.058890. The p-value was found to be 0.0001. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and turnover was positive and it shows that in Kenya firms which are small size and low market value are likely to have positive correlation with market breath.

These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.3.4 Fama-French Three Factor and Price Impact

Table 4. 9: Fama-French Three Factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNONE(-1)	0.025357	0.066675	0.380314	0.7045
RETURNONE(-2)	0.183000	0.068530	2.670367	0.0088
MARKETRET	0.893846	0.147317	6.067513	0.0000
HML	-1.022405	0.145579	-7.023013	0.0000
SMB	0.645464	0.160563	4.019991	0.0001
PRICE IMPACTONE	5.199674	1.847548	2.814365	0.0058
PRICE IMPACTONE(-1)	-2.784483	1.946283	-1.430667	0.1554
PRICE IMPACTONE(-2)	-0.295782	1.947340	-0.151890	0.8796
PRICE IMPACTONE(-3)	4.311041	1.857487	2.320899	0.0222
C	-3.265989	2.183748	-1.495589	0.1377
R-squared	0.591401	Mean dependent var		-6.988220
Adjusted R-squared	0.557032	S.D. dependent var		12.06083
S.E. of regression	8.027183	Akaike info criterion		7.085140
Sum squared resid	6894.617	Schwarz criterion		7.321223
Log likelihood	-404.4807	Hannan-Quinn criter.		7.180986
F-statistic	17.20780	Durbin-Watson stat		2.020805
Prob(F-statistic)	0.000000			

4.4.5 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.9 the coefficient of market premium was found to be 0.893846. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.893846 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.067513. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and the return on the market portfolio was significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios.

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess return found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional

view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.9 the coefficient of Value Premium (HML) was found to be -1.022405. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by 1.022405 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio one.

The coefficient was statistically significant with a t-statistic value of -7.023013. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (small size and low market value portfolio) and hml was negative and it shows that in Kenya firms which are (small size and low value) are likely to get higher returns as a result of Value Premium (HML) premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They support those of Xu and Zhang (2014), in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) was found to be 0.645464. This value shows that holding other variables in the model constant, an increase in the size premium by

one percent causes the excess return of the portfolio to decrease by 0.645464 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio one.

The coefficient was statistically significant with a t-statistic value of 4.019991 .The p-value was found to be 0.0001. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and low market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant.

Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.3.6 Price Impact and Excess Return

The regression results in table 4.9 the coefficient of price impact was found to be price impactone 5.199674, price impactone (-1)-2.784483, price impactone (-2) -0.295782, price impactone (-3) 4.311041. These value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by 5.199674,-2.784483, -0.295782, 4.311041 units. All the coefficients are statistically insignificant apart from first term and lag three term. The value of lag three is very remote in the past and was interpreted as being of little consequence statistically. The positive effect of the first term shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio one.

The coefficient is not just positive but it is also statistically significant for portfolio one with a t-statistic value of 2.814365. The p-value was found to be 0.0058. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and price impact was positive and it shows that in Kenya firms which are small size and are low market value are likely to have positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.3.7 Fama-French three factor and resiliency

The value of adjusted R-squared was found to be 0.564864 shows that the independent variables in this portfolio are able to explain about of 0.564864 the variation in returns. The value of F-statistic of 13.44043 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson stat 1.959888 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 10: Fama-French three factor and resiliency

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returnone (-1)	0.003347	0.072835	0.045952	0.9634
Returnone (-2)	0.168622	0.072887	2.313459	0.0227
Marketret	1.042658	0.155445	6.707585	0.0000
Hml	-1.086322	0.150621	-7.212280	0.0000
Smb	0.626053	0.160249	3.906756	0.0002
Smb (-1)	0.318167	0.162121	1.962532	0.0524
Smb (-2)	0.242877	0.162473	1.494878	0.1380
resilientone	-0.998288	0.660033	-1.512482	0.1335
Resilientone (-1)	0.255773	0.770556	0.331933	0.7406
Resilientone (-2)	1.701401	0.728166	2.336557	0.0214
Resilientone (-3)	-1.550506	0.762212	-2.034219	0.0445
Resilientone (-4)	1.009548	0.681274	1.481852	0.1414
C	0.241300	1.297787	0.185932	0.8529

R-squared	0.610269	Mean dependent var	-6.987983
Adjusted R-squared	0.564864	S.D. dependent var	12.11316
S.E. of regression	7.990424	Akaike info criterion	7.099641
Sum squared resid	6576.227	Schwarz criterion	7.408233
Log likelihood	-398.7792	Hannan-Quinn criter.	7.224912
F-statistic	13.44043	Durbin-Watson stat	1.959888
Prob(F-statistic)	0.000000		

4.3.8 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.10 the coefficient of market premium was found to be 1.042658. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.042658 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient is positive and also statistically significant with a t-statistic value of 6.707585. The p-value was found to be 0.000. The interpretation was that the variation between the excess returns of firms in the (small size and low market value portfolio) and the return on the market portfolio was very close to value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the

results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

Value Premium (HML) had a coefficient of -1.086322. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by 1.086322 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio one.

The coefficient is also statistically significant with a t-statistic value of-7.212280. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (small size and low market value portfolio) and hml was negative and it shows that in Kenya firms which are (small size and low value) are likely to get lower returns as a result of Value Premium (HML) premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They support those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) was found to be smb 0.626053 Smb (-1) 0.318167, Smb (-2) 0.242877. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to increase by smb 0.626053, Smb (-1) 0.318167 and Smb (-2) 0.242877 percent respectively. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio one.

The coefficients were also statistically significant for the first two terms and insignificant for the last term with a t-statistic value of 3.906756, 1.962532 and 1.494878. The p-value was found to be 0.0002, 0.0524 and 0.1380. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. These results contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of

the portfolios and that the effect was statistically significant. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.3.9 Market Resiliency and Excess Return

The coefficients of market resiliency were found to be-0.998288, 0.255773, 1.701401, 1.009548 and -1.5505061. These value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to decrease by percent -0.998288, 0.255773, 1.701401, -1.5505061and1.009548. The interpretation was that since only the remote past coefficients were significant it was logical to conclude that resiliency has no significant effect on excess returns for the firms in portfolio one.

The coefficient were statistically insignificant for portfolio one with a t-statistic values of -1.512482, 0.331933, 2.336557,-2.034219 and 1.481852. The p-values were found to be 0.1335, 0.7406, 0.0214, 0.0445 and 0.1414. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are big size and high value are likely to have positive correlation with market resiliency. These findings supports those of who found that resiliency had an effect on excess returns.

4.3.10 Fama-French Three Factor and Bid Ask Spread

The value of adjusted R-squared was found to be 0.523950 shows that the independent variables in this portfolio are able to explain about of the variation in returns. The value

of F-statistic of 17.09655 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.051385 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 11: Fama-French three factor and spread

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returnone (-1)	-0.018634	0.070358	-0.264847	0.7916
Returnone (-2)	0.113397	0.070879	1.599869	0.1125
Marketret	1.057616	0.153306	6.898742	0.0000
Hml	-1.114916	0.150380	-7.413993	0.0000
Smb	0.654042	0.164031	3.987311	0.0001
Smb (-1)	0.290791	0.166742	1.743956	0.0840
Smb (-2)	0.248692	0.169213	1.469694	0.1445
spreadone	0.351762	0.406799	0.864707	0.3891
C	-0.272087	1.485834	-0.183121	0.8550
R-squared	0.556500	Mean dependent var		-6.905771
Adjusted R-squared	0.523950	S.D. dependent var		12.04253
S.E. of regression	8.308910	Akaike info criterion		7.145740
Sum squared residua	7525.141	Schwarz criterion		7.357063
Log likelihood	-412.5986	Hannan-Quinn criter.		7.231543
F-statistic	17.09655	Durbin-Watson stat		2.051385
Prob(F-statistic)	0.000000			

4.3.11 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.11 the coefficient of market premium was found to be 1.057616. This value shows that holding other variables in the model constant, an

increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.057616 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 6.898742. The p-value was found to be 0.000. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios.

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. These findings contradict those of Xu, and Zhang (2014), in China who found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The coefficient of Value Premium (HML) was found to be -1.114916. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -1.114916 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio one.

The coefficient was statistically significant with a t-statistic value of -7.413993. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (small size and low market value portfolio) and hml was negative and it shows that in Kenya firms which are (small size and low value) are likely to get higher returns as a result of Value Premium (HML) premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They support those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) was found to be smb 0.654042, Smb (-1) 0.290791 and Smb (-2) 0.248692. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to increase by 0.654042, 0.290791 and 0.248692 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient for the current period was the only one which was statistically significant with a t-statistic value of 3.987311 but 1.743956 and 1.469694 the subsequent periods were statistically insignificant. The p-values were found to be 0.0001, 0.0840 and 0.1445. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. These results Contradicts those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of

assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.3.12 Bid Ask Spread and Excess Return

From the regression results in table 4.11 the coefficient of spread was found to be 0.351762. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by 0.351762 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio one.

The coefficient is not just positive but it is also statistically insignificant for portfolio five with a t-statistic value of 0.864707. The p-value was found to be 0.3891. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and high market value are likely to have negative correlation with market spread. These findings support those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.3.12 Summary of Findings of Portfolio One

Portfolio one is formed from small size with low value companies. There is a positive effect between the market premium and excess return in small size and low value firms. This is confirmed by all the regression equations on portfolio one. The coefficients are positive and statistically significant with P-value was found to be 0.000. The value premium (HML) had a negative effect and significant effect on excess return meaning an increase in the value premium leads to a decrease in excess return on the small size with low value companies in Kenya. The negative effect shows that there is an inverse relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio one. The coefficient of SMB was found to be positive and statistically significant across all the tables meaning that an increase in the size premium for small size with low value companies in Kenya causes an increase in the excess return.

Trading volume had a positive coefficient that was statistically significant. Price impact had a negative and a statistically insignificant effect on excess return for the small and low value companies. Market resiliency has a negative and statistically insignificant relation with excess return. Bid Ask Spread had mixed result, it had a negative and statistically insignificant effect when regressed with other liquidity factors such as trade volume, price impact and resiliency but it is positive and statistically insignificant when Regressed with the Fama- French factors alone.

4.4 Portfolio Two Small Size Medium Value (S/M)

Portfolio one is formed from small size with low value companies as used by Fama and French three factor model (1993).

4.4.1 Portfolio Two descriptive statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera test were used. The descriptive statistics for portfolio two is as shown in table 4.12 below.

Table 4. 12: Portfolio Two descriptive statistics

	Return	market	hml	smb	Lturnover	Price Impact	Immediacy	spread	resiliency
mean	-7.11	-7.28	-0.8	-0.1	13.91	0.38	0.07	1.59	0.20
median	-7.33	-7.32	-0.9	-0.5	13.69	0.28	0.07	1.10	0.00
maximum	14.59	8.16	16.	12.	17.53	1.78	0.08	13.68	4.48
minimum	-22.0	-30.1	-19.	-12.	11.80	0.00	0.06	0.13	0.00
std. dev.	7.31	6.06	5.45	4.95	1.29	0.34	0.01	1.65	0.85
skewness	0.27	-0.51	0.04	0.25	1.27	1.56	-0.78	3.75	4.17
kurtosis	3.24	4.65	4.40	2.81	4.39	5.89	3.53	25.81	18.93
jarque-bera	1.79	18.76	9.76	1.40	41.96	90.1	13.63	2881	1617
probability	0.41	0.00	0.01	0.50	0.00	0.00	0.00	0.00	0.00
sum	-853.	-873.	-104	-20	1668.6	45.2	8.70	190.	24.42
sum sq. dev.	6358.	4367	353	291	198.18	13.3	0.00	322.6	85.24
observations	120	120	120	120	120	120	120.00	120	120

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables'. The table 4.12 shows the descriptive statistics for

the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, volume, market resiliency and bid-ask spread variables were 0.73, -0.51, 0.04, 0.25, 1.30, -0.24, 1.13, 9.76 and 1.56 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return, market premium, hml, smb, price impact, immediacy, volume, market resiliency and bid-ask spread variables were 0.27 -0.51 0.04 0.25 1.27 1.56 -0.78 3.75 and 4.17 respectively. These values of skewness shows that the variables are not all normally distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, volume, market resiliency and bid-ask spread variables were 3.24 4.65 4.40 2.81 4.39 5.89 3.53 25.81 and 18.93 respectively. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 1.79, 18.76, 9.76, 1.40, 41.96, 90.1, 13.63, 2881, and 1617 respectively and the probability values of 0.41, 0.00, 0.01, 0.50, 0.00, 0.00, 0.00, 0.00 and 0.00 respectively. The probabilities of the jarque-bera are all away from the value of one (1) except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not normal and thus in further analysis this problem was considered before further analysis was executed.

4.4.2 Portfolio Two Group Unit Root Test

A unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is stationarity

Table 4. 13: Portfolio Two Group Unit Root Test

Group unit root test: Summary

Series: RETURNTWO, MARKETRET, HML, SMB, PRICE IMPACTTWO, IMMEDIACYTWO, VOLUMETWO, RESILIENTTWO, SPREADTWO

Method	Statistic	P-value	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.7587	0.0000	9	1070
ADF - Fisher Chi-square	383.656	0.0000	9	107-0
PP - Fisher Chi-square	383.239	0.0000	9	1071

To test for unit root this study chose is Im, Pesaran and Shin (IPS), the Fisher-type Augmented Dickey and Fuller (ADF) and the Fisher-type Phillips and Perron (PP) tests with and without time trend. The null hypothesis was that panel data was non-stationarity.

Im, Pesaran and Shin (IPS) proposes a test for the presence of unit roots in panels that combines information from the time series dimension with that from the cross section dimension, such that fewer time observations are required for the test to have power. IPS test has been found to have superior test power by researchers in economics to analyze long-run relationships in panel data. Both the result of ADF and Phillips Perron (PP) are presented for comparison purposes. This is based on the observation by Maddala and Wu (1999) that unlike the ADF test which is parametric, the PP test is non-parametric and hence robust in presence of serial correlation in the error terms without adding

lagged difference terms. In addition, the tests played a confirmatory and complementary role to the findings of LLC test. The results from the unit root test for all the variables in in table 4.13 above shows the variables in the group are stationary.

4.4.3 Portfolio Two multicollinearity Test.

Pair-wise correlation was used to examine the level of collinearity present between explanatory variables used in the study. The correlation coefficients range from negative one to positive one. According to Guajarati (2009) if the correlation coefficient are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity. Pair-wise correlation coefficients less than 0.8 indicates that the problem of multicollinearity is not severe and is normally ignored. However, correlation coefficients in excess of 0.8 points to existence high degree of multicollinearity among the regressors and warrants a remedial action.

Table 4. 14: Portfolio Two correlation analysis

	return	market	hml	smb	Lturn Over	Price Impact	Imme diacy	spread	Resi lient
return	1.00								
market	0.46	1.00							
hml	0.03	0.19	1.00						
smb	0.25	-0.25	-0.29	1.00					
Volume	0.22	0.16	-0.08	0.02	1.00				
Price Impact	0.28	-0.20	-0.01	0.27	-0.05	1.00			
immediacy	-0.20	-0.14	0.09	0.02	-0.99	0.07	1.00		
spread	0.12	0.14	0.08	0.00	0.24	0.05	-0.27	1.00	
resiliency	0.11	0.00	-0.03	0.04	-0.03	0.10	0.01	0.11	1.00

Table 4.14 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is no serious multicollinearity problem since the highest correlation between the independent variables was 0.99% between turnover and immediacy and the least one was 0.01%. Therefore, immediacy variable was dropped from further analysis.

4.4.4 Portfolio Two Granger Causality

The study found that market premium has a one-way causality to the trading volume, trading volume has a one way causality to price impact and price impact has a one way causality to the value premium as indicated in Table 15. This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process.

Table 4. 15: Portfolio Two Granger Causality

Variables	Causality
Portfolio two	
Market=>Volume	One-way
Volume=> Price Impact	One-way
Price Impact=>hml	One-way

4.4.5 Portfolio Two Regression Results

The regression analysis shows the good of-fit statistics where **t**he value of R-squared of 0.459870 and adjusted-R-squared of 0.403819, shows that the variables included in this portfolio are able to explain about 40 % of the variation in returns. The value of F-statistic of 8.204468 with a P-Values of 0.000000 was also found to be statistically significant. The value of the Durbin Watson of 2.041229 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 16: Portfolio Two Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returntwo(-1)	0.033805	0.090376	0.374049	0.7091
Marketret	0.748374	0.134401	5.568202	0.0000
Marketret(-1)	0.177235	0.155962	1.136396	0.2584
Marketret(-2)	0.292458	0.140506	2.081454	0.0398
Hml	0.359284	0.134181	2.677607	0.0086
Smb	0.641765	0.144931	4.428079	0.0000
Volumetwo	0.676925	0.590309	1.146729	0.2541
Price Impacttwo	-0.718907	2.165081	-0.332046	0.7405
Price Impacttwo(-1)	-5.001836	2.099845	-2.382002	0.0190
Resilienttwo	0.800343	0.823497	0.971884	0.3333
Spreadtwo	0.550826	0.434034	1.269083	0.2072
C	-6.705088	8.601779	-0.779500	0.4374

R-squared	0.459870	Mean dependent var	-7.391435
Adjusted R-squared	0.403819	S.D. dependent var	9.246881
S.E. of regression	7.139771	Akaike info criterion	6.865383
Sum squared resid	5403.492	Schwarz criterion	7.147147
Log likelihood	-393.0576	Hannan-Quinn criter.	6.979788
F-statistic	8.204468	Durbin-Watson stat	2.041229
Prob(F-statistic)	0.000000		

4.4.6 Three Factor Asset Pricing Model and Excess Return

From the regression results in table 4.16 the coefficients of market premium were found to be marketret 0.748374, marketret (-1) 0.177235 and marketret (-2) 0.292458. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.748374, 0.177235 and 0.292458 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first and the third coefficients were the only one statistically significant. The t-statistic values were found to be 5.568202, 1.136396 and 2.081454. The p-value were found to be 0.0000, 0.2584 and 0.0398. The interpretation was that the variation between the excess return of firms in the small size and medium market value portfolio and the return on the market portfolio was statistically significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found

that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

Value Premium (HML) coefficient was 0.359284. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.359284 percent. The positive effect shows that there is a direct relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio.

The coefficient was statistically significant with a t-statistic value of 2.677607. The p-value was found to be 0.0086. The interpretation was that the relation between the excess return of firms in the small size and medium market value portfolio and hml was positive and it shows that in Kenya firms which are small size and medium value are likely to get higher returns as a result of Value Premium (HML). These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. The results contradicts those of Vakilifard, and Heirany, (2013), who by employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.16 the coefficient of Size Premium (SMB) was found to be 0.641765. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to increase by 0.641765 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio.

The coefficient was statistically significant with a t-statistic value of 4.428079. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and medium value are likely to have a positive correlation with the premium for size. These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found

that the size premium had a positive effect on the return of stocks. The results contradict those of Estrada (2011), who after employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.4.7 Trading Volume and Excess Return

From the regression results in table 4.16 the coefficient of trading volume was found to be 0.676925. This value shows that holding other variables in the model constant, an increase in turnover by one percent causes the excess return of the portfolio to increase by 0.676925 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (log turnover) and excess returns of the firms in portfolio one.

The coefficient was statistically insignificant with a t-statistic value of 1.146729. The p-value was found to be 0.2541. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and turnover was positive and it shows that in Kenya firms which are small size and low value are likely to have positive correlation with market breath though statistically insignificant.

These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. They contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. They Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.4.8 Price Impact and Excess Return

From the regression results in table 4.16 the coefficient of price impact was found to be price impacttwo -0.718907 and price impacttwo (-1) -5.001836. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by -0.718907 and -5.001836 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio two.

The coefficients were statistically insignificant for portfolio two with t-statistic values of -0.332046 and -2.382002. The p-values were found to be 0.7405 and 0.0190. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and price impact was positive and it shows that in Kenya firms which are small size and medium value are likely to have positive correlation with market price impact. These findings support those of who found that price impact, had a significant effect on excess returns.

4.4.9 Bid Ask Spread and Excess Return

From the regression results in table 4.16 the coefficient of spread was found to be 0.550826. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by 0.550826 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio two.

The coefficient was statistically insignificant for portfolio two with a t-statistic value of 1.269083. The p-value was found to be 0.2072. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and spread was positive and it shows that in Kenya firms which are small size and medium value are likely to have negative correlation with market spread. These findings

contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.4.10 Market Resiliency and Excess Return

The coefficient of resiliency was found to be 0.800343. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by 0.800343 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio two.

The coefficient was statistically insignificant for portfolio two with a t-statistic value of 0.971884. The p-value was found to be 0.3333. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are small size and medium value are likely to have positive correlation with market resiliency. These findings support those of who found that resiliency, had a significant effect on excess returns.

4.4.11 Portfolio Two Heteroscedasticity Test

Post-estimation test to test for the presence of heteroscedasticity and serial correlation was done. In particular, autoregressive conditional Heteroscedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the

test statistics; F-statistic and Observation R-square are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 17: Portfolio Two Heteroscedasticity Test

Heteroscedasticity Test: ARCH			
F-statistic	0.034278	Prob. F(1,115)	0.8534
Obs*R-squared	0.034864	Prob. Chi-Square(1)	0.8519

Table 4.17 presents the result after the testing for heteroscedasticity using ARCH test. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedacity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.4.12 Portfolio Two Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic, Observations R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicate the absence of autocorrelation in the model.

Table 4. 18: Portfolio Two Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.658739	Prob. F(2,104)	0.5196
Obs*R-squared	1.476131	Prob. Chi-Square(2)	0.4780

Table 4.18 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the bases that the p-value of the two test statistics that is F-statistic and the chi-square were statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated.

4.5 Portfolio two Fama-French three factor and Individual liquidity-Measurers

4.5.1 Fama-French three factor and volume

The value of adjusted R-squared was found to be 0.393052 shows that the independent variables in this portfolio are able to explain about of 39% the variation in returns. The value of F-statistic of 8.576777 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.008085 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms

Table 4. 19: Fama-French three factor and volume

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNTWO(-1)	0.027461	0.088257	0.311150	0.7563
MARKETRET	0.746508	0.136358	5.474607	0.0000
MARKETRET(-1)	0.100704	0.150733	0.668096	0.5055
MARKETRET(-2)	0.269457	0.137618	1.958001	0.0528
HML	0.293950	0.130856	2.246362	0.0267
HML(-1)	0.126796	0.126821	0.999804	0.3197
HML(-2)	-0.262210	0.127846	-2.050980	0.0427
SMB	0.637199	0.143359	4.444790	0.0000
VOLUMETWO	2.671219	1.377372	1.939359	0.0551
VOLUMETWO(-1)	-1.735751	1.330384	-1.304699	0.1948
C	-12.28304	8.415573	-1.459561	0.1473
R-squared	0.444928	Mean dependent var		-7.391435
Adjusted R-squared	0.393052	S.D. dependent var		9.246881
S.E. of regression	7.203955	Akaike info criterion		6.875722
Sum squared resid	5552.975	Schwarz criterion		7.134006
Log likelihood	-394.6676	Hannan-Quinn criter.		6.980593
F-statistic	8.576777	Durbin-Watson stat		2.008085
Prob(F-statistic)	0.000000			

4.5.2 Three Factor Asset Pricing Model on Excess Return

Market premium coefficient was found to be 0.746508, 0.100704 and 0.269457. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.746508, 0.100704 and 0.269457 percent in month one, two and three respectively.

However, only the current value is statistically significant. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient is also statistically significant with a t-statistic value of 5.474607, 0.668096 and 1.958001. The p-value was found to be 0.000, 0.5055 and 0.0528. The interpretation was that the variation between the excess return of firms in the (small size and low medium value portfolio) and the return on the market portfolio was very statistically significant. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market.

These contradicts those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The coefficient of Value Premium (HML) were found to be 0.293950, 0.126796 and -0.262210. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess returns on the portfolio to increase by 0.293950, 0.126796 and reduce by - 0.262210 percent respectively. Only the first coefficient and the second lag were of any statistical significant. The positive effect shows that there is a positive relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio two.

The current and the second lags of the coefficients were statistically significant with a t-statistics values of 2.246362, 0.999804 and -2.050980. The p-values were found to be 0.0267, 0.3197 and 0.0427. The interpretation was that the relation between the excess return of firms in the (small size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and medium value) are likely to get higher returns as a result of Value Premium (HML) premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.19 the coefficient of Size Premium (SMB) was found to be 0.637199. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to increase by 0.637199 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in portfolio two.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 4.444790. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and medium market value are likely to have a positive correlation with the premium for size.

These findings concur with those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and

Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results contradict those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.5.3 Trading Volume and Excess Return

Trading volume has a positive effect on excess returns the coefficient was found to be 2.671219, -1.735751. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 2.671219 and decrees by -1.735751 percent given different time horizons. The positive and negative effect shows that there is a positive and negative relationship between the proxy for liquidity (log trading volume) and excess returns of the firms in portfolio one in different horizons.

The coefficient were statistically insignificant with a t-statistic values of 1.939359 and -1.304699. The p-value was found to be 0.0551 and 0.1948. The interpretation was that the variation between the excess returns of firms in the (small size and medium market value portfolio) and trading volume was positive and it shows that in Kenya firms which are big size and high market value are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results support those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks.

Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.5.4 Fama-French three factor and Price Impact

The value of adjusted R-squared was found to be 0.396224 shows that the independent variables in this portfolio are able to explain about of 39.6224 % the variation in returns. The value of F-statistic of 8.678063 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.996905 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 20: Fama-French three factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNTWO(-1)	0.082406	0.089218	0.923649	0.3577
MARKETRET	0.758743	0.135872	5.584238	0.0000
MARKETRET(-1)	0.085561	0.155346	0.550780	0.5829
MARKETRET(-2)	0.339001	0.139237	2.434703	0.0166
HML	0.360170	0.133661	2.694651	0.0082
HML(-1)	0.067255	0.125608	0.535436	0.5935
HML(-2)	-0.215036	0.126740	-1.696673	0.0927
SMB	0.663194	0.146816	4.517171	0.0000
PRICE IMPACTTWO	-0.129289	2.168125	-0.059632	0.9526
PRICE IMPACTTWO(-1)	-4.959447	2.109478	-2.351031	0.0206
C	3.485923	1.963469	1.775389	0.0787

R-squared	0.447829	Mean dependent var	-7.391435
Adjusted R-squared	0.396224	S.D. dependent var	9.246881
S.E. of regression	7.185103	Akaike info criterion	6.870482
Sum squared resid	5523.951	Schwarz criterion	7.128766
Log likelihood	-394.3584	Hannan-Quinn criter.	6.975353
F-statistic	8.678063	Durbin-Watson stat	1.996905
Prob(F-statistic)	0.000000		

4.5.5 Three Factor Asset Pricing Model on Excess Return

Market premium is a major determinant of excess return and has a coefficient of 0.758743, marketret (-1) 0.085561 and marketret (-2) 0.339001 in period one two and three. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.758743, 0.085561 and 0.339001 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 5.584238, 0.550780 and 2.434703. The p-value was found to be 0.000, 0.5829 and 0.0166. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in

Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.20 the coefficients of Value Premium (HML) were found to be HML 0.360170, HML (-1) 0.067255 and HML (-2) - 0.215036. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.360170, 0.067255 and decrease by - 0.215036 percent. The positive effect shows that there is a positive relationship between the proxy for financial distress Value Premium (HML) and excess returns of the firms in the portfolio two.

The first coefficient was statistically significant with a t-statistic value of 2.694651 the other two that is 0.535436 and -1.696673 were statistically insignificant. The p-value was found to be 0.0082, 0.5935 and 0.0927. The interpretation was that the relation between the excess return of firms in the (small size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and medium value) are likely to get higher returns as a result of Value Premium (HML) premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a

statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) was found to be 0.663194. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.663194 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio two.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 4.517171. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.5.6 Price Impact and Excess Return

Price impact had coefficient of -0.129289 and - 4.959447. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to decrease by 0.129289 and 4.959447 pecent. The positive effect shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio two.

The coefficient that was statistically significant for portfolio two was that of lag one with a t-statistic value of -2.351031 the other one for the current period that is -0.059632 was very small. The p-values were found to be 0.9526 and 0.0206. These implies that only lag two is significant. The conclusion is that in portfolio two the price impact is statistically insignificant since the results indicate that only the remote is significant. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and price impact was positive and it shows that in Kenya firms which are big size and are high market value are likely to have positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.5.7 Fama-French three factor and resiliency

The value of adjusted R-squared was found to be 0.378214 shows that the independent variables in this portfolio are able to explain about of 37.82% the variation in returns. The value of F-statistic of 8.907506 was also found to be statistically significant. The value of Durbin-Watson statistic 1.984088 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 21: Fama-French three factor and resiliency

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNTWO(-1)	0.066169	0.087785	0.753762	0.4526
MARKETRET	0.741002	0.138280	5.358719	0.0000
MARKETRET(-1)	0.132247	0.152144	0.869223	0.3867
MARKETRET(-2)	0.314719	0.142230	2.212742	0.0290
HML	0.305983	0.132931	2.301813	0.0233
HML(-1)	0.069804	0.126551	0.551593	0.5824
HML(-2)	-0.257833	0.127791	-2.017610	0.0461
SMB	0.665154	0.144944	4.589046	0.0000
RESILIENTTWO	0.929953	0.825726	1.126225	0.2626
C	1.186903	1.386817	0.855847	0.3940

R-squared	0.426043	Mean dependent var	-7.391435
Adjusted R-squared	0.378214	S.D. dependent var	9.246881
S.E. of regression	7.291483	Akaike info criterion	6.892229
Sum squared resid	5741.897	Schwarz criterion	7.127033
Log likelihood	-396.6415	Hannan-Quinn criter.	6.987566
F-statistic	8.907506	Durbin-Watson stat	1.984088
Prob(F-statistic)	0.000000		

4.5.8 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.21 the coefficient of market premium was found to be 0.741002, 0.132247 and 0.314719. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.741002, 0.132247 and 0.314719 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The first and third coefficients were statistically significant with a t-statistic values of 5.358719, 0.869223 and 2.212742. The interpretation was that only the first value is relevant and means that the lagged values are remote. The p-value were found to be 0.0000, 0.3867 and 0.0290. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and the return on the market portfolio was significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in

Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

Value Premium (HML) coefficients in table 4.21 were found to be HML 0.305983, HML (-1) 0.069804 and HML (-2) -0.257833. These values shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.305983, 0.069804 and decrease by 0.257833 percent respectively. The positive effect shows that there is a positive relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two.

The coefficient were statistically significant for the first and third terms respectively with a t-statistic value of 2.301813, 0.551593 and -2.017610. The p-value were found to be 0.0233, 0.5824 and 0.0461 respectively. The interpretation was that the relation between the excess return of firms in the (small size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and medium value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically

significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The regression results in table 4.21 the coefficient of Size Premium (SMB) was found to be 0.665154. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.665154 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio two.

The coefficient was statistically significant with a t-statistic value of 4.589046. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and medium market value are likely to have a positive correlation with the premium for size.

These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by Size Premium (SMB), could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. These contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found

that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.5.9 Market Resiliency and Excess Return

The coefficient of resiliency was found to be 0.929953. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by 0.929953 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio two.

The coefficient is statistically insignificant for portfolio two with a t-statistic value of 1.126225. The p-value was found to be 0.2626. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are small size and high value are likely to have positive correlation with market resiliency. These findings support those of who found that resiliency had an effect on excess returns.

4.5.10 Fama-French three factor and spread

The value of adjusted R-squared was found to be 0.387668 shows that the independent variables in this portfolio are able to explain about of 38.77% the variation in returns. The value of F-statistic of 9.230317 was also found to be statistically significant. The

value of the Durbin Watson of Durbin-Watson statistic 1.995685 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 22: Fama-French three factor and spread

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNTWO(-1)	0.033542	0.088200	0.380300	0.7045
MARKETRET	0.737314	0.137101	5.377901	0.0000
MARKETRET(-1)	0.178603	0.154261	1.157802	0.2495
MARKETRET(-2)	0.255167	0.138349	1.844364	0.0679
HML	0.264709	0.131976	2.005732	0.0474
HML(-1)	0.023110	0.129322	0.178704	0.8585
HML(-2)	-0.231745	0.127104	-1.823261	0.0710
SMB	0.641884	0.143589	4.470297	0.0000
SPREADTWO	0.741984	0.431599	1.719152	0.0885
C	-0.212872	1.572878	-0.135339	0.8926
R-squared	0.434771	Mean dependent var		-7.391435
Adjusted R-squared	0.387668	S.D. dependent var		9.246881
S.E. of regression	7.235836	Akaike info criterion		6.876907
Sum squared resid	5654.591	Schwarz criterion		7.111711
Log likelihood	-395.7375	Hannan-Quinn criter.		6.972244
F-statistic	9.230317	Durbin-Watson stat		1.995685
Prob(F-statistic)	0.000000			

4.5.11 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.22 the coefficient of market premium was found to be marketret 0.737314, marketret (-1) 0.17860 and marketret (-2) 0.255167. This value shows that holding other variables in the model constant, an increase in the market premium by 0.737314, 0.17860 and 0.255167 one percent causes the excess return on the portfolio to increase by one percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first coefficient was statistically significant with a t-statistic value of 5.377901, 1.157802 and 1.844364. The interpretation was that only the first term was statistically significant and the last two were not. The p-value were found to be 0.0000, 0.2495 and 0.0679. The interpretation was that the variation between the excess returns of firms in the (small size and low market value portfolio) and the return on the market portfolio was very close to the value of one. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios.

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. The findings contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an

attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.22 the coefficient of Value Premium (HML) were found to be HML 0.264709, HML (-1) 0.023110 and HML (-2) -0.231745. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.264709, 0.023110 and reduce by -0.231745 percent respectively. The positive effect shows that there is a positive relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two.

The coefficient of the first term was the only one statistically significant with a t-statistic value of 2.005732 and the other two 0.178704 and -1.823261. The p-values were found to be 0.0474, 0.8585 and 0.0710. The interpretation was that the relation between the excess returns of firms in the (small size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and medium value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), in China who found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to

assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

Size premium (SMB) had a coefficient of 0.641884. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.641884 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio two.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 4.470297. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and medium market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

The findings contradict those of Xu and Zhang (2014), in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.5.12 Bid Ask Spread and Excess Return

Bid ask spread had a positive effect on excess return as shown in table 4.22 with a coefficient of 0.741984. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by 0.741984 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio two.

The coefficient is not just positive but it is also statistically insignificant for portfolio five with a t-statistic value of 1.719152. The interpretation was the effect of spread in this portfolio was very small. The p-value was found to be 0.0885. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and high market value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and

Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.5.13 Summary of Findings Small size and Medium Value firms

Portfolio two is formed from small size with medium value companies. There is a positive effect between the market premium and excess return in small size and medium value firms. The value premium (HML) had a positive and significant effect on excess return meaning an increase in the value premium leads to an increase in excess return on the small size with low value companies in Kenya, which shows a direct relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two. The coefficient of Size Premium (SMB) was found to be positive and statistically significant across all the tables meaning that an increase in the size premium for small size with low value companies in Kenya causes an increase in the excess return. Trading trading volume had a positive coefficient that was statistically insignificant. Price impact has a negative and statistically insignificant relation with excess return. Market resiliency has a positive and statistically insignificant relation with excess return. Bid ask spread had a positive but statistically insignificant effect.

4.6 Portfolio Three Small size High value

Portfolio Three is formed from Small Size with High Value companies as used by Fama and French three factor model (1993).

4.6.1 Portfolio Three descriptive statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera

test were used. The descriptive statistics of portfolio three is as shown in table 4.23 below.

Table 4. 23: Portfolio Three descriptive statistics

	return	Market	Hml	Smb	Price Impact	Lturnover	spread	resilient	Immediacy
mean	-8.01	-7.28	-0.87	-0.17	0.34	14.23	1.52	0.94	0.07
median	-7.80	-7.32	-0.99	-0.56	0.27	14.06	1.22	0.00	0.07
maximum	27.74	8.16	16.8	12.9	1.26	16.46	7.52	4.48	0.08
minimum	-31.12	-30.1	-19.	-12.	0.00	12.93	0.28	0.00	0.06
std. dev.	8.27	6.06	5.45	4.95	0.29	0.83	1.07	1.35	0.00
skewness	0.36	-0.51	0.04	0.25	1.18	0.64	2.25	1.07	-0.44
kurtosis	5.39	4.65	4.40	2.81	3.90	2.62	10.77	2.72	2.33
jarque-bera	31.20	18.76	9.76	1.40	31.6	8.91	403.3	23.48	6.15
probability	0.00	0.00	0.01	0.50	0.00	0.01	0.00	0.00	0.05
sum	-961.	-873.	-104	-20.	41.3	1707.9	182.9	112.27	8.46
sum sq. dev.	8136	4367	353	291	9.72	81.545	136.5	215.66	0.001

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables'. The table 4.23 shows the descriptive statistics for the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were -8.01, -7.28, -0.87, -0.17, 0.34, 14.23, 1.52, 0.94, and 0.07 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 0.36, -0.51 0.04 0.25 1.18 0.64 2.25 1.07 and -0.44 respectively. These values of skewness shows that the variables are not all normally distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 5.39 4.65 4.40 2.81 3.90 2.62, 10.77 2.72 and 2.33 respectively. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 31.20, 18.76, 9.76, 1.40, 31.6, 8.91, 403.3, 23.48 and 6.15 respectively and the probability values of 0.00, 0.00, 0.01,0.50, 0.00, 0.01 0.00 0.00 and 0.05 respectively

.The probabilities of the jarque-bera are all away from the value of one (1) except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not normal and thus in further analysis this problem was considered before further analysis was executed.

4.6.2 Portfolio Three Group Unit Root Test

Table 4. 24: Portfolio Three Group Unit Root Test

Group unit root test: Summary
Series: RETURNTHREE, MARKETRET, HML, SMB, PRICE IMPACTTHREE, IMMEDIACYTHEE, RESILIENTTHREE, SPREADTHREE, VOLUMETHREE

Method	Statistic	P-value	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-19.1807	0.0000	9	1070
ADF - Fisher Chi-square	308.555	0.0000	9	1070
PP - Fisher Chi-square	345.847	0.0000	9	1071

The results from the unit root test for all the variables in table 4.24 above shows that at least some of the variables in the group are stationary. The interpretation is that a method that is able to combine stationary and non-stationary was required. In this study thus ARDL modeling was used.

4.6.3 Portfolio Three correlation analysis

The correlation analysis was used as a pre estimation diagnostic test for multicollinearity and association between independent variables. The correlation coefficients range from negative one to positive one. The correlation coefficient are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity.

Table 4. 25: Portfolio Three correlation analysis

	return	Market	hml	smb	Lturn-over	Price Impact	Resi-liency	spread	Imme-diacy
return	1.00								
market	0.70	1.00							
hml	0.21	0.15	1.00						
smb	0.05	-0.13	-0.29	1.00					
Lturn over	0.34	0.29	-0.11	-0.02	1.00				
Price Impact	-0.07	0.06	0.05	0.05	0.08	1.00			
Resi liency	-0.14	-0.27	-0.14	0.11	-0.32	-0.06	1.00		
spread	0.26	0.25	0.07	-0.15	0.47	0.21	-0.16	1.00	
Imme-diacy	-0.34	-0.28	0.13	0.02	-0.99	-0.08	0.31	-0.47	1.00

Table 4.25 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is serious multicollinearity problem since the highest correlation between the independent variables was 0.99% between turnover and immediacy and the least one was 0.01%. Thus immediacy variable was dropped from further analysis.

4.6.4 Portfolio Three Granger Causality

The study found that market premium has a one-way causality to the trading volume and bid ask spread has a one way causality to the market resiliency as indicated in Table 4.26. This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process.

Table 4. 26: Portfolio Three Granger Causality

Variables	Causality
Portfolio three	
Return=>Volume	One-way
Spread=>resiliency	One-way

4.6.5 Portfolio Three Regression Results

The value of adjusted-R-squared of 0.671492, shows that the variables in this portfolio are able to explain about 67.1492% of the variation in returns. The value of F-statistic of 15.81951 was also found to be statistically significant with p-value of 0.0000. The value of the Durbin Watson of 1.992966 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 27: Portfolio Three Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Returnthree(-1)	0.084064	0.081247	1.034669	0.3033
Marketret	0.890402	0.096235	9.252409	0.0000
Marketret(-1)	0.042358	0.128423	0.329835	0.7422
Marketret(-2)	0.207828	0.095810	2.169162	0.0324
Hml	0.398855	0.089129	4.475019	0.0000
Smb	0.360201	0.095777	3.760847	0.0003
Smb(-1)	0.153116	0.095336	1.606066	0.1114
Volumethree	5.022844	1.235140	4.066621	0.0001
Volumethree(-1)	-3.110610	1.235781	-2.517121	0.0134
Price Impactthree	-4.655711	1.660281	-2.804171	0.0061
Resilientthree	-0.095336	0.610831	-0.156076	0.8763
Resilientthree(-1)	0.656507	0.688327	0.953773	0.3425
Resilientthree(-2)	-1.744491	0.693995	-2.513693	0.0135
Resilientthree(-3)	2.041056	0.630356	3.237940	0.0016
Spreadthree	0.596842	0.534307	1.117038	0.2667
Spreadthree(-1)	-0.898454	0.517912	-1.734760	0.0859
C	-24.93099	11.42322	-2.182484	0.0314

R-squared	0.716804	Mean dependent var	-7.954201
Adjusted R-squared	0.671492	S.D. dependent var	8.368059
S.E. of regression	4.796202	Akaike info criterion	6.107120
Sum squared resid	2300.355	Schwarz criterion	6.508462
Log likelihood	-340.2665	Hannan-Quinn criter.	6.270060
F-statistic	15.81951	Durbin-Watson stat	1.992966
Prob(F-statistic)	0.000000		

4.6.6 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.27 the coefficient of market premium was found to be marketret 0.890402, marketret (-1) 0.042358 and marketret (-2) 0.207828. These values shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by

0.890402, 0.042358 and 0.207828 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns in portfolio three.

The first and third coefficients were statistically significant. The t-statistics values were found to be 9.252409, 0.329835 and 2.169162 respectively. The p-value were found to be 0.0000, 0.7422 and 0.0324 respectively. The interpretation was that the relationship between the excess return of firms in the (small size and high market value portfolio) and the return on the market portfolio was statistically significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.27 the coefficient of Value Premium (HML) was found to be 0.398855. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.398855 percent. The positive effect shows that there is a positive relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio three.

The coefficient was statistically significant t-statistic value of 4.475019. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and high value) results to higher returns as a result of HML.

These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. The results contradict Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.27 the coefficient of size premium (SMB) was found to be Smb 0.360201 and Smb (-1) 0.153116. These values shows that holding

other variables in the model constant, an increase in the size premium by one percent causes the excess return of portfolio three to increase by 0.360201 and 0.153116 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in portfolio three.

The first term's coefficient was statistically significant with a t-statistic value of 3.760847. The second term influence was statistically insignificant 1.606066. The p-values was found to be 0.0003 and 0.1114. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are small size and high value are likely to have a positive correlation with the premium for size. These findings support those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard, and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. They contradict

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.6.7 Trading Volume and Excess Return

The regression results in table 4.27 the coefficient of log trading volume was found to be trading volumethree 5.022844 and trading volumethree (-1) -3.110610. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 5.022844 and then decrease by -3.110610 percent. The positive and negative significant effects shows that there is a positive and negative relationship between the proxy for liquidity (log trading volume) and excess returns of the firms in portfolio three under different horizon.

The coefficients were statistically significant. The t-statistics values were 4.066621 and -2.517121. The p-values were found to be 0.0001 and 0.0134. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and trading volume was positive and negative and it shows that in Kenya firms which are small size and high value are likely to have positive and negative correlation with market breath in different horizons. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. They contradict those of Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.6.8 Price Impact and Excess Return

The regression results in table 4.27 the coefficient of price impact was found to be-4.655711. This value shows that holding other variables in the model constant, an

increase in price impact by one unit causes the excess return of the portfolio to decrease by -4.655711 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio three.

The coefficient was statistically significant for portfolio three with a t-statistic value of-2.804171. The p-value was found to be 0.0061. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and price impact was negative and it shows that in Kenya firms which are small size and high value are likely to have negative correlation with the price impact. These findings support those who found that price impact had a significant effect on excess returns.

4.6.9 Bid Ask Spread and Excess Return

From the regression results in table 4.27 the coefficient of spread was found to be Spreadthree 0.596842 and Spreadthree (-1) - 0.898454. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by 0.596842 and -0.898454 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio three.

The coefficients were statistically insignificant for portfolio three with a t-statistic values of 1.117038 and -1.734760. The p-values were found to be 0.2667 and 0.0859. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and spread was positive and it shows that in Kenya firms which are small size and high value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a

negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.6.10 Market Resiliency and Excess Return

From the regression results in table 4.27 the coefficient of resiliency was found to be resilientthree -0.095336, resilientthree (-1) 0.656507, resilientthree (-2) -1.744491 and resilientthree (-3) 2.041056. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to decrease by - 0.095336 increase by 0.656507 decrease by -1.744491 and then increase by 2.041056 percent. The positive and negative effect shows that there is a negative relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio three given different horizons.

The first two coefficients were statistically insignificant for portfolio three. The t-statistics values were found to be -0.156076, 0.953773, - 2.513693 and 3.237940 respectively. The p-values were found to be 0.8763, 0.3425, 0.0135 and 0.0016. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and resiliency was positive and negative in different horizons and it shows that in Kenya, the returns of firms which are small size and high value are likely to have positive and negative correlation with market resiliency in different horizons. These findings support those of who found that resiliency had effect on excess returns.

4.6.11 Portfolio Three Heteroskedasticity Test

The study further embarked on post-estimation test to test for the presence of heteroscedasticity and serial correlation. In particular, autoregressive conditional

Heteroskedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the test statistics; F-statistic and Observation R-square are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 28: Portfolio Three Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.218195	Prob. F(1,114)	0.6413
Obs*R-squared	0.221599	Prob. Chi-Square(1)	0.6378

Table 4.28 presents the result after the testing for heteroscedasticity using ARCH test. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedasticity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.6.12 Portfolio Three Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic, Observations*R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicates the absence of autocorrelation in the model.

Table 4. 29: Portfolio Three Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.005380	Prob. F(2,98)	0.9946
Obs*R-squared	0.012844	Prob. Chi-Square(2)	0.9936

Table 4.29 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the bases that the p-value of the two test statistics that is F-statistic and the chi-square were statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated.

4.7 Portfolio Three Fama-French three factor and Individual liquidity-Measurers

4.7.1 Fama-French three factor and trade volume

The value of adjusted R-squared was found to be 0.617401 shows that the independent variables in this portfolio are able to explain about of 61.74% the variation in returns. The value of F-statistic of 19.71895 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.958812 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 30: Fama-French three factor and trade volume

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNTHREE(-1)	0.115416	0.086869	1.328621	0.1868
MARKETRET	0.928336	0.100180	9.266636	0.0000
MARKETRET(-1)	0.000233	0.131016	0.001779	0.9986
MARKETRET(-2)	0.238792	0.099830	2.391989	0.0185
MARKETRET(-3)	-0.189827	0.099491	-1.907978	0.0591
HML	0.357294	0.093865	3.806451	0.0002
SMB	0.287242	0.101565	2.828161	0.0056
SMB(-1)	0.144879	0.100201	1.445886	0.1512
VOLUMETHREE	3.904496	1.300405	3.002522	0.0033
VOLUMETHREE(-1)	-2.620117	1.290552	-2.030231	0.0448
C	-18.21983	10.67959	-1.706041	0.0909
R-squared	0.650384	Mean dependent var		-7.954201
Adjusted R-squared	0.617401	S.D. dependent var		8.368059
S.E. of regression	5.176028	Akaike info criterion		6.215252
Sum squared resid	2839.874	Schwarz criterion		6.474944
Log likelihood	-352.5923	Hannan-Quinn criter.		6.320684
F-statistic	19.71895	Durbin-Watson stat		1.958812
Prob(F-statistic)	0.000000			

4.7.2 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.30 the coefficient of market premium was found to be marketret 0.928336, marketret (-1) 0.000233, marketret (-2) 0.238792 and marketret (-3) -0.189827. This value shows that holding other variables in the model

constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.928336, 0.000233, and 0.238792 and reduce by - 0.18982 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first and third terms coefficient were found to be statistically significant while others were not with t-statistics values of 9.266636, 0.001779, and 2.391989 and reduce by -1.907978 respectively. The p-values were found to be 0.0000, 0.9986, 0.0185 and 0.0591. The interpretation was that the variation between the excess return of firms in the (small size and medium market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the

results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.30 the coefficient of Value Premium (HML) was found to be 0.357294. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.357294 percent. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio three.

The coefficient was statistically significant with a t-statistic value of 3.806451. The p-value was found to be 0.0002. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.30 the coefficient of Size Premium (SMB) was found to be SMB 0.287242 and SMB (-1) 0.144879. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.287242 and 0.144879 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio three.

The coefficients were statistically significant with a t-statistic value of 2.828161 and 1.445886. The p-value was found to be 0.0056 and 0.1512. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect

on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.7.3 Trading Volume and Excess Return

The regression results in table 4.28 the coefficient of log trading volume was found to be trading volumethree 3.904496 and trading volumethree (-1)-2.620117. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 3.904496 and -2.620117 percent. The positive\negative effect shows that there is a direct relationship between the proxy for liquidity (log trading volume) and excess returns of the firms in portfolio three.

The coefficients were statistically significant with a t-statistic value of 3.002522 and -2.030231. The p-value was found to be 0.0033 and 0.0448. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and trading volume was positive\negative and it shows that in Kenya firms which are small size and high market value are likely to have positive\negative correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was

valid for developed markets only since the emerging markets showed a positive relationship.

4.7.4 Fama-French Three factor and Price Impact

The value of adjusted R-squared was found to be 0.610334 shows that the independent variables in this portfolio are able to explain about of 61.0334 % the variation in returns. The value of F-statistic of 19.16908 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.108065 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms. The regression equation for Fama-French three factor model and price impact is as shown in figure 4.31.

Table 4. 31: Fama-French three factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNTHREE(-1)	0.208931	0.087788	2.379962	0.0191
MARKETRET	0.964030	0.099018	9.735930	0.0000
MARKETRET(-1)	-0.026493	0.129479	-0.204615	0.8383
MARKETRET(-2)	0.285451	0.101760	2.805150	0.0060
MARKETRET(-3)	-0.232763	0.099624	-2.336415	0.0214
HML	0.399971	0.094322	4.240495	0.0000
HML(-1)	-0.116674	0.094640	-1.232815	0.2204
HML(-2)	-0.151906	0.091577	-1.658782	0.1001
SMB	0.336782	0.103805	3.244361	0.0016
PRICE IMPACTTHREE	-3.312164	1.705851	-1.941650	0.0548
C	1.782548	1.217939	1.463577	0.1463

R-squared	0.643926	Mean dependent var	-7.954201
Adjusted R-squared	0.610334	S.D. dependent var	8.368059
S.E. of regression	5.223613	Akaike info criterion	6.233555
Sum squared resid	2892.330	Schwarz criterion	6.493247
Log likelihood	-353.6630	Hannan-Quinn criter.	6.338987
F-statistic	19.16908	Durbin-Watson stat	2.108065
Prob(F-statistic)	0.000000		

4.7.5 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.31 the coefficient of market premium were found to be marketret 0.964030, marketret (-1) -0.026493, marketret (-2) 0.285451 and marketret (-3) -0.232763. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.964030 reduce by -0.026493 increase by 0.285451 and increase by -0.232763 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first, third and fourth coefficients were statistically significant with t-statistic values of 9.735930,-0.204615, 2.805150 and -2.336415. The p-values were found to be 0.0000, 0.8383, 0.0060 and 0.0214. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and the return on the market portfolio was significant. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant

effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.31 the coefficients of Value Premium (HML) were found to be HML 0.399971, HML (-1) -0.116674 and HML (-2) -0.151906. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.399971 reduce by -0.116674 and reduce by -0.151906 percent. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first coefficient was the only one statistically significant. The t- statistics were 4.240495, -1.232815and -1.658782 respectively. The p-values were found to be 0.0000, 0.2204 and 0.1001. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios

and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.31 the coefficient of Size Premium (SMB) was found to be 0.336782. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.336782 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio three.

The coefficient was statistically significant with a t-statistic value of 3.244361. The p-value was found to be 0.0016. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative

value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.7.6 Price Impact and Excess Return

The regression results in table 4.31 shows the coefficient of price impact was found to be -3.312164. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to decrease by-3.312164 units. The negative effect shows that there is a negative relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio three.

The coefficient was statistically insignificant for portfolio three with a t-statistic value of -1.941650. The p-value was found to be 0.0548. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and price impact was positive and it shows that in Kenya firms which are big size and are high market value are likely to have positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.7.7 Fama-French three factor and Market Resiliency and Excess Return

Table 4. 32: Fama-French three factor and Market Resiliency and Excess Return

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNTHREE(-1)	0.226011	0.088038	2.567205	0.0117
MARKETRET	0.930494	0.099745	9.328694	0.0000
MARKETRET(-1)	0.000347	0.132747	0.002614	0.9979
MARKETRET(-2)	0.298492	0.102915	2.900389	0.0046
MARKETRET(-3)	-0.167673	0.103771	-1.615801	0.1092
HML	0.438149	0.094338	4.644464	0.0000
HML(-1)	-0.159543	0.096760	-1.648858	0.1022
HML(-2)	-0.160720	0.091397	-1.758485	0.0816
SMB	0.347141	0.102356	3.391502	0.0010
RESILIENTTHREE	-0.231451	0.655681	-0.352994	0.7248
RESILIENTTHREE(-1)	0.598044	0.733694	0.815114	0.4169
RESILIENTTHREE(-2)	-1.835348	0.759733	-2.415779	0.0175
RESILIENTTHREE(-3)	2.033578	0.680197	2.989688	0.0035
C	0.718293	1.043823	0.688137	0.4929

R-squared	0.668206	Mean dependent var	-7.954201
Adjusted R-squared	0.626329	S.D. dependent var	8.368059
S.E. of regression	5.115278	Akaike info criterion	6.214212
Sum squared resid	2695.105	Schwarz criterion	6.544728
Log likelihood	-349.5314	Hannan-Quinn criter.	6.348398
F-statistic	15.95644	Durbin-Watson stat	2.047935
Prob(F-statistic)	0.000000		

The value of adjusted R-squared was found to be 0.626329 shows that the independent variables in this portfolio are able to explain about of 62.6329 % the variation in returns. The value of F-statistic of 15.95644 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.047935 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms

4.7.9 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.32 the coefficient of market premium was found to be marketret 0.930494, marketret (-1) 0.000347, marketret (-2) 0.298492 and marketret (-3) -0.167673. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.930494, 0.000347, and 0.298492 and reduce by - 0.167673 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficients of the first and second lag term were statistically significant. The t-statistic values were 9.328694, 0.002614, 2.900389 and -1.615801. The p-value were found to be 0.0000, 0.9979, 0.0046 and 0.1092. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and the return on the market portfolio was very significant. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt

to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.32 the coefficients of Value Premium (HML) were found to be hml 0.438149, hml (-1) -0.159543 and hml (-2) -0.160720. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.438149 and reduce by -0.159543 and -0.160720 percent. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first coefficient was statistically significant with a t-statistic value of 4.644464, and the others were not -1.648858 and -1.758485. The p-values were found to be 0.0000, 0.1022 and 0.0816. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013),

employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The coefficient of Size Premium (SMB) was found to be 0.347141. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.347141 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient is not just positive but it is also statistically significant with a t-statistic value of 3.391502. The p-value was found to be 0.0010. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are (small size and high market value) are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative

value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.7.11 Market Resiliency and Excess Return

From the regression results in table 4.32 the coefficient of resiliency was found to be resilientthree -0.231451, resilient three (-1) 0.598044, resilient three (-2) -1.835348 and resilient three (-3) 2.033578. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to decrease by -0.231451, increase by 0.598044, decrease by -1.835348 and increase by 2.033578 percent. The negative and positive effects, shows that there is a negative and positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio three given different horizons.

Only the second and third lags of the resiliency coefficients were statistically significant for portfolio three with t-statistic values of -0.352994, 0.815114 2.415779 and 2.989688. The p-value were found to be 0.7248, 0.4169, 0.0175 and 0.0035. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are big size and high value are likely to have positive correlation with market resiliency. These findings support those of who found that resiliency had an effect on excess returns.

4.7.12 Fama-French three factor and spread

The value of adjusted R-squared was found to be 0.597064 shows that the independent variables in this portfolio are able to explain about of 59.7064 % the variation in returns. The value of F-statistic of 18.18866 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.067509 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 33: Fama-French three factor and spread

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNTHREE(-1)	0.199916	0.090828	2.201027	0.0299
MARKETRET	0.941553	0.101615	9.265840	0.0000
MARKETRET(-1)	-0.010998	0.132091	-0.083258	0.9338
MARKETRET(-2)	0.291137	0.104626	2.782640	0.0064
MARKETRET(-3)	-0.231557	0.101391	-2.283806	0.0244
HML	0.389361	0.096083	4.052338	0.0001
HML(-1)	-0.110270	0.096564	-1.141935	0.2561
HML(-2)	-0.162118	0.093885	-1.726767	0.0871
SMB	0.328856	0.105769	3.109179	0.0024
SPREADTHREE	0.195217	0.496146	0.393467	0.6948
C	0.241158	1.468497	0.164221	0.8699
R-squared	0.631799	Mean dependent var		-7.954201
Adjusted R-squared	0.597064	S.D. dependent var		8.368059
S.E. of regression	5.311816	Akaike info criterion		6.267044
Sum squared resid	2990.831	Schwarz criterion		6.526735
Log likelihood	-355.6221	Hannan-Quinn criter.		6.372475
F-statistic	18.18866	Durbin-Watson stat		2.067509
Prob(F-statistic)	0.000000			

4.7.13 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.33 the coefficient of market premium was found to be marketret 0.941553, marketret (-1) -0.010998, marketret (-2) 0.291137and marketret (-3) -0.231557. This value shows that holding other variables in the model constant, an

increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.941553 decrease by -0.010998 increase by 0.291137 and decrease by -0.231557 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

All coefficients except that of lag one were statistically significant with t-statistic values of 9.265840, -0.083258, 2.782640 and -2.283806 respectively. The p-value was found to be 0.0000, 0.9338, 0.0064 and 0.0244. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.33 the coefficients of Value Premium (HML) were found to be HML 0.389361, HML (-1) -0.110270 and HML (-2) -0.162118. These values shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.389361 reduce by -0.110270 and -0.162118 percent given different horizons. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio three.

The first coefficient was statistically significant with t-statistic values of 4.052338, -1.141935 and -1.726767 others were not. The p-values were found to be 0.0001, 0.2561 and 0.0871. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (small size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.33 the coefficient of Size Premium (SMB) was found to be 0.328856. This value shows that holding other variables in the model

constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by 0.328856 percent. The positive effect shows that there is a positive relationship between the proxy for size and excess returns of the firms in the portfolio three.

The coefficient was statistically significant with a t-statistic value of 3.109179. The p-value was found to be 0.0024. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect

on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.7.14 Bid Ask Spread and Excess Return

The regression results in table 4.33 the coefficient of spread was found to be 0.195217. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by 0.195217 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio three.

The coefficient was statistically insignificant for portfolio three with a t-statistic value of 0.393467. The p-value was found to be 0.6948. The interpretation was that the variation between the excess return of firms in the (small size and high market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and high market value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.7.15 Summary of Findings Small size and High Value firms

Portfolio three is formed from small size with high value companies. There is a positive effect between the market premium and excess return in small size and High value firms.. The value premium (HML) had a positive and significant effect on excess return meaning an increase in the value premium leads to an increase in excess return on the small size with High value companies in Kenya, which shows a direct relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two. The coefficient of Size Premium (SMB) was found to be positive and statistically significant across all the tables meaning that an increase in the size premium for small size with High value companies in Kenya causes an increase in the excess return. Trading trading volume had a positive coefficient that was statistically significant. Price impact has a negative and statistically significant relation with excess return. Market resiliency has a negative and statistically insignificant relation with excess return. Bid ask spread had a positive but statistically insignificant effect.

4.8 Portfolio Four Big Size Low Value Companies

Portfolio four is formed from big size with low value companies as used by Fama and French three factor model (1993).

4.8.1 Portfolio Four descriptive statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera test were used.

Table 4. 34: Portfolio Four descriptive statistics

	return	market	hml	smb	Price Impact	Resi liency	spread	Lturn over	Imme diacy
mean	-6.30	-7.28	-0.87	-0.17	0.28	2.32	8.27	16.63	0.06
median	-6.73	-7.32	-0.99	-0.56	0.22	2.20	7.50	16.60	0.06
maximum	9.71	8.16	16.8	12.9	1.29	19.12	66.36	18.14	0.07
minimum	-19.7	-30.1	-19.9	-13	0.01	0.00	1.64	15.09	0.06
std. dev.	5.77	6.06	5.45	4.95	0.23	2.85	6.66	0.64	0.00
skewness	0.31	-0.51	0.04	0.25	1.44	2.29	5.82	0.04	0.17
kurtosis	3.03	4.65	4.40	2.81	5.93	12.54	49.85	2.81	2.85
jarque-bera	1.98	18.76	9.76	1.40	84.5	560.72	1165	0.22	0.68
Proba Bility	0.37	0.00	0.01	0.50	0.00	0.00	0.00	0.89	0.71
Sum	-755.	-873	-104.	-20	33	278	992.6	1995	7.23
sum sq. dev.	3960.	4367.	3538	2916	6.44	966.84	5275.	49.03	0.00
Obser vations	120	120	120	120	120	120	120	120	120

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables'. The table 4.34 shows the descriptive statistics for the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were -6.30, -7.28, -0.87, -0.17, 0.28, 2.32, 8.27, 16.63, and 0.06 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 0.31, -0.51, 0.04, 0.25, 1.44, 2.29, 5.82, 0.04 and 0.17 respectively. These values of skewness shows that the variables are not all normally

distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 3.03, 4.65, 4.40, 2.81, 5.93, 12.54, 49.85, 2.81, and 2.85 respectively. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 1.98, 18.76, 9.76, 1.40, 84.5, 560.72, 1165, 0.22 and 0.68 respectively and the probability values of 0.37, 0.00, 0.01, 0.50, 0.00, 0.00, 0.00, 0.89 and 0.71 respectively. The probabilities of the jarque-bera are all away from the value of one (1) except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not normal and thus in further analysis this problem was considered before further analysis was executed.

4.8.2 Portfolio four group unit root test

Table 4. 35: Portfolio Four group unit root Test

Group unit root test: Summary
Series: RETURNFOUR, MARKET, HML, SMB, PRICE IMPACTFOUR, IMMEDIACYFOUR, VOLUMEFOUR, RESILIENTFOUR, SPREADFOUR

Method	Statistic	P-value	Cross-sections	observations
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.5235	0.0000	9	1061
ADF - Fisher Chi-square	298.929	0.0000	9	1061
PP - Fisher Chi-square	395.378	0.0000	9	1071

The results from the unit root test for all the variables in in table 4.35 above shows that at least some of the variables in the group are stationary. The interpretation is that a

method that is able to combine stationary and non-stationary was required. In this study thus ARDL modeling was used.

4.8.3 Portfolio Four correlation analysis

The correlation analysis was used as a pre estimation diagnostic test for multicollinearity and association between independent variables. The correlation coefficients range from negative one to positive one. Muriithi (2016), note that if the correlation coefficient are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity.

Table 4. 36: Portfolio Four Multicollinearity Test

	return	market	hml	smb	Lturn Over	Price Impact	Resi liency	spread	Imme-diacy
Return	1.00								
market	0.69	1.00							
Hml	-0.16	0.15	1.00						
Smb	-0.26	-0.13	-0.29	1.00					
Lturn-over	-0.15	-0.22	-0.04	0.03	1.00				
Price Impact	0.34	0.32	-0.10	0.01	-0.20	1.00			
resilient	-0.09	-0.23	-0.05	0.01	0.63	-0.04	1.00		
spread	-0.05	0.06	0.05	0.10	0.34	0.07	0.04	1.00	
immediacy	0.15	0.21	0.05	-0.02	-0.99	0.20	-0.62	-0.34	1.00

Table 4.36 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is serious multicollinearity problem since the highest correlation between the independent variables was 0.99% between trading volume and immediacy and the least one was 0.01%. Thus immediacy variable from further analysis.

4.8.4 Portfolio Four Granger Causality

The study found that the value premium (HML) has a one-way causality to the market resiliency, price impact has a one way causality to the bid ask spread and trading volume has a one way causality to bid ask spread as shown in table 4.37. This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process.

Table 4. 37: Portfolio Four Granger Causality

Variable	Causality
Portfolio four	
Hml=>resiliency	One-way
Price Impactfour=>spread	One-way
Volume=>spread	One-way

4.8.5 Portfolio Four Regression Results

The value of adjusted R-squared of 0.661529, shows that the variables in this portfolio are able to explain about 66% of the variation in returns. The value of F-statistic of 16.11454 was also found to be statistically significant. The value of the Durbin Watson of 1.908157 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 38: Portfolio Four Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
returnfour(-1)	-0.162935	0.084833	-1.920660	0.0576
marketret	0.700843	0.071049	9.864173	0.0000
marketret(-1)	0.162318	0.088986	1.824083	0.0711
marketret(-2)	0.248488	0.067963	3.656242	0.0004
marketret(-3)	-0.088542	0.066683	-1.327802	0.1872
hml	-0.281099	0.062268	-4.514325	0.0000
smb	-0.292464	0.067684	-4.321031	0.0000
Smb(-1)	0.041300	0.066659	0.619567	0.5369
Smb(-2)	0.122386	0.066159	1.849867	0.0673
Volumefour	1.023177	0.813724	1.257400	0.2115
Price Impactfour	2.606392	1.532732	1.700488	0.0921
Resilientfour	0.685878	0.253845	2.701956	0.0081
Resilientfour(-1)	0.735391	0.477419	1.540346	0.1266
Resilientfour(-2)	-1.613486	0.636963	-2.533091	0.0128
Spreadfour	-0.108466	0.055029	-1.971074	0.0515
c	-17.33778	13.11218	-1.322265	0.1891

R-squared	0.705297	Mean dependent var	-6.308951
Adjusted R-squared	0.661529	S.D. dependent var	5.813186
S.E. of regression	3.382008	Akaike info criterion	5.401267
Sum squared resid	1155.236	Schwarz criterion	5.779000
Log likelihood	-299.9741	Hannan-Quinn criter.	5.554622
F-statistic	16.11454	Durbin-Watson stat	1.908157
Prob(F-statistic)	0.000000		

4.8.6 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.38 the coefficient of market premium was found to be marketret 0.700843, marketret (-1) 0.162318, marketret (-2) 0.248488 and marketret (-3) -0.088542. These values shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.700843, 0.162318, 0.248488 and decrease by -0.088542 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first and third coefficients were statistically significant. The t-statistic values were 9.864173, 1.824083, 3.656242 and -1.327802 respectively. The p-values were found to be 0.0000, 0.0711, 0.0004 and 0.1872. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and the return on the market portfolio was statistically significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor's effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.38 the coefficient of HML was found to be-0.281099. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -0.281099 percent. The negative effect shows that there is an inverse

relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio four.

The coefficient was statistically significant with a t-statistic value of - 4.514325. The p-value was found to be 0.0000. The interpretation was that the relation between the excess return of firms in the (big size and low market value portfolio) and hml was negative and it shows that in Kenya firms which are (big size and low value) are likely to get lower higher returns as a result of HML. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. Support those of De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

The regression results in table 4.38 the coefficient of Size Premium (SMB) was found to be smb-0.292464, Smb (-1) 0.041300 and Smb (-2) 0.122386. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by - 0.292464 then increase by 0.041300 and decrease by 0.122386 percent. The positive effect shows that there is a negative relationship between the proxy for size and excess returns of the firms in the portfolio four.

The first terms coefficient was statistically significant. The t-statistic values were -4.321031, 0.619567 and 1.849867. The p-values were found to be 0.0000, 0.5369 and 0.0673. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and low value are likely to have a negative correlation with the premium for size. These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These findings support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant.

4.8.7 Trading Volume and Excess Return

From the regression results in table 4.38 the coefficient of log trading volume was found to be 1.023177. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 1.023177 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (log trading volume) and excess returns of the firms in portfolio four.

The coefficient was found to be statistically insignificant with a t-statistic value of 1.257400. The p-value was found to be 0.2115. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and trading volume was positive and it shows that in Kenya firms which are big size and low value are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These findings contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.8.8 Price Impact and Excess Return

The regression results in table 4.38 the coefficient of price impact was found to be 2.606392. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by 2.606392 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio four.

The coefficient was statistically significant for portfolio four with a t-statistic value of 1.700488. The p-value was found to be 0.0921. The interpretation was that the variation between the excess return of firms in the (size and low market value portfolio) and price impact was positive and it shows that in Kenya firms which are big size and low market value are likely to have positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.8.9 Bid Ask Spread and Excess Return

From the regression results in table 4.38 the coefficient of spread was found to be-0.108466. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by-0.108466 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio four.

The coefficient was statistically significant for portfolio four with a t-statistic value of-1.971074. The p-value was found to be 0.0515. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and medium market value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.8.10 Market Resiliency and Excess Return

From the regression results in table 4.38 the coefficient of resiliency was found to be resilientfour 0.685878, resilientfour (-1) 0.735391 and resilientfour (-2) -1.613486. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by 0.685878, 0.735391 and reduce by -1.613486 respectively percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio four.

The first and third coefficients were statistically significant for portfolio four. The t-statistic values were 2.701956, 1.540346 and -2.533091. The p-values were found to be 0.0081, 0.1266 and 0.0128. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are big size and low value are likely to have positive correlation with market resiliency. These findings supports those of who found that resiliency had an effect on excess returns.

4.8.11 Portfolio Four Heteroskedasticity Test

The study further embarked on post-estimation test to test for the presence of heteroscedasticity and serial correlation. In particular, autoregressive conditional Heteroskedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the test statistics; F-statistic and Observation R-square are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 39: Portfolio Four Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.115134	Prob. F(1,114)	0.7350
Observation*R-squared	0.117036	Prob. Chi-Square(1)	0.7323

Table 4.39 presents the result after the testing for heteroscedasticity using ARCH. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedasticity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.8.12 Portfolio Four Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic, Observations*R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicate the absence of autocorrelation in the model.

Table 4. 40: Portfolio Four Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.205291	Prob. F(2,99)	0.8148
Observation*R-squared	0.483230	Prob. Chi-Square(2)	0.7854

Table 4.40 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the bases that the p-value of the two test statistics that is F-statistic and the chi-square were

statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated.

4.9 Portfolio Four Fama-French three factor and Individual liquidity-Measurers

4.9.1 Fama-French three factor and trade volume

The value of adjusted R-squared was found to be 0.645864 shows that the independent variables in this portfolio are able to explain about of 64.5864 % the variation in returns. The value of F-statistic of 18.47784 was also found to be statistically significant. The value of the Durbin Watson of statistic 1.950794 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 41: Fama-French three factor and trade volume

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNFOUR(-1)	-0.110072	0.089024	-1.236426	0.2191
MARKETRET	0.780329	0.066845	11.67367	0.0000
MARKETRET(-1)	0.074144	0.096593	0.767586	0.4445
MARKETRET(-2)	0.210008	0.068970	3.044931	0.0030
MARKETRET(-3)	-0.110365	0.068451	-1.612316	0.1100
HML	-0.362319	0.063074	-5.744370	0.0000
HML(-1)	0.010905	0.065739	0.165883	0.8686
HML(-2)	-0.036270	0.062091	-0.584146	0.5604
HML(-3)	0.138473	0.061239	2.261188	0.0258
HML(-4)	0.114191	0.060722	1.880546	0.0629
SMB	-0.313218	0.069394	-4.513606	0.0000
VOLUMEFOUR	0.575921	0.578552	0.995451	0.3218
C	-10.31167	9.421368	-1.094499	0.2763

R-squared	0.682817	Mean dependent var	-6.325014
Adjusted R-squared	0.645864	S.D. dependent var	5.835797
S.E. of regression	3.472844	Akaike info criterion	5.433101
Sum squared resid	1242.246	Schwarz criterion	5.741693
Log likelihood	-302.1199	Hannan-Quinn criter.	5.558372
F-statistic	18.47784	Durbin-Watson stat	1.950794
Prob(F-statistic)	0.000000		

4.9.2 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.41 the coefficient of market premium was found to be marketret 0.780329, marketret (-1) 0.074144, marketret (-2) 0.210008 and marketret (-3) -0.110365. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.780329, 0.074144, and 0.210008 and reduce by - 0.110365 percent respectively. The positive effect shows that there is a positive relationship between the market premium and excess returns

Only the first and third terms coefficients were statistically significant. The t-statistic values were 11.67367, 0.767586, 3.044931 and -1.612316. The p-value was found to be 0.0000, 0.4445, 0.0030 and 0.1100. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and the return on the market portfolio was statistically significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression

in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.41 the coefficient of Value Premium (HML) was found to be hml-0.362319, hml (-1) 0.010905, hml (-2) -0.036270, hml (-3) 0.138473 and hml (-4) 0.114191. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by -0.362319, 0.010905 increase by -0.036270 increase by 0.138473 and 0.114191 percent respectively. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first and the third lag coefficient were statistically significant. The t-statistic values were -5.744370, 0.165883,-0.584146, 2.261188 and 1.880546. The p-values were found to be 0.0000, 0.8686, 0.5604, 0.0258 and 0.0629. The interpretation was that the relation between the excess return of firms in the (big size and low market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and low value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market.

They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.41 the coefficient of Size Premium (SMB) was found to be -0.313218. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.313218 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio four.

The coefficient was statistically significant with a t-statistic value of -4.513606. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are small size and low market value are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.*(2014), in UK also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a

positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.9.3 Trading Volume and Excess Return

The regression results in table 4.41 the coefficient of log turnover was found to be 0.575921. This value shows that holding other variables in the model constant, an increase in turnover by one percent causes the excess return of the portfolio to increase by 0.575921 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (log trading volume) and excess returns of the firms in portfolio six.

The coefficient was statistically insignificant with a t-statistic value of 0.995451. The p-value was found to be 0.3218. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and trading volume was positive and it shows that in Kenya firms which are (big size and low market value) are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for

NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.9.4 Fama-French Three Factor and Price Impact

The value of adjusted R-squared was found to be 0.648071 shows that the independent variables in this portfolio are able to explain about of 64.8071% the variation in returns. The value of F-statistic of 18.64750 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.910666 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 42: Fama-French Three factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFOUR(-1)	-0.086412	0.088269	-0.978963	0.3299
MARKETRET	0.737625	0.070550	10.45540	0.0000
MARKETRET(-1)	0.050614	0.094679	0.534579	0.5941
MARKETRET(-2)	0.204819	0.067862	3.018177	0.0032
MARKETRET(-3)	-0.116398	0.067918	-1.713814	0.0896
HML	-0.349985	0.063774	-5.487914	0.0000
HML(-1)	0.024151	0.065881	0.366588	0.7147
HML(-2)	-0.048481	0.061973	-0.782288	0.4358
HML(-3)	0.118832	0.062336	1.906322	0.0594
HML(-4)	0.113395	0.060466	1.875351	0.0636
SMB	-0.312456	0.069163	-4.517693	0.0000
PRICE IMPACTFOUR	1.979621	1.544454	1.281762	0.2028
C	-1.651623	0.888556	-1.858773	0.0659

R-squared	0.684794	Mean dependent var	-6.325014
Adjusted R-squared	0.648071	S.D. dependent var	5.835797
S.E. of regression	3.462008	Akaike info criterion	5.426851
Sum squared resid	1234.506	Schwarz criterion	5.735443
Log likelihood	-301.7574	Hannan-Quinn criter.	5.552122
F-statistic	18.64750	Durbin-Watson stat	1.910666
Prob(F-statistic)	0.000000		

4.9.5 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.42 the coefficient of market premium was found to be marketret 0.737625, marketret (-1) 0.050614, marketret (-2) 0.204819 and marketret (-3) -0.116398. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.737625, 0.050614, 0.204819 and -0.116398 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first and third coefficients were statistically significant. The t-statistic values were 10.45540, 0.534579, 3.018177 and -1.713814. The p-value were found to be 0.0000, 0.5941, 0.0032 and 0.0896. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and the return on the market portfolio was very significant. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant

effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.42 the coefficient of Value Premium (HML) was found to be hml-0.349985, hml (-1) 0.024151, hml (-2) -0.048481, hml (-3) 0.118832 and hml (-4) 0.113395. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.349985, 0.024151 decrease by -0.048481, 0.118832 and 0.113395 percent. The positive\negative effects shows that there is a positive\negative relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio four.

The first coefficient was statistically significant. The t-statistic values were -5.487914, 0.366588,-0.782288, 1.906322 and 1.875351 respectively. The p-value were found to be 0.0000, 0.7147, 0.4358, 0.0594 and 0.0636. The interpretation was that the relation between the excess return of firms in the (big size and low market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some

of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.42 the coefficient of Size Premium (SMB) was found to be-0.312456. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.312456 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio four.

The coefficient was statistically significant with a t-statistic value of -4.517693. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a

positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.9.6 Price Impact and Excess Return

The regression results in table 4.42 the coefficient of price impact was found to be 1.979621. This value shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by 1.979621 units. The positive effect shows that there is a positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio four.

The coefficient was statistically insignificant for portfolio four with a t-statistic value of 1.281762. The p-value was found to be 0.2028. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and price impact was positive and it shows that in Kenya firms which are (big size and low market value) are likely to have positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.9.7 Fama-French three factor and resiliency

The value of adjusted R-squared was found to be 0.668268 shows that the independent variables in this portfolio are able to explain about of 66.8268 % the variation in returns. The value of F-statistic of 16.44439 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.999816 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 43: Fama-French three factor and resiliency

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFOUR(-1)	-0.136284	0.088373	-1.542137	0.1262
RETURNFOUR(-2)	-0.145745	0.092272	-1.579508	0.1174
MARKETRET	0.704596	0.068040	10.35566	0.0000
MARKETRET(-1)	0.126441	0.096653	1.308188	0.1938
MARKETRET(-2)	0.330974	0.098366	3.364708	0.0011
MARKETRET(-3)	-0.142060	0.069558	-2.042314	0.0438
MARKETRET(-4)	0.108220	0.068428	1.581519	0.1169
HML	-0.331135	0.063618	-5.205031	0.0000
HML(-1)	-0.006707	0.064218	-0.104446	0.9170
HML(-2)	-0.085294	0.065637	-1.299466	0.1968
HML(-3)	0.147532	0.058673	2.514468	0.0135
SMB	-0.320094	0.067466	-4.744488	0.0000
RESILIENTFOUR	0.682095	0.255387	2.670825	0.0088
RESILIENTFOUR(-1)	0.809564	0.497334	1.627807	0.1067
RESILIENTFOUR(-2)	-1.527284	0.638390	-2.392400	0.0186
C	-0.949372	0.714866	-1.328042	0.1872

R-squared	0.711538	Mean dependent var	-6.325014
Adjusted R-squared	0.668268	S.D. dependent var	5.835797
S.E. of regression	3.361194	Akaike info criterion	5.389912
Sum squared resid	1129.763	Schwarz criterion	5.769717
Log likelihood	-296.6149	Hannan-Quinn criter.	5.544091
F-statistic	16.44439	Durbin-Watson stat	1.999816
Prob(F-statistic)	0.000000		

4.9.8 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.43 the coefficient of market premium was found to be marketret 0.704596, marketret (-1) 0.126441, marketret (2)0.330974, marketret (-3) -0.142060 and marketret (-4) 0.108220. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.704596, 0.126441, 0.330974 reduce by -0.142060 and increase by 0.108220 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first, third and fourth coefficients were statistically significant with t-statistic values of 10.35566, 1.308188, 3.364708,-2.042314 and 1.581519. The p-values were found to be 0.0000, 0.1938, 0.0011, 0.0438 and 0.1169. The interpretation was that the variation between the excess return of firms in the (small size and low market value portfolio) and the return on the market portfolio was very significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany (2013), employed linear regression

in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.43 the coefficient of Value Premium (HML) was found to be hml-0.331135, hml (-1) -0.006707, hml (-2) - 0.085294 and hml (-3) 0.147532. These values shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.331135 reduce by -0.006707 and -0.085294 and reduce by 0.147532 percent. The significant negative effect shows that there is a positive relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio four.

The first and fourth coefficients were statistically significant. The t-statistics values were -5.205031,-0.104446,-1.299466 and 2.514468. The p-value was found to be 0.0000, 0.9170, 0.1968 and 0.0135. The interpretation was that the relation between the excess return of firms in the (small size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and low value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios

and that the effect was a statistically significant. Vakilifard, and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.43 the coefficient of Size Premium (SMB) was found to be -0.320094. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by - 0.320094 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically significant with a t-statistic value of - 4.744488. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009), noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.9.9 Market Resiliency and Excess Return

Market resiliency From the regression results in table 4.43 the coefficient of resiliency were found to be resilientfour 0.682095, resilientfour (-1) 0.809564 and resilientfour (-2) -1.527284. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by percent 0.682095, 0.809564 and reduce by -1.527284. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio four.

The first and lag two coefficient were statistically significant for portfolio four. The t-statistic values were 2.670825, 1.627807 and -2.392400. The p-values were found to be 0.0088, 0.1067 and 0.0186. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are (big size and low value) are likely to have positive correlation with market resiliency. These findings support those of who found that resiliency had an effect on excess returns.

4.9.10 Fama-French three factor and spread

The value of adjusted R-squared was found to be 0.652584 shows that the independent variables in this portfolio are able to explain about of 65.2584 % the variation in returns. The value of F-statistic of 16.42963 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.943872 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 44: Fama-French three factor and spread

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFOUR(-1)	-0.075756	0.088597	-0.855064	0.3945
MARKETRET	0.767785	0.065963	11.63966	0.0000
MARKETRET(-1)	0.056384	0.094838	0.594531	0.5535
MARKETRET(-2)	0.203560	0.067906	2.997695	0.0034
MARKETRET(-3)	-0.127483	0.068832	-1.852097	0.0669
HML	-0.354804	0.063426	-5.593968	0.0000
HML(-1)	0.013294	0.065564	0.202764	0.8397
HML(-2)	-0.052539	0.061944	-0.848166	0.3984
HML(-3)	0.123231	0.061165	2.014730	0.0466
HML(-4)	0.105176	0.060589	1.735891	0.0856
SMB	-0.293989	0.070335	-4.179864	0.0001
SPREADFOUR	-0.072271	0.052144	-1.385988	0.1688
SPREADFOUR(-1)	-0.003965	0.052852	-0.075020	0.9403
SPREADFOUR(-2)	0.103217	0.051384	2.008741	0.0472
C	-1.101676	0.976420	-1.128281	0.2619
R-squared	0.694878	Mean dependent var		-6.325014
Adjusted R-squared	0.652584	S.D. dependent var		5.835797
S.E. of regression	3.439738	Akaike info criterion		5.428819
Sum squared resid	1195.012	Schwarz criterion		5.784887
Log likelihood	-299.8715	Hannan-Quinn criter.		5.573362
F-statistic	16.42963	Durbin-Watson stat		1.943872
Prob(F-statistic)	0.000000			

4.9.11 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.44 the coefficient of market premium was found to be marketret 0.767785, marketret (-1) 0.056384, marketret (-2) 0.203560 and marketret (-3) -0.127483. These values shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.767785, 0.056384, 0.203560 and decrease by - 0.127483 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first and third coefficients were statistically significant. The t-statistic values were 11.63966, 0.594531, 2.997695 and -1.852097. The p-values were found to be 0.0000, 0.5535, 0.0034 and 0.0669. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and the return on the market portfolio was very close to the value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant

effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.44 the coefficient of Value Premium (HML) was found to be hml-0.354804, hml (-1) 0.013294, hml (-2)-0.052539, hml (-3) 0.123231 and hml (-4) 0.105176. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -0.354804, 0.013294, decrease by -0.052539 increase by 0.123231 and 0.105176 percent respectively. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first term and the third lag term coefficients were statistically significant. The t-statistic values were -5.593968, 0.202764, -0.848166, 2.014730 and 1.735891. The p-values were found to be 0.0000, 0.8397, 0.3984, 0.0466 and 0.0856. The interpretation was that the relation between the excess return of firms in the (big size and low market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and low value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value

with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.44 the coefficient of Size Premium (SMB) was found to be-0.293989. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.293989 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio four.

The coefficient was statistically significant with a t-statistic value of -4.179864. The p-value was found to be 0.0001. The interpretation was that the variation between the excess return of firms in the (big size and small market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and low market value) are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heiran (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.9.12 Bid Ask Spread and Excess Return

The regression results in table 4.44 the coefficient of spread was found to be spreadfour -0.072271,spreadfour(-1) -0.003965 and spreadfour(-2) 0.103217.This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by spreadfour -0.072271, -0.003965 and increase by 0.103217 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio four.The coefficients were statistically insignificant for portfolio four except for the second lag. The t-statistic values were found to be -1.385988,-0.075020 and 2.008741. The p-values were found to be 0.1688, 0.9403 and 0.0472. The interpretation was that the variation between the excess return of firms in the (big size and low market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and low market value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky

(2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.9.13 Summary of Findings Big Size and low Value firms

Portfolio four is formed from big size with low value companies. There is a positive effect between the market premium and excess return in big size and low value firms. The value premium (HML) had a negative and significant effect on excess return meaning an increase in the value premium leads to an increase in excess return on the big size with low value companies in Kenya, which shows a direct relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two. The coefficient of SMB was found to be negative and statistically significant across all the tables meaning that an increase in the size premium for big size with low value companies in Kenya causes an increase in the excess return. Trading trading volume had a positive coefficient that was statistically insignificant. Price impact has a positive and statistically insignificant relation with excess return. Market resiliency has a positive and statistically significant relation with excess return. bid ask spread had a negative but statistically insignificant effect.

4.10 Portfolio Five Big size and Medium value companies

Portfolio five is formed from big size with medium value companies as used by Fama and French three factor model (1993).

4.10.1 Portfolio Five descriptive statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera test were used.

Table 4. 45: Portfolio Five descriptive statistics

	return	market	hml	Smb	Price Impact	T. Volume	Resi liency	spread	Imme diacy
mean	-6.21	-7.28	-0.87	-0.17	0.41	16.20	2.48	6.31	0.06
median	-7.00	-7.32	-0.99	-0.56	0.35	16.28	3.08	4.48	0.06
Maxi Mum	35.77	8.16	16.8	12.9	1.92	18.00	6.78	41.17	0.07
Mini Mum	-37.4	-30.1	-19	-12	0.00	14.41	0.00	0.51	0.06
std. dev.	11.34	6.06	5.45	4.95	0.35	0.82	2.35	5.59	0.00
skewness	0.47	-0.51	0.04	0.25	1.64	-0.22	0.17	2.70	0.44
kurtosis	4.83	4.65	4.40	2.81	6.47	2.52	1.55	14.74	2.69
jarque-bera	21.25	18.76	9.76	1.40	113.	2.09	11.04	835.2	4.43
Proba Bility	0.00	0.00	0.01	0.50	0.00	0.35	0.00	0.00	0.11
Sum	-744.	-873.	-10	-20.	49.7	1944	297.	757.6	7.43
sum sq. dev.	1529	4367	353	291	14.2	79.39	659.3	3712.	0.001
observations	120	120	120	120	120	120	120	120	120

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables'. The table 4.45 shows the descriptive statistics for the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were -6.21, -7.28, -0.87, -0.17, 0.41, 16.20, 2.48, 6.31 and 0.06 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 0.47, -0.51, 0.04, 0.25, 1.64, -0.22, 0.17, 2.70 and 0.44 respectively. These values of skewness shows that the variables are not all normally distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 4.83, 4.65, 4.40, 2.81, 6.47, 2.52, 1.55, 14.74, and 2.69. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 21.25, 18.76, 9.76, 1.40, 113, 2.09, 11.04, 835.2 and 4.43 respectively and the probability values of 0.00, 0.00, 0.01, 0.50, 0.00, 0.35, 0.00, 0.00 and 0.11 respectively. The probabilities of the jarque-bera are all away from the value of one (1) except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not normal and thus in further analysis this problem was considered before further analysis was executed.

4.10.2 Portfolio five Group Unit Root Test

Table 4. 46: Portfolio Five Group unit root test

Group unit root test: Summary

Series: RETURNFIVE, MARKET, HML, SMB, PRICE IMPACTFIVE, IMMEDIACYFIVE, LTUNOVERFIVE, RESILIENTFIVE, SPREADFIVE

Method	Statistic	P-value	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.4412	0.0000	9	1064
ADF - Fisher Chi-square	284.001	0.0000	9	1064
PP - Fisher Chi-square	374.591	0.0000	9	1071

The results from the unit root test for all the variables in in table 4.46 above shows that at least some of the variables in the group are stationary. The interpretation is that a method that is able to combine stationary and non-stationary was required. In this study thus ARDL modeling was used.

4.10.3 Portfolio Five correlation analysis

The correlation analysis was used as a pre estimation diagnostic test for multicollinearity and association between independent variables. The correlation coefficients range from negative one to positive one. Muriithi (2016), note that if the correlation coefficient are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity.

Table 4. 47 : Portfolio Five correlation analysis

	Return	market	hml	Smb	price impact	Lturn over	spread	Resi lient	Imme diacy
return	1.00								
Market	0.49	1.00							
Hml	-0.11	0.15	1.00						
Smb	-0.37	-0.13	-0.29	1.00					
Price Impact	0.10	0.36	-0.06	0.01	1.00				
ltunover	0.03	-0.19	-0.02	0.04	-0.15	1.00			
spread	0.01	0.00	-0.01	0.12	0.05	0.43	1.00		
Resi liency	0.11	0.31	-0.01	-0.09	0.28	-0.52	-0.09	1.00	
Imme diacy	-0.04	0.18	0.04	-0.04	0.15	-0.99	-0.43	0.50	1.00

Table 4.47 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is serious multicollinearity problem since the highest correlation between the independent variables was 0.99% between trading volume and immediacy and the least one was 0.01%. Thus immediacy variable from further analysis.

4.10.4 Portfolio Five Granger Causality

The study found that the bid ask spread has a one-way causality to the market return, market resiliency and the market return have a two way causality and resiliency has a one way causality to the trading volume as shown in table 4.48 . This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process.

Table 4. 48: Portfolio Five Granger Causality

Variable	Causality
Portfolio five	
Spread=>return	One-way
Resiliency <=>market	Two -way
Resiliency=> Volume	One-way

4.10.5 Portfolio Five Regression Results

The value of adjusted-R-squared of 0.49008, shows that the independent variables in this portfolio are able to explain about 49.0087 % of the variation in returns. The value of F-statistic of 9.032205 was also found to be statistically significant. The value of the Durbin Watson of 2.041589 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 49: Portfolio Five Regression Results Big Size and Medium Value

Variable	Coefficient	Std. Error	t-Statistic	Probability
Return five (-1)	-0.030599	0.080711	-0.379123	0.7054
Return five (-2)	0.204518	0.081046	2.523484	0.0131
Marketret	1.124386	0.170270	6.603564	0.0000
Hml	-0.609819	0.150247	-4.058772	0.0001
Smb	-0.668441	0.166913	-4.004716	0.0001
Smb (-1)	0.077450	0.167339	0.462835	0.6445
Smb (-2)	0.443261	0.169905	2.608878	0.0104
Ltunoverfive	3.325497	1.868399	1.779864	0.0780
Ltunoverfive (-1)	-3.428502	1.858008	-1.845257	0.0679
Price Impactfive	-3.097249	2.457354	-1.260400	0.2104
Price Impactfive (-1)	3.474911	2.317765	1.499251	0.1369
Resilientfive	-0.264440	0.430829	-0.613794	0.5407
Spreadfive	-0.198303	0.164840	-1.202998	0.2317
Spreadfive (-1)	0.427510	0.161000	2.655335	0.0092
C	2.771804	22.96770	0.120683	0.9042
R-squared	0.551102	Mean dependent var		-6.088558
Adjusted R-squared	0.490087	S.D. dependent var		11.36373
S.E. of regression	8.114632	Akaike info criterion		7.143496
Sum squared resid	6782.267	Schwarz criterion		7.495702
Log likelihood	-406.4663	Hannan-Quinn criter.		7.286502
F-statistic	9.032205	Durbin-Watson stat		2.041589
Prob(F-statistic)	0.000000			

4.10.6 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.49 the coefficient of market premium was found to be 1.124386. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.124386 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.603564. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and the return

on the market portfolio was very statistically significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.49 the coefficient of Value Premium (HML) was found to be -0.609819. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by - 0.609819 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of 4.058772. The p-value was found to be 0.0001. The interpretation was that the relation between the excess return of firms in the (big size and medium market value portfolio) and hml was negative and it shows that in Kenya firms which are (big size and medium value) are likely to get lower higher returns as a result of HML. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. These results supports those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.49 the coefficient of Size Premium (SMB) was found to be Smb -0.668441, Smb (-1) 0.077450 and Smb (-2) 0.443261. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.668441 increase by 0.077450 and increase by 0.443261 percent respectively. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio five.

The first and third coefficient terms were statistically significant. The t-statistic values were -4.004716, 0.462835 and 2.608878. The p-value was found to be 0.0001, 0.6445 and 0.0104. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and medium value) are likely to have a negative correlation with the premium for size. These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results contradict those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.10.7 Trading Volume and Excess Return

From the regression results in table 4.49 the coefficient of log trading volume were found to be ltunoverfive 3.325497 and ltunoverfive (-1) -3.428502. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 3.325497 and - 3.428502 percent. The positive\negative effect shows that there is a positive\negative relationship between the proxy for liquidity (trading volume) and excess returns of the firms in portfolio five.

The coefficient were statistically insignificant with t-statistic values of 1.779864 and -1.845257. The p-values were found to be 0.0780 and 0.0679. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and trading volume was positive\negative and it shows that in Kenya firms which are big size and medium value are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky 2003), who show that stock returns in emerging markets are positively correlated with liquidity measures. The results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.10.8 Price Impact and Excess Return

From the regression results in table 4.49 the coefficient of price impact was found to be price impactfive -3.097249 and price impactfive (-1) 3.474911. These values shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to decrease by price impactfive -3.097249 and increase by price impactfive (-1) 3.474911 units respectively. The negative and positive

effect shows that there is a negative and positive relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio five.

The coefficient were statistically insignificant for portfolio five. The t-statistic values were -1.260400 and 1.499251. The p-value was found to be 0.2104 and 0.1369. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and price impact was negative and positive and it shows that in Kenya firms which are big size and are medium market value are likely to have negative and positive correlation with market price impact. These findings supports those of who found that price impact had a significant effect on excess returns.

4.10.9 Bid Ask Spread and Excess Return

From the regression results in table 4.49 the coefficient of spread was found to be Spreadfive -0.198303 and Spreadfive (-1) 0.427510. These values shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by - 0.198303 and increase by 0.427510 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio five.

The second term coefficient was the only one statistically significant for portfolio five with a t-statistic values of-1.202998 and 2.655335. The p-value were found to be 0.2317 and 0.0092. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and spread was negative and it shows that in Kenya firms which are (big size and medium market value) are likely to have negative or positive correlation with market spread given different horizons.. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a negative and positive relationship between bid-ask spread and

returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets returns.

4.10.10 Market Resiliency and Excess Return

From the regression results in table 4.49 the coefficient of resiliency was found to be -0.264440. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to decrease by -0.264440 percent. The negative effect shows that there is a negative relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio five.

The coefficient was statistically insignificant for portfolio five with a t-statistic value of -0.613794. The p-value was found to be 0.5407. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and resiliency was negative and it shows that in Kenya, the returns of firms which are (big size and medium value) are likely to have negative correlation with market resiliency. These findings support those of who found that resiliency had an effect on excess returns.

4.10.11 Portfolio Five Heteroskedasticity Test

The study further embarked on post-estimation test to test for the presence of heteroscedasticity and serial correlation. In particular, autoregressive conditional Heteroskedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the test statistics; F-statistic and Observation R-square

are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 50: Portfolio Five Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.619914	Prob. F(1,115)	0.4327
Obs*R-squared	0.627314	Prob. Chi-Square(1)	0.4283

Table 4.50 presents the result after the testing for heteroscedasticity using ARCH test. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedasticity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.10.12 Portfolio Five Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic, Observations R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicate the absence of autocorrelation in the model.

Table 4. 51: Portfolio Five Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.112015	Prob. F(2,101)	0.3329
Obs*R-squared	2.542387	Prob. Chi-Square(2)	0.2805

Table 4.51 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the bases that the p-value of the two test statistics that is F-statistic and the chi-square were statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated.

4.11Portfolio five Fama-French three factor and Individual liquidity-Measurers

4.11.1 Fama-French three factor and trade volume

The value of adjusted R-squared was found to be 0.465587 shows that the independent variables in this portfolio are able to explain about of 46.56% the variation in returns. The value of F-statistic of 11.19318 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.994558 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 52: Fama-French three factor and trade volume

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFIVE(-1)	-0.090715	0.090316	-1.004420	0.3174
RETURNFIVE(-2)	0.166380	0.080330	2.071213	0.0407
MARKETRET	1.014481	0.162968	6.225022	0.0000
MARKETRET(-1)	0.289066	0.178196	1.622179	0.1077
HML	-0.582625	0.151515	-3.845338	0.0002
SMB	-0.810715	0.165805	-4.889569	0.0000
SMB(-1)	0.118049	0.169837	0.695076	0.4885
SMB(-2)	0.438096	0.171591	2.553138	0.0121
LTUNOVERFIVE	4.004416	1.831167	2.186811	0.0309
LTUNOVERFIVE(-1)	-2.644032	1.845521	-1.432675	0.1549
C	-19.33372	17.26144	-1.120052	0.2652

R-squared	0.511263	Mean dependent var	-6.088558
Adjusted R-squared	0.465587	S.D. dependent var	11.36373
S.E. of regression	8.307288	Akaike info criterion	7.160728
Sum squared resid	7384.181	Schwarz criterion	7.419013
Log likelihood	-411.4830	Hannan-Quinn criter.	7.265599
F-statistic	11.19318	Durbin-Watson stat	1.994558
Prob(F-statistic)	0.000000		

4.11.2 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.52 the coefficient of market premium was found to be marketret1.014481 and marketret (-1) 0.289066. These values shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.014481 and 0.289066. Percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first coefficient was statistically significant with t-statistic values of 6.225022 and 1.622179. The p-value was found to be 0.0000 and 0.1077. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and the return on the market portfolio was significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.52 the coefficient of Value Premium (HML) was found to be-0.582625. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to decrease by -0.582625 percent. The positive effect shows that there is an

inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of -3.845338. The p-value was found to be 0.0002. The interpretation was that the relation between the excess return of firms in the (big size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and medium value) are likely to get higher returns as a result of HML premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market.

They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.52 the coefficient of Size Premium (SMB) were found to be -0.810715, SMB (-1) 0.118049 and SMB (-2) 0.438096. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.810715 and increase by 0.118049 and 0.438096 percent respectively. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio five.

The first and third coefficients were statistically significant. The t-statistic values were -4.889569, 0.695076 and 2.553138. The p-values were found to be 0.0000, 0.4885 and 0.0121. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and medium market value) are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.11.3 Trading Volume and Excess Return

From the regression results in table 4.52 the coefficient of trading volume was found to be ltunoverfive 4.004416 and ltunoverfive (-1) -2.644032. These values shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 4.004416 and - 2.644032 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (trading volume) and excess returns of the firms in portfolio five.

The first term coefficient was statistically significant. The t-statistic values were 2.186811 and -1.432675 respectively. The p-values were found to be 0.0309 and 0.1549. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and trading volume was positive and it shows that in Kenya firms which are big size and high market value are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and trading volume but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.11.4 Fama-French three factor and Price Impact

The value of adjusted R-squared was found to be 0.454687 shows that the independent variables in this portfolio are able to explain about of 45.47% the variation in returns. The value of F-statistic of 11.83953 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.020775 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 53: Fama-French three factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFIVE(-1)	-0.008035	0.078102	-0.102877	0.9183
RETURNFIVE(-2)	0.199241	0.078481	2.538719	0.0126
MARKETRET	1.093498	0.168329	6.496188	0.0000
Value Premium (HML)	-0.584860	0.153824	-3.802142	0.0002
SMB	-0.733895	0.168099	-4.365836	0.0000
SMB(-1)	0.155173	0.170280	0.911286	0.3642
SMB(-2)	0.437598	0.172179	2.541527	0.0125
PRICE IMPACTFIVE	-3.270744	2.471145	-1.323574	0.1884
PRICE IMPACTFIVE(-1)	3.339999	2.350436	1.421012	0.1582
C	2.014474	2.161660	0.931911	0.3535

R-squared	0.496634	Mean dependent var	-6.088558
Adjusted R-squared	0.454687	S.D. dependent var	11.36373
S.E. of regression	8.391576	Akaike info criterion	7.173272
Sum squared resid	7605.204	Schwarz criterion	7.408076
Log likelihood	-413.2230	Hannan-Quinn criter.	7.268609
F-statistic	11.83953	Durbin-Watson stat	2.020775
Prob(F-statistic)	0.000000		

4.11.5 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.53 the coefficient of market premium was found to be 1.093498. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase 1.093498 by percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.496188. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and the return on the market portfolio was very significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios.

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional

view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.53 the coefficient of Value Premium (HML) was found to be -0.584860. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by -0.584860 percent. The negative effect shows that there is a negative relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of -3.802142. The p-value was found to be 0.0002. The interpretation was that the relation between the excess return of firms in the (big size and medium market value portfolio) and hml was negative and it shows that in Kenya firms which are (big size and medium value) are likely to get lower returns as a result of HML premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market.

They support those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.53 the coefficient of Size Premium (SMB) was found to be smb-0.733895, smb (-1) 0.155173 and smb (-2) 0.437598. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.733895 and increase by 0.155173 and 0.437598 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of - 4.365836, 0.911286 and 2.541527. The p-value was found to be 0.0000, 0.3642 and 0.0125. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and medium market value) are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.11.6 Price Impact and Excess Return

From the regression results in table 4.53 the coefficient of price impact was found to be price impactfive -3.270744 and price impactfive (-1) 3.339999. These values shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to decrease by -3.270744 and 3.339999 units. The positive and negative effect shows that there is a positive and negative relationships between the proxy for liquidity (price impact) and excess returns of the firms in portfolio five given different horizons.

The coefficient were statistically insignificant for portfolio five with t-statistic values of -1.323574 and 1.421012. The p-value were found to be 0.1884 and 0.1582. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and price impact was positive and it shows that in Kenya firms which are big size and are high market value are likely to have negative and positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.11.7 Fama-French three factor and resilient five

The value of adjusted R-squared was found to be 0.452647 shows that the independent variables in this portfolio are able to explain about of 45.2647% the variation in returns. The value of F-statistic of 11.75067 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.984706 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 54: Fama-French three factor and resilient five

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFIVE(-1)	-0.028739	0.086596	-0.331877	0.7406
RETURNFIVE(-2)	0.174020	0.078085	2.228598	0.0279
MARKETRET	1.049323	0.163379	6.422613	0.0000
MARKETRET(-1)	0.264545	0.178678	1.48056	0.1416
HML	-0.566133	0.152882	-3.703081	0.0003
SMB	-0.815020	0.167828	-4.856285	0.0000
SMB(-1)	0.160632	0.170411	0.942614	0.3480
SMB(-2)	0.420508	0.172655	2.435536	0.0165
RESILIENTFIVE	-0.464519	0.369770	-1.256235	0.2117
C	4.384200	2.054108	2.134357	0.0351

R-squared	0.494751	Mean dependent var	-6.088558
Adjusted R-squared	0.452647	S.D. dependent var	11.36373
S.E. of regression	8.407260	Akaike info criterion	7.177007
Sum squared resid	7633.659	Schwarz criterion	7.411810
Log likelihood	-413.4434	Hannan-Quinn criter.	7.272344
F-statistic	11.75067	Durbin-Watson stat	1.984706
Prob(F-statistic)	0.000000		

4.11.8 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.54 the coefficient of market premium was found to be marketret 1.049323 and marketret (-1) 0.264545. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.049323 and 0.264545 percent.

The positive effect shows that there is a positive relationship between the market premium and excess returns.

The first coefficient was statistically significant. The t-statistic values were 6.422613 and 1.480569. The p-value were found to be 0.0000 and 0.1416. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and the return on the market portfolio was significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one.

De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.54 the coefficient of Value Premium (HML) was found to be-0.566133. This value shows that holding other variables in the model

constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by -0.566133 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of -3.703081. The p-value was found to be 0.0003. The interpretation was that the relation between the excess return of firms in the (big size and medium market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and medium value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.54 the coefficient of Size Premium (SMB) was found to be smb -0.815020, smb (-1) 0.160632 and smb (-2) 0.420508. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.815020 and increase by 0.160632 and 0.420508 percent. The negative effect shows

that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio five.

The first and second lag terms coefficients were found to be statistically significant. The t-statistic values were -4.856285, 0.942614 and 2.435536. The p-values were found to be 0.0000, 0.3480 and 0.0165. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and medium market value) are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.11.9 Market Resiliency and Excess Return

From the regression results in table 4.54 the coefficient of resiliency was found to be -0.464519. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by - 0.464519percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio five.

The coefficient was statistically insignificant for portfolio five with a t-statistic value of -1.256235. The p-value was found to be 0.2117. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and resiliency was negative and it shows that in Kenya, the returns of firms which are big size and high value are likely to have negative correlation with market resiliency. These findings support those of who found that resiliency had an effect on excess returns.

4.11.10 Fama-French three factor and spread

The value of adjusted R-squared was found to be 0.475424 shows that the independent variables in this portfolio are able to explain about of 47.5424% the variation in returns. The value of F-statistic of 12.78192 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.030935 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 55: Fama-French Three Factor and Spread

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RETURNFIVE(-1)	0.034999	0.075425	0.464028	0.6436
RETURNFIVE(-2)	0.168848	0.080143	2.106828	0.0374
MARKETRET	1.070829	0.153129	6.992992	0.0000
HML	-0.546411	0.149990	-3.642992	0.0004
SMB	-0.704139	0.167294	-4.208989	0.0001
SMB(-1)	0.160979	0.167022	0.963818	0.3373
SMB(-2)	0.402289	0.169618	2.371728	0.0195
SPREADFIVE	-0.217024	0.158708	-1.367438	0.1743
SPREADFIVE(-1)	0.429782	0.152975	2.809497	0.0059
C	0.637263	1.778422	0.358331	0.7208

R-squared	0.515776	Mean dependent var	-6.088558
Adjusted R-squared	0.475424	S.D. dependent var	11.36373
S.E. of regression	8.230477	Akaike info criterion	7.134503
Sum squared resid	7316.000	Schwarz criterion	7.369307
Log likelihood	-410.9357	Hannan-Quinn criter.	7.229840
F-statistic	12.78192	Durbin-Watson stat	2.030935
Prob(F-statistic)	0.000000		

4.11.11 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.55 the coefficient of market premium was found to be 1.070829. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 1.070829 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient was statistically significant. The t-statistic value was 6.992992. The p-value was found to be 0.000. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of Trimech *et al.* (2009), who's effort while investigating the

market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.55 the coefficient of Value Premium (HML) was found to be -0.546411. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by -0.546411 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio five.

The coefficient was statistically significant with a t-statistic value of -3.642992. The p-value was found to be 0.0004. The interpretation was that the relation between the excess return of firms in the (big size and medium market value portfolio) and hml was negative and it shows that in Kenya firms which are (big size and medium market value)

are likely to get higher returns as a result of HML premium. These findings contradict those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a negative effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They support those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.55 the coefficient of Size Premium (SMB) was found to be SMB -0.704139, SMB (-1) 0.160979 and SMB (-2) 0.402289. These values shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.704139 and increase by 0.160979 and 0.402289 percent. The positive effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio five.

The coefficient was statistically significant. The t-statistic values of -4.208989, 0.963818 and 2.371728. The p-values were found to be 0.0001, 0.3373 and 0.0195. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and medium market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.11.12 Bid Ask Spread and Excess Return

From the regression results in table 4.55 the coefficient of spread was found to be spreadfive -0.217024 and spreadfive (-1) 0.429782. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to decrease by spreadfive -0.217024 and increase by spreadfive(-1) 0.429782 units given the different horizons. The negative effect shows that there is

an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio five.

The first coefficient was statistically insignificant for portfolio five. The t-statistic values were -1.367438 and 2.809497 respectively. The p-values were found to be 0.1743 and 0.0059. The interpretation was that the variation between the excess return of firms in the (big size and medium market value portfolio) and spread was negative and it shows that in Kenya firms which are big size and high market value are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.11.13 Summary of Findings Big Size and medium Value firms

Portfolio five is formed from Big Size with Medium Value companies. There is a positive effect between the market premium and excess return in big size and Medium value firms. The value premium (HML) had a negative and significant effect on excess return meaning an increase in the value premium leads to a decrease in excess return on the big size with medium value companies in Kenya, which shows an indirect relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio two. The coefficient of SMB was found to be negative and statistically significant across all the tables meaning that an increase in the size premium for big size with medium value companies in Kenya causes an increase in the excess return. Trading trading volume had a positive coefficient that was statistically

insignificant when put together with other liquidity measure but it is positive and significant when used by the Fama French factors only. Price impact has a negative and statistically insignificant relation with excess return. Market resiliency has a negative and statistically insignificant relation with excess return. Bid ask spread had a negative but statistically insignificant effect.

4.12 Portfolio Six Big size and High Value Companies

Portfolio six is formed from big size with high value companies as used by Fama and French three factor model (1993).

4.12.1 Portfolio Six descriptive statistics

This section presents the descriptive statistical analysis of the collected data of portfolio one. Summary statistics that encapsulate the measures of central tendency such as the mean, the measures of dispersion such as standard deviation, minimum and maximum observations, measures of distribution such as Skewedness and Kurtosis and Jarque-bera test were used.

Table 4. 56: Portfolio Six descriptive statistics

	return	market	hml	Smb	price impact	T. volume	Resi liency	spread	Imme diacy
mean	-7.55	-7.28	-0.87	-0.17	0.37	15.66	0.93	2.32	0.06
median	-8.10	-7.32	-0.9	-0.5	0.30	15.49	0.00	1.50	0.06
maximum	9.10	8.16	16	12	1.71	18.18	9.34	12.63	0.07
minimum	-32.2	-30.19	-19	-12	0.00	13.83	0.00	0.10	0.06
std. dev.	6.88	6.06	5.45	4.95	0.30	0.91	1.98	2.21	0.00
skewness	-0.11	-0.51	0.04	0.25	1.76	0.67	2.32	2.50	-0.41
kurtosis	3.36	4.65	4.40	2.81	7.28	2.95	7.64	10.53	2.70
jarque-bera	0.89	18.76	9.76	1.40	153	8.96	214.82	408.	3.83
Probability	0.64	0.00	0.01	0.50	0.00	0.01	0.00	0.00	0.15
sum	-906	-873.4	-104	-20	44.8	1879	111.41	278.2	7.69

Descriptive statistics gives a presentation of mean, median, maximum, minimum and standard deviations of the variables'. The table 4.56 shows the descriptive statistics for the variables applied in this study. From the results the mean of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were -7.55, -7.28, -0.87, -0.17, 0.37, 15.66, 0.93, 2.32, and 0.06 respectively. This implies that over the period the company had both positive and negative returns.

The skewness and kurtosis test was to find out if the data is normally distributed. The test statistics is a chi-square distribution for skewness and kurtosis. The test is carried out against the null hypothesis of normal distribution. The skewness of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were -0.11 -0.51 0.04 0.25 1.76 0.67 2.32 2.50 and -0.41 These values of skewness shows that the variables are not all normally distributed since their value of skewness disperse from zero. The Kurtosis values of excess return, market premium, hml, smb, price impact, immediacy, trading volume, market resiliency and bid-ask spread variables were 3.36, 4.65, 4.40, 2.81, 7.28, 2.95, 7.64, 10.53 and 2.70 respectively. These values of kurtosis except for smb were away from the expected value of 3 for a normal distribution.

The extension of the Jarque-Bera normality test by Galvao, Montes-Rojas, Sosa-Escudero and Wang (2013) gave the following values of 0.89, 18.76, 9.76, 1.40, 153, 8.96, 214.82, 408, and 3.83 respectively and the probability values of 0.64, 0.00, 0.01, 0.50, 0.00, 0.01, 0.00, 0.00 and 0.15 respectively.

The probabilities of the jarque-bera are all away from the value of one (1) except that of smb which means that for portfolio one the majority of the variables are not normally distributed. The interpretation of these statistics is that the distribution of variables is not

normal and thus in further analysis this problem was considered before further analysis was executed.

4.12.2 Portfolio Six Group Unit Root Test

Table 4. 57: Portfolio Six Group unit root test

Group unit root test: Summary

Series: RETURNSIX, MARKETRET, HML, SMB, PRICE IMPACTSIX, IMMEDIACYSIX,
LTUNOVERSIX, RESILIENTSIX, SPREADSIX

Method	Statistic	P-value	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-16.2796	0.0000	9	1051
ADF - Fisher Chi-square	321.218	0.0000	9	1051
PP - Fisher Chi-square	381.410	0.0000	9	1071

The results from the unit root test for all the variables in in table 4.57 above shows that at least some of the variables in the group are stationary. The interpretation is that a method that is able to combine stationary and non-stationary variables was required. In this study thus ARDL modeling was used.

4.12.3 Portfolio Six correlation analysis

The correlation analysis was used as a pre estimation diagnostic test for multicollinearity and association between independent variables. The correlation coefficients range from negative one to positive one. If the correlation coefficient are significant and near perfect (positive or negative one) the data regression estimates are affected by multicollinearity. The variables with the near perfect correlation coefficient give the same information and one of the variables should be dropped in favour of the other to avoid multicollinearity.

Table 4. 58: Portfolio Six correlation analysis

	return	market	hml	Smb	Ltun over	price impact	spread	Resi liency	Imme Diacy
return	1.00								
market	0.62	1.00							
Hml	0.28	0.15	1.00						
Smb	-0.32	-0.13	-0.29	1.00					
ltunover	0.34	0.27	-0.13	-0.10	1.00				
price impact	-0.22	0.11	0.00	0.16	-0.15	1.00			
spread	0.16	0.28	0.09	-0.02	0.55	0.01	1.00		
Resili Ency	-0.22	-0.18	0.08	0.08	-0.18	0.07	-0.16	1.00	
Imme diacy	-0.34	-0.26	0.14	0.09	-0.99	0.15	-0.54	0.18	1.00

Table 4.58 shows the pair-wise correlation matrix. The result for pair-wise correlation, shows that there is serious multicollinearity problem since the highest correlation between the independent variables was 0.99% between trading volume and immediacy and the least one was 0.01%. Thus immediacy variable from further analysis.

4. 12. 4 Portfolio Six Granger Causality

The study found that the market return has a one-way causality to the market premium, market return has a one-way causality to trading volume and market premium has a one way causality to the price impact as shown in table 4.59. This called for the introduction of the lag structure. All other pairs of variables which had no causality are reported in the Appendix III due to the large size of the tables generated in the process

Table 4. 59: Portfolio Six Granger Causality

Variable	Causality
Portfolio six	
Return=> market	One-way
Return=> Volume	One-way
Market=> Price Impact	One-way

4.12.5 Regression Results Portfolio Six

The value of adjusted R-squared was found to be 0.600098 shows that the independent variables in this portfolio are able to explain about 0.60.0098 of the variation in returns. The value of F-statistic of 14.50549 was also found to be statistically significant. The value of the Durbin Watson of 1.893674 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 60: Portfolio Six Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Return six(-1)	0.112130	0.073231	1.531186	0.1288
Returnsix(-2)	0.112632	0.072456	1.554481	0.1231
Marketret	0.741898	0.106828	6.944822	0.0000
Hml	0.292999	0.103656	2.826652	0.0056
Hml(-1)	-0.068466	0.101215	-0.676444	0.5003
Hml(-2)	-0.206062	0.100879	-2.042657	0.0436
Smb	-0.185316	0.109468	-1.692882	0.0935
Ltunoversix	4.660717	1.225326	3.803656	0.0002
Ltunoversix(-1)	-2.900405	1.208351	-2.400300	0.0182
price impactsix	-5.949465	1.751907	-3.395993	0.0010
price impactsix(-1)	3.699623	1.760699	2.101224	0.0380
Resilientsix	-0.288541	0.261986	-1.101359	0.2733
Spreadsix	-0.672338	0.295980	-2.271564	0.0252
C	-26.72419	12.72573	-2.100013	0.0381

R-squared	0.644531	Mean dependent var	-9.029396
Adjusted R-squared	0.600098	S.D. dependent var	8.454170
S.E. of regression	5.346234	Akaike info criterion	6.301656
Sum squared resid	2972.551	Schwarz criterion	6.630382
Log likelihood	-357.7977	Hannan-Quinn criter.	6.435128
F-statistic	14.50549	Durbin-Watson stat	1.893674
Prob(F-statistic)	0.000000		

4.12.5 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.60 the coefficient of market premium was found to be 0.741898. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.741898 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.944822. The p-value was found to be 0.0000. The interpretation was that the variation between the

excess return of firms in the (big size and high market value portfolio) and the return on the market portfolio was statistically significant. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.60 the coefficient of Value Premium (HML) was found to be 0.292999, Hml (-1) - 0.068466 and Hml (-2) - 0.206062. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.292999 and decrease by - 0.068466 and decrease by -0.206062 percent. The positive effect shows

that there is a positive relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first and third coefficients were also statistically significant. The t-statistic values were 2.826652, -0.676444 and -2.042657. The p-value were found to be 0.0056, 0.5003 and 0.0436. The interpretation is that the relation between the excess return of firms in the (big size and high market value portfolio) and hml is positive and it shows that in Kenya firms which are (big size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.60 the coefficient of Size Premium (SMB) was found to be -0.185316. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by - 0.185316 percent. The negative effect shows that there is a negative relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically insignificant with a t-statistic value of-1.692882. The p-value was found to be 0.0935. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and high market value) are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.12.6 Trading Volume and Excess Return

From the regression results in table 4.60 the coefficient of trading volume was found to be Ltunoversix 4.660717 and Ltunoversix (-1) -2.900405. This value shows that holding other variables in the model constant, an increase in trading volume by one percent causes the excess return of the portfolio to increase by 4.660717 and decrease by -2.900405 percent. The positive\negative effect shows that there is a positive\negative relationship between the proxy for liquidity (trading volume) and excess returns of the firms in portfolio six.

The coefficients were statistically significant with a t-statistic values of 3.803656 and -2.400300. The p-values were found to be 0.0002 and 0.0182. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and trading volume was positive and negative in different horizons respectively and it shows that in Kenya firms which are big size and high market value are likely to have positive correlation with market breath. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results also support those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and turnover but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.12.7 Price Impact and Excess Return

The regression results in table 4.60 the coefficients of price impact were found to be price impactsix -5.949465 and price impactsix (-1) 3.699623. These values shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to decrease by -5.949465 and increase by

3.699623 units. The negative and positive effect shows that there is negative and positive given different horizons relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio six.

The two coefficient were statistically significant for portfolio six with t-statistic values of -3.395993 and 2.101224. The p-values were found to be 0.0010 and 0.0380. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and price impact is negative or positive given two horizons and it shows that in Kenya firms which are (big size and are high market value) are likely to have a negative or positive correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.12.8 Bid Ask Spread and Excess Return

The regression results in table 4.60 the coefficient of spread was found to be -0.672338. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by -0.672338 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio six.

The coefficient was statistically significant for portfolio six with a t-statistic value of-2.271564. The p-value was found to be 0.0252. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and spread was negative and it shows that in Kenya firms which are (big size and high market value) are likely to have negative correlation with market spread. These findings contradict those by other researchers Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between

bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.12.9 Market Resiliency and Excess Return

The regression results in table 4.60 the coefficient of resiliency was found to be-0.288541. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by -0.288541 percent. The positive effect shows that there is a positive relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio six.

The coefficient is statistically insignificant for portfolio five with a t-statistic value of -1.101359. The p-value was found to be 0.2733. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and resiliency was positive and it shows that in Kenya, the returns of firms which are big size and high value are likely to have positive correlation with market resiliency. These findings supports those of who found that resiliency had an effect on excess returns.

4.12.10 Portfolio Six Heteroskedasticity Test

The study further embarked on post-estimation test to test for the presence of heteroscedasticity and serial correlation. In particular, autoregressive conditional Heteroskedasticity (ARCH) test was carried out to test for the stability of the variance on the residuals from the model. If the test statistics; F-statistic and Observation R-square are significant the model is said to have heteroscedasticity problem. If the two test statistics are insignificant the model is said to be stable and well identified.

Table 4. 61: Portfolio Six Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.600804	Prob. F(1,115)	0.4399
Obs*R-squared	0.608076	Prob. Chi-Square(1)	0.4355

Table 4.61 presents the result after the testing for heteroscedasticity using Breusch-Pagan-Godfrey test. In this study since time series data was used the method of autoregressive distributed lag model was used since it eliminate heteroscedasticity problem and give best linear unbiased estimates. The interpretation was that, since the test statistics were statistically insignificant, the presence of heteroscedasticity was rejected or ruled-out.

4.12.11 Portfolio Six Autocorrelation Test

The Breusch-Godfrey Serial Correlation LM Test of autocorrelation was also performed to test for the existence of the serial correlation among the error terms. Two test statistics were used these were; F-statistic and Observations*R-squared. If the statistics are significant, that indicates the presence of autocorrelation. If the test statistics are insignificant that indicate the absence of autocorrelation in the model.

Table 4. 62: Portfolio Six Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.876117	Prob. F(2,102)	0.4195
Obs*R-squared	1.992860	Prob. Chi-Square(2)	0.3692

Table 4.62 presents the results for the test of serial correlation. The test results could not rejected the hypothesis of no serial correlation. The null could not be rejected on the

bases that the p-value of the two test statistics that is F-statistic and the chi-square were statistically insignificant. The langrage multiplier (LM) indicates that the residuals were serially uncorrelated.

4.13 Portfolio Six Fama-French three factor and Individual liquidity-Measurers

4.13.1 Fama-French three factor and trade volume

The value of adjusted R-squared was found to be 0.527661shows that the independent variables in this portfolio are able to explain about of 52.77 % the variation in returns. The value of F-statistic of 17.33794 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 2.013212 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 63: Fama-French three factor and trade volume

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNSIX(-1)	0.145756	0.075482	1.931015	0.0561
MARKETRET	0.703174	0.110913	6.339846	0.0000
HML	0.275866	0.105885	2.605344	0.0105
HML(-1)	-0.114333	0.106001	-1.078598	0.2831
HML(-2)	-0.219642	0.099312	-2.211625	0.0291
SMB	-0.259735	0.115913	-2.240773	0.0271
LTUNOVERSIX	4.283018	1.310115	3.269193	0.0014
LTUNOVERSIX(-1)	-3.098791	1.275009	-2.430408	0.0167
C	-21.44037	11.44253	-1.873743	0.0636

R-squared	0.559958	Mean dependent var	-9.029396
Adjusted R-squared	0.527661	S.D. dependent var	8.454170
S.E. of regression	5.810290	Akaike info criterion	6.430344
Sum squared resid	3679.782	Schwarz criterion	6.641667
Log likelihood	-370.3903	Hannan-Quinn criter.	6.516147
F-statistic	17.33794	Durbin-Watson stat	2.013212
Prob(F-statistic)	0.000000		

4.13.2 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.63 the coefficient of market premium was found to be 0.703174. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.703174 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.339846. The p-value was found to be 0.000. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and the return on the market portfolio was very close to the actual expected value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the

results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.63 the coefficient of Value Premium (HML) was found to be hml 0.275866, hml (-1) -0.114333 and hml (-2) -0.219642. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.275866 reduce by -0.114333 and reduce by -0.219642 percent. The negative effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first term and second lag term coefficients were statistically significant. The t-statistic values were 2.605344,-1.078598 and -2.211625. The p-values were found to be 0.0105, 0.2831 and 0.0291. The interpretation was that the relation between the excess return of firms in the (big size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and high market value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in

assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.63 the coefficient of Size Premium (SMB) was found to be -0.259735. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.259735 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically significant with a t-statistic value of -2.240773. The p-value was found to be 0.0271. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and SMB was positive and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009), noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically

significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.13.3 Trading Volume and Excess Return

The coefficient of trading volume was found to be ltunoversix 4.283018 and ltunoversix (-1) -3.098791. This value shows that holding other variables in the model constant, an increase in turnover by one percent causes the excess return of the portfolio to increase by ltunoversix 4.283018 and ltunoversix (-1) -3.098791 percent. The positive and negative effect shows that there is a positive and negative relationship between the proxy for liquidity (logtrading volume) and excess returns of the firms in portfolio six.

The coefficients were statistically significant. The t-statistic values were 3.269193 and -2.430408. The p-values were found to be 0.0014 and 0.0167. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and trading volume was positive and negative horizon it shows that in Kenya firms which are (big size and high market value) are likely to have positive and negative correlation with market breath given different horizons. These findings support those of (Jun, Marathe and Shawky, 2003) who show that stock returns in emerging markets are positively correlated with liquidity measures. These results contradict those of Datar, Narayan, and Radcliffe (1998) use turnover ratio as a liquidity measure and find a negative correlation between liquidity and returns for NYSE stocks. Similarly, Dey (2005) support a negative relation between returns and trading volume but this relationship was valid for developed markets only since the emerging markets showed a positive relationship.

4.13.4 Fama-French three factor and Price Impact

The value of adjusted R-squared was found to be 0.546164 shows that the independent variables in this portfolio are able to explain about of 54.62% the variation in returns. The value of F-statistic of 16.64471 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic 1.912403 is also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 64: Fama-French Three Factor and Price Impact

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNSIX(-1)	0.128770	0.075210	1.712135	0.0897
RETURNSIX(-2)	0.110161	0.073041	1.508214	0.1344
MARKETRET	0.811724	0.109867	7.388233	0.0000
HML	0.231267	0.106110	2.179494	0.0315
HML(-1)	-0.092781	0.104874	-0.884686	0.3783
HML(-2)	-0.246344	0.105165	-2.342452	0.0210
SMB	-0.265045	0.114894	-2.306864	0.0230
PRICE IMPACTSIX	-6.247443	1.842836	-3.390124	0.0010
PRICE IMPACTSIX(-1)	3.526004	1.868936	1.886638	0.0619
C	-0.446749	1.418939	-0.314847	0.7535

R-squared	0.581075	Mean dependent var	-9.029396
Adjusted R-squared	0.546164	S.D. dependent var	8.454170
S.E. of regression	5.695350	Akaike info criterion	6.398115
Sum squared resid	3503.197	Schwarz criterion	6.632919
Log likelihood	-367.4888	Hannan-Quinn criter.	6.493453
F-statistic	16.64471	Durbin-Watson stat	1.912403
Prob(F-statistic)	0.000000		

4.13.5 Three Factor Asset Pricing Model on Excess Return

The regression results in table 4.64 the coefficient of market premium was found to be 0.811724. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.811724 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 7.388233. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and the return on the market portfolio was significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In

essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.64 the coefficient of HML was found to be hml 0.231267, hml (-1) -0.092781 and hml (-2) -0.246344. These values shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.231267 and decrease by -0.092781 and -0.246344 percent. The positive and negative effect shows that there is a positive and negative relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six given different horizons.

The coefficient was statistically significant. The t-statistic values were 2.179494, -0.884686 and -2.342452. The p-values were found to be 0.0315, 0.3783 and 0.0210. The interpretation was that the relation between the excess return of firms in the (big size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and high value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns.

De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in

assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.64 the coefficient of Size Premium (SMB) was found to be -0.265045. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by - 0.265045 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically significant with a t-statistic value of-2.306864. The p-value was found to be 0.0230. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.13.6 Price Impact and Excess Return

The regression results in table 4.64 the coefficient of price impact was found to be price impactsix -6.247443 and price impactsix (-1) 3.526004. These values shows that holding other variables in the model constant, an increase in price impact by one unit causes the excess return of the portfolio to increase by -6.247443 and 3.526004 units respectively. The negative effect shows that there is a negative relationship between the proxy for liquidity (price impact) and excess returns of the firms in portfolio six.

The first coefficient was statistically significant for portfolio six. The t-statistic values were -3.390124 and 1.886638. The p-value was found to be 0.0010 and 0.0619. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and price impact was negative and it shows that in Kenya firms which are (big size and are high market value) are likely to have negative correlation with market price impact. These findings support those of who found that price impact had a significant effect on excess returns.

4.13.7 Fama-French three factor and resiliency

The value of adjusted R-squared was found to be 0.490740 shows that the independent variables in this portfolio are able to explain about of 49.1% the variation in returns. The

value of F-statistic of 17.10644 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic is 1.997950 also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 65: Fama-French three factor and resiliency

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNSIX(-1)	0.160466	0.074274	2.160469	0.0329
MARKETRET	0.777450	0.112404	6.916545	0.0000
HML	0.270941	0.108893	2.488143	0.0143
HML(-1)	-0.099383	0.109047	-0.911371	0.3641
HML(-2)	-0.240617	0.103094	-2.333951	0.0214
SMB	-0.310941	0.119125	-2.610220	0.0103
RESILIENTSIX	-0.348100	0.292487	-1.190138	0.2366
C	-2.055037	1.026090	-2.002785	0.0477
R-squared	0.521208	Mean dependent var		-9.029396
Adjusted R-squared	0.490740	S.D. dependent var		8.454170
S.E. of regression	6.033104	Akaike info criterion		6.497789
Sum squared resid	4003.818	Schwarz criterion		6.685632
Log likelihood	-375.3696	Hannan-Quinn criter.		6.574059
F-statistic	17.10644	Durbin-Watson stat		1.997950
Prob(F-statistic)	0.000000			

4.13.8 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.65 the coefficient of market premium was found to be 0.777450. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.777450 percent. The positive effect shows that there is a positive relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.916545. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and the return on

the market portfolio was very significant. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market. Xu, and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

The regression results in table 4.65 the coefficient of Value Premium (HML) was found to be hml 0.270941, hml (-1) -0.099383 and hml (-2) -0.240617. These values shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.270941, -0.099383 and -0.240617 percent. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The coefficient was statistically significant. The t-statistic values were 2.488143, -0.911371 and -2.333951. The p-value were found to be 0.0143, 0.3641 and 0.0214. The

interpretation was that the relation between the excess return of firms in the (big size and high market value portfolio) and hml was positive and it shows that in Kenya firms which are (big size and high market value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.65 the coefficient of Size Premium (SMB) was found to be -0.310941. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.310941 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically significant. The t-statistic values is -2.610220. The p-value was found to be 0.0103. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are big size and high market value are likely to have a negative correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.13.9 Market Resiliency and Excess Return

From the regression results in table 4.65 the coefficient of market resiliency was found to be -0.348100. This value shows that holding other variables in the model constant, an increase in resiliency by one percent causes the excess return of the portfolio to increase by - 0.348100 percent. The negative effect shows that there is a negative relationship between the proxy for liquidity (resiliency) and excess returns of the firms in portfolio six.

The coefficient was statistically insignificant for portfolio six with a t-statistic value of -1.190138. The p-value was found to be 0.2366. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and resiliency was negative and it shows that in Kenya, the returns of firms which are big size and high value are likely to have negative correlation with market resiliency. These findings supports those of who found that resiliency had an effect on excess returns.

4.13.10 Fama-French three factor and spread

The value of adjusted R-squared was found to be 0.490834 shows that the independent variables in this portfolio are able to explain about of 49.0834% the variation in returns. The value of F-statistic of 15.09844 was also found to be statistically significant. The value of the Durbin Watson of Durbin-Watson statistic is 1.975346 also close to the critical value of 2 which indicate the absence of autocorrelation in the error terms.

Table 4. 66: Fama-French three factor and spread

Variable	Coefficient	Std. Error	t-Statistic	Probability
RETURNSIX(-1)	0.158618	0.076785	2.065739	0.0412
RETURNSIX(-2)	0.107792	0.080638	1.336744	0.1841
MARKETRET	0.788815	0.115641	6.821260	0.0000
HML	0.287189	0.109917	2.612783	0.0102
HML(-1)	-0.084929	0.111101	-0.764435	0.4463
HML(-2)	-0.313972	0.111633	-2.812530	0.0058
SMB	-0.309002	0.119080	-2.594900	0.0108
SPREADSIX	-0.326394	0.278811	-1.170663	0.2443
C	-0.631967	1.498708	-0.421675	0.6741

R-squared	0.525649	Mean dependent var	-9.029396
Adjusted R-squared	0.490834	S.D. dependent var	8.454170
S.E. of regression	6.032547	Akaike info criterion	6.505421
Sum squared resid	3966.687	Schwarz criterion	6.716745
Log likelihood	-374.8199	Hannan-Quinn criter.	6.591225
F-statistic	15.09844	Durbin-Watson stat	1.975346
Prob(F-statistic)	0.000000		

4.13.11 Three Factor Asset Pricing Model on Excess Return

From the regression results in table 4.66 the coefficient of market premium was found to be 0.788815. This value shows that holding other variables in the model constant, an increase in the market premium by one percent causes the excess return on the portfolio to increase by 0.788815 percent. The positive effect shows that there is a direct relationship between the market premium and excess returns.

The coefficient was statistically significant with a t-statistic value of 6.821260. The p-value was found to be 0.0000. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and the return on the market portfolio was very close to value of one. These findings support those of who found that market premium had a significant effect on excess returns. These findings support those of Trimech *et al.* (2009), who's effort while investigating the market-factor effect in Tunisia, revealed that all estimated market coefficients were statistically significant at the 1 per cent level. Hence, they stated that the market risk is a key variable in capturing the cross-section of excess stock returns regardless of the assets forming the portfolios. Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that the effect of market premium was positive and close to the pre-expected value of one. De Pena, Forner, and López-Espinosa, (2010) while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that market premium had a positive relationship with all portfolios in the market.

Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the market premium had positive and a statistically significant effect on the stocks return. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the market premium had a positive effect on the return of stocks. In

essence the results in this paper support the traditional view that the market premium is key pricing of assets in Kenya context as well as globally.

From the regression results in table 4.66 the coefficient of Value Premium (HML) was found to be HML 0.287189, HML (-1) -0.084929 and HML (-2) -0.313972. This value shows that holding other variables in the model constant, an increase in the value premium by one percent causes the excess return on the portfolio to increase by 0.287189 decrease by -0.084929 and decrease by -0.313972 percent. The positive effect shows that there is an inverse relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six.

The first coefficient was statistically significant. The t-statistic values of 2.612783, -0.764435 and -2.812530. The p-value was found to be 0.0102, 0.4463 and 0.0058. The interpretation was that the relation between the excess return of firms in the (big size and high market value portfolio) and hml was negative and it shows that in Kenya firms which are (big size and high market value) are likely to get higher returns as a result of HML premium. These findings supports those of Estrada (2011), who employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that value premium had a positive effect on stock returns. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that value premium had a positive relationship with some portfolios and a negative value with some other portfolios in the market. They contradict those of Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the value premium had positive and negative effect on some of the portfolios and that the effect was a statistically significant. Vakilifard, and Heirany, (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the value premium had a negative effect on the return of stocks.

From the regression results in table 4.66 the coefficient of Size Premium (SMB) was found to be -0.309002. This value shows that holding other variables in the model constant, an increase in the size premium by one percent causes the excess return of the portfolio to decrease by -0.309002 percent. The negative effect shows that there is an inverse relationship between the proxy for size and excess returns of the firms in the portfolio six.

The coefficient was statistically significant with a t-statistic value of -2.594900. The p-value was found to be 0.0108. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and SMB was negative and it shows that in Kenya the returns of firms which are (big size and high market value) are likely to have a positive correlation with the premium for size.

These findings contradict those of Trimech *et al.* (2009) in Tunisia, who note that the size factor represented by SMB, could have significant positive relationships with the stocks returns. Trimech *et al.* (2009) noted the estimated size effect was more pronounced for small portfolios than for big ones. Adami *et al.* (2014) in UK, also found similar results by revealing that the SMB coefficients were all positive indicating that in a given month the small capitalization stocks outperformed the large cap stocks. The size co-efficient values of all the deciles were found to be similar. De Pena, Forner, and López-Espinosa (2010), while evaluating the relevance of the Fama-French model in Spanish capital market and employing regression analysis found that size premium had a positive relationship with small size portfolios and a negative value with big size portfolios in the market. Xu and Zhang (2014), while investigating the relevance of the three factor model in pricing of assets in China found that the size premium had positive and negative effect on some of the portfolios and that the effect was statistically significant. Vakilifard and Heirany (2013), employed linear regression in Iran in an attempt to assess the role of Fama-French in assets pricing in Iran found that the size premium had a positive effect on the return of stocks. These results support those of

Estrada (2011), employing regression analysis in the analysis in USA from the year 1977 to 2009 on excess found that size premium had a negative effect on stock returns.

4.13.12 Bid Ask Spread and Excess Return

From the regression results in table 4.66 the coefficient of spread was found to be-0.326394. This value shows that holding other variables in the model constant, an increase in spread by one unit causes the excess return of the portfolio to increase by -0.326394 units. The negative effect shows that there is an inverse relationship between the proxy for liquidity (spread) and excess returns of the firms in portfolio six.

The coefficient was statistically insignificant for portfolio five. The t-statistic value was -1.170663. The p-value was found to be 0.2443. The interpretation was that the variation between the excess return of firms in the (big size and high market value portfolio) and spread was negative and it shows that in Kenya firms which are (big size and high market value) are likely to have negative correlation with market spread. These findings contradict those by other researchers. Amihud and Mendelson (1986) in USA (New York Stock Exchange from 1961 to 1980), and Jun, Marathe, and Shawky (2003) (27 emerging markets from 1992 to 1999) show that there is a positive relationship between bid-ask spread and returns. Other studies show a negative relationship between stock returns and liquidity. These include Datar, Narayan, and Radcliffe (1998) (for NYSE from 1962 to 1991) and Dey (2005) (48 stock exchanges between 1995 and 2001). Thus the findings of this research are in line with the existing literature on the possible effect of spread on assets pricing.

4.13.13 Summary of Findings Big Size and High Value firms

Portfolio six is formed from Big Size with high Value companies. There is a positive effect between the market premium and excess return in big size and Medium value firms. The value premium (HML) had a positive and significant effect on excess return

meaning an increase in the value premium leads to an increase in excess return on the small size with low value companies in Kenya, which shows a direct relationship between the proxy for financial distress HML and excess returns of the firms in the portfolio six. The coefficient of Size Premium (SMB) was found to be negative and statistically significant across all the tables meaning that an increase in the size premium for big size with high value companies in Kenya causes an increase in the excess return. Trading trading volume had a positive coefficient that was statistically significant when put together with other liquidity measure but it is positive and significant when used by the Fama French factors only. Price impact has a negative and statistically significant relation with excess return. Market resiliency has a negative and statistically insignificant relation with excess return. Bid ask spread had a negative but statistically significant effect when regressed with other liquidity factors put with the Fama French factors only it has a negative effect that is statistically insignificant.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study sought to examine the effect of market liquidity and three factor asset pricing model on excess returns in Nairobi Securities Exchange (NSE). The chapter provides a summary of the major findings of this study arrived at after testing the various hypotheses presented in chapter 1. Based on this findings the chapter also provides conclusion, recommendations and suggests areas for further research.

5.2 Summary of findings

The study revealed the effect of stock market liquidity on asset pricing at Nairobi securities exchange in Kenya using the extension of Fama-French three factor model. The findings were arrived at after multidimensional analysis of data. The data was first subjected to descriptive statistics analysis test which is essential for convergence of the parameters to their true values. Some of the variables were however found not to be normally distributed. This called for special treatment of the data that would take care of dispersion from normality such as introduction of the lags in the estimation process. The variables were then subjected to unit root test analysis to assess the stationarity of the variables. The study found that all the variables were stationary at level as presented by the group unit roots tests tables in chapter four.

Pair-wise correlation was used to test for multicollinearity among the independent variables. The study found that two of the variables were highly correlated. These variables were namely immediacy and resiliency in each of the six portfolios. A decision was made to drop the immediacy variable from the model to ensure that the parameters of each of the explanatory variables could be identified uniquely. The study further

conducted granger causality to test the direction of causality. The researcher found that some of the variables granger caused each other. To avoid any inconsistency and bias in the result, the study employed the Autoregressive Distributed Lag Model, as the model estimation method which is capable of combining both stationary and non-stationary time-series data by selecting the optimal lag structure of the dependent and the independent variables in order to achieve optimal convergence. The method is also preferred since it give optimal results even when all the variables are integrated of order one *d* (1), order zero *d* (0) or when the researcher encounters a mixture of both. In other word there is a bound to the parameters estimated.

The key objective of the study was to identify the causal and effect of market liquidity and three factor model in the determination of excess returns in the market in various portfolios. This was achieved through running regression of excess returns on the smb, hml, market premium, spread, price impact, resiliency and trading volume. The objectives were to find out whether these variables have any causal relationship.

5.2.1 The Effect of Three Factor Asset Pricing model on Excess Return in the Nairobi Securities Exchange in Kenya

The first objective was to establish the effect of market premium on excess return of the listed firms in Nairobi Securities Exchange. The study found that market premium has a positive effect on excess return of portfolios. The market premium seems to strongly explain the excess return implying that the market risk is a major determinant in capturing of excess return regardless of the assets forming the portfolios. All the coefficients were statistically significant for all the six portfolios.

The study was to establish the effect of value premium (HML) on excess return of the listed firms in Nairobi Securities Exchange. The study found that value premium has a positive effect on excess return of portfolios. The value premium seems to strongly

explain the excess return implying that the value premium is a major determinant in capturing of excess return regardless of the assets forming the portfolios. The coefficients were statistically significant for all the six portfolios.

The study was to establish the effect of size premium (SMB) on excess return of the listed firms in Nairobi Securities Exchange. The study found that SMB has a positive effect on excess return of portfolios. The SMB seems to strongly explain the excess return implying that the size is a major determinant in capturing of excess return regardless of the assets forming the portfolios. The coefficients were statistically significant for all the six portfolios.

5.2.2 The Effect of Trading Volume on Excess Return in the Nairobi Securities Exchange in Kenya

The second objective was to establish the effect of trading volume on excess return of the listed firms in Nairobi Securities Exchange. The study found that volume has a positive effect on excess return of all the portfolios. The effect of trading volume is statistically significant for portfolio 1 and portfolio 2 but it is statistically insignificant for all the other portfolios. The results implies that an increase in volume affects all portfolios in small and big companies but it is more significant for small companies.

5.2.3 The Effect of Market Price Impact on Excess Return in the Nairobi Securities Exchange in Kenya

The third objective was to establish the effect of price impact on excess return of the listed firms in Nairobi Securities Exchange. Price impact was measured using Amihud (2002) ratio. The study found that price impact has a negative effect on excess return of portfolios except portfolio 2 which has a positive effect. The portfolios had mixed

significance levels with portfolio 1 and portfolio 6 being statistically significant and the rest being statistically insignificant.

5.2.4 The Effect of Market resiliency on Excess Return in the Nairobi Securities Exchange in Kenya

The fourth objective was to establish the effect of market resiliency on excess return of the listed firms in Nairobi Securities Exchange. The study found that market resiliency has a mixed effect on excess return of portfolios. Portfolio 1, 3, 5 and 6 had a negative effect on excess return that were statistically insignificant while portfolios 2 and 4 showed positive effect on excess return. Only portfolio four had a statistically significant effect.

5.2.5 The Effect of Three Factor Model Variables on Excess Return in the Nairobi Securities Exchange in Kenya

The fifth objective was to establish the effect of **three factor model variables** on excess return of the listed firms in Nairobi Securities Exchange. The three factors considered under Fama French Three Factor Models are Market Premium, High Minus Low (HML), and Small Minus Big (SMB).

5.2.5 The effect of Bid –Ask Spread on excess return in the Nairobi Securities Exchange in Kenya

The fifth objective was to establish whether the Bid –Ask Spread affects excess return of the listed firms in Nairobi Securities Exchange. The finding revealed that Bid –Ask Spread has a mixed result from different portfolio. Portfolio 1 to portfolio three which represent all the small companies had a negative but statistically insignificant effect on excess return, while Portfolio 4 to portfolio 6 which represent all the big companies have a positive statistically significant effect on excess return implying that a reduction of the

bid ask spread will reduce excess return for small companies and an increase in excess return for big companies.

5.3 Conclusions

The study concluded that in Kenya market premium, hml (proxy for value), smb (proxy for size), price impact, ltunover, spread, resiliency variables have effect on stock market performance. The study concludes that the four variables that is price impact, trading volume bid ask spread and resiliency as measurers of liquidity have significant effect on excess returns across the market. Their effect was distributed across the market.

The study found that the returns in each portfolio were affected slightly differently by the same explanatory variables. However that study revealed that the traditional Fama-French variables that is market premium, smb (proxy for size), and hml (proxy for value) were significant in all the portfolios.

The research thus concludes that market liquidity at Nairobi securities exchange is a key determinant of the excess return. Market liquidity should thus be of key interest to all market players.

5.4 Recommendations

The results of the study showed that liquidity variables have a role to play in explaining the on stock pricing. Based on the objectives of the study, the following recommendations were reached

5.4.1 Bid –Ask Spread

From the finding, it is recommended that Government should strive to reduce cost of transaction in the NSE. This can be done by ensuring there is increased efficiency in the financial market by improving the automation to reduce information asymmetry and

reduction of taxes on the transactions carried out in Nairobi Securities Exchange. This will in turn reduce cost of operation of the dealers and increase their profits. The dealers will in turn transfer some of the benefits by decreasing their Bid Ask spread and thus improve liquidity. Reduction of taxes and other transaction cost such as licensing fee will also increase competition and therefore improve liquidity in the market.

5.4.2 Trading Volume

The study also recommends that NSE should explore ways of increasing the volumes of trade and trading volume in the market. NSE should find incentives to increase the number of traded shares. These can be achieved by carrying investor education on the importance and benefits of a stock market in a country and to the investors. The investor education should be done so as to reach as many people as possible. In addition brokerage services should be decentralized to enable the investment companies to reach as many people as possible. The government should also reduce taxes to the foreign investors to encourage them to invest more in the NSE. The government should also encourage cross listing of the shares in different stock exchanges such as Tanzania Stock Exchange, or Uganda Stock Exchange. This will capture more investors from diverse areas in East Africa that will be good for increasing the number of investors and the amount of trade they do.

5.4.3 Price Impact

A Deep market is essential for raising of long term capital that is essential for economic growth. The study also recommends that NSE should explore ways of increasing the price impact in NSE. The incentives should include reducing the minimum requirements for firms to list in the NSE so as to encourage more firms to list, reduction of taxes to companies that are listed in Nairobi Securities Exchange, and providing grants to encourage more companies to set up. This will attract more companies to come and invest and this will improve liquidity.

5.4.4 Market Resiliency

The government should also come up policies that ensures that the market is resilient to changes in the prices of the securities. Shocks that destabilize the market such as unethical practices by the corporate executives should be severely punished to reduce their impact in the market. The study also recommend that the CMA (capital market authority) to be keen on malpractices that may cause liquidity in the market. The CMA should ensure that the trading activities are disclosed to the market players to ensure that investors make informed decisions when investing.

5.4.5 Three Factor Asset Pricing Model

The study found that the three Fama French factors such as market Premium, value premium, and the size effect are very important in determining excess returns. The recommendation is to the portfolio managers should increase portfolio returns by carefully evaluating portfolio performance while taking into account the market Premium, value premium, and the size effects.

5.5 Area for Further Research

This study helped to analyses the effect of market liquidity and Fama French three factor asset pricing variables on excess return. The study did not consider all the asset pricing models in its analysis and therefore the suggestion that in future a study can be done to test market liquidity on the other asset pricing models such as CAPM, APT, CAHART and FAMA FRENCH FIVE FACTOR model.

This study also was not able to look at the macroeconomic variables that also affect excess return in Kenya. It is therefore in this light that the future researchers are encouraged to consider other macroeconomic variables which would improve the prediction power of the model. The other macroeconomic variables apart from liquidity would be, inflation, exchange rate, economic growth and foreign direct investments.

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APPENDICES

Appendix 1: Listed Companies

INVESTMENT SERVICES
Nairobi Securities Exchange

MANUFACTURING AND ALLIED
B.O.C Kenya
British American Tobacco Kenya
Carbacid Investments
East African Breweries
Mumias Sugar Co.
Unga Group
Eveready East Africa
Kenya Orchards
A.Baumann
Flame Tree Group Holdings

TELECOMMUNICATION AND TECHNOLOGY
Safaricom Ltd

AGRICULTURAL
Eaagads Ltd
Kapchorua Tea
Kakuzi
Limuru Tea Co.
Rea Vipingo Plantations
Sasini
Williamson Tea Kenya

AUTOMOBILES AND ACCESSORIES
Car and General (K)
Sameer Africa
Marshalls (E.A.)

BANKING
Barclays Bank
CFC Stanbic Holdings
IandM Holdings

Diamond Trust Bank Kenya
Housing Finance Co
Kenya Commercial Bank
National Bank of Kenya
NIC Bank
Standard Chartered Bank
Equity Bank
The Co-operative Bank of Kenya

COMMERCIAL AND SERVICES

Express
Kenya Airways
Nation Media Group
Standard Group
TPS Eastern Africa (Serena)
Scangroup Ltd
Uchumi Supermarket
Hutchings Biemer
Longhorn Kenya
Atlas Development and Support Services

CONSTRUCTION AND ALLIED

Athi River Mining
Bamburi Cement
Crown Berger
E.A.Cables
E.A.Portland Cement

ENERGY AND PETROLEUM

KenolKobil
Total Kenya
KenGen
Kenya Power and Lighting Co

INSURANCE

Jubilee Holdings
Pan Africa Insurance Holdings
Kenya Re-Insurance Corporation
Liberty Kenya Holdings
British-American Investments Company (Kenya)
CIC Insurance Group

INVESTMENT

Olympia Capital Holdings
Centum Investment
Trans-Century

Appendix II: Data Collection Schedule

	Independent variables								Dependent variable
Date:Monthly	turnover	immediacy	sml	hml	T. Volume	Price Impact	Market return	resiliency	Portfolio returns
Jan-06									
Feb-06									
Mar-06									
Apr-06									
May-06									
Jun-06									
Jul-06									
Aug-06									
Sep-06									
Oct-06									
Nov-06									
Dec-06									
Jan-07									
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Feb-15									
Mar-15									
Apr-15									
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Jul-15									
Aug-15									
Sep-15									
Oct-15									
Nov-15									
Dec-15									

Appendix III: Granger Causality Test
Granger causality portfolio one

Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
MARKETRET does not Granger Cause RETURNONE	117	0.62166	0.6025
RETURNONE does not Granger Cause MARKETRET		0.52209	0.6680
HML does not Granger Cause RETURNONE	117	0.08775	0.9666
RETURNONE does not Granger Cause HML		1.95873	0.1244
SMB does not Granger Cause RETURNONE	117	0.85692	0.4658
RETURNONE does not Granger Cause SMB		1.20157	0.3127
VOLUMEONE does not Granger Cause RETURNONE	117	0.47089	0.7032
RETURNONE does not Granger Cause VOLUMEONE		1.21317	0.3084
PRICE IMPACTONE does not Granger Cause RETURNONE	117	2.35412	0.0760
RETURNONE does not Granger Cause PRICE IMPACTONE		0.77450	0.5107
SPREADONE does not Granger Cause RETURNONE	117	0.98636	0.4020
RETURNONE does not Granger Cause SPREADONE		1.28943	0.2817
RESILIENTONE does not Granger Cause RETURNONE	117	0.44903	0.7185
RETURNONE does not Granger Cause RESILIENTONE		0.58182	0.6282
HML does not Granger Cause MARKETRET	117	0.64332	0.5888
MARKETRET does not Granger Cause HML		2.80605	0.0430
SMB does not Granger Cause MARKETRET	117	0.78685	0.5037
MARKETRET does not Granger Cause SMB		0.71930	0.5425
VOLUMEONE does not Granger Cause MARKETRET	117	2.06341	0.1092
MARKETRET does not Granger Cause VOLUMEONE		0.73319	0.5344
PRICE IMPACTONE does not Granger Cause MARKETRET	117	0.73799	0.5316
MARKETRET does not Granger Cause PRICE IMPACTONE		0.56756	0.6375
SPREADONE does not Granger Cause MARKETRET	117	0.47081	0.7032
MARKETRET does not Granger Cause SPREADONE		0.14933	0.9299
RESILIENTONE does not Granger Cause MARKETRET	117	0.18933	0.9035
MARKETRET does not Granger Cause RESILIENTONE		0.18448	0.9068
SMB does not Granger Cause HML	117	0.47764	0.6985
HML does not Granger Cause SMB		1.54253	0.2076
VOLUMEONE does not Granger Cause HML	117	2.28065	0.0833

HML does not Granger Cause VOLUMEONE		1.89011	0.1354

PRICE IMPACTONE does not Granger Cause HML	117	0.05956	0.9809
HML does not Granger Cause PRICE IMPACTONE		0.32558	0.8069
SPREADONE does not Granger Cause HML	117	0.49865	0.6840
HML does not Granger Cause SPREADONE		0.16759	0.9180
RESILIENTONE does not Granger Cause HML	117	0.50327	0.6808
HML does not Granger Cause RESILIENTONE		0.83299	0.4785
VOLUMEONE does not Granger Cause SMB	117	1.77320	0.1565
SMB does not Granger Cause VOLUMEONE		0.92191	0.4328

PRICE IMPACTONE does not Granger Cause SMB	117	1.13764	0.3372
SMB does not Granger Cause PRICE IMPACTONE		0.93890	0.4245
SPREADONE does not Granger Cause SMB	117	2.00906	0.1169
SMB does not Granger Cause SPREADONE		1.55056	0.2056
RESILIENTONE does not Granger Cause SMB	117	0.18256	0.9080
SMB does not Granger Cause RESILIENTONE		0.59036	0.6226
PRICE IMPACTONE does not Granger Cause VOLUMEONE	117	0.72945	0.5366
VOLUMEONE does not Granger Cause PRICE IMPACTONE		0.75234	0.5233
SPREADONE does not Granger Cause VOLUMEONE	117	1.22426	0.3044
VOLUMEONE does not Granger Cause SPREADONE		1.81467	0.1487
RESILIENTONE does not Granger Cause VOLUMEONE	117	0.72416	0.5397
VOLUMEONE does not Granger Cause RESILIENTONE		0.36254	0.7802
SPREADONE does not Granger Cause PRICE IMPACTONE	117	0.30872	0.8190
PRICE IMPACTONE does not Granger Cause SPREADONE		0.18732	0.9048
RESILIENTONE does not Granger Cause PRICE IMPACTONE	117	0.32618	0.8064
PRICE IMPACTONE does not Granger Cause RESILIENTONE		0.04322	0.9880
RESILIENTONE does not Granger Cause SPREADONE	117	1.79994	0.1514
SPREADONE does not Granger Cause RESILIENTONE		1.03495	0.3801

Granger causality portfolio Two

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.

MARKETRET does not Granger Cause RETURNTWO	116	0.84059	0.5024
RETURNTWO does not Granger Cause MARKETRET		1.75314	0.1437
HML does not Granger Cause RETURNTWO	116	0.74849	0.5611
RETURNTWO does not Granger Cause HML		0.53733	0.7086
SMB does not Granger Cause RETURNTWO	116	1.68304	0.1592
RETURNTWO does not Granger Cause SMB		1.21845	0.3073
PRICE IMPACTTWO does not Granger Cause RETURNTWO	116	0.47645	0.7529
RETURNTWO does not Granger Cause PRICE IMPACTTWO		0.99385	0.4143
VOLUMETWO does not Granger Cause RETURNTWO	116	0.45101	0.7715
RETURNTWO does not Granger Cause VOLUMETWO		1.75995	0.1423
RESILIENTTWO does not Granger Cause RETURNTWO	116	0.65430	0.6251
RETURNTWO does not Granger Cause RESILIENTTWO		1.88490	0.1184
SPREADTWO does not Granger Cause RETURNTWO	116	0.35379	0.8409
RETURNTWO does not Granger Cause SPREADTWO		0.73694	0.5688
HML does not Granger Cause MARKETRET	116	0.39143	0.8144
MARKETRET does not Granger Cause HML		2.16737	0.0776
SMB does not Granger Cause MARKETRET	116	1.09410	0.3633
MARKETRET does not Granger Cause SMB		0.77633	0.5430
PRICE IMPACTTWO does not Granger Cause MARKETRET	116	0.51218	0.7269
MARKETRET does not Granger Cause PRICE IMPACTTWO		1.18390	0.3221
VOLUMETWO does not Granger Cause MARKETRET	116	0.50646	0.7311
MARKETRET does not Granger Cause VOLUMETWO		2.50811	0.0462
RESILIENTTWO does not Granger Cause MARKETRET	116	0.08293	0.9875
MARKETRET does not Granger Cause RESILIENTTWO		0.19052	0.9429
SPREADTWO does not Granger Cause MARKETRET	116	1.67470	0.1612
MARKETRET does not Granger Cause SPREADTWO		0.49508	0.7394
SMB does not Granger Cause HML	116	0.22234	0.9254
HML does not Granger Cause SMB		1.15753	0.3338
PRICE IMPACTTWO does not Granger Cause HML	116	2.77147	0.0308
HML does not Granger Cause PRICE IMPACTTWO		1.03128	0.3946
VOLUMETWO does not Granger Cause HML	116	0.84079	0.5023
HML does not Granger Cause VOLUMETWO		1.36277	0.2518
RESILIENTTWO does not Granger Cause HML	116	0.67349	0.6118
HML does not Granger Cause RESILIENTTWO		0.62743	0.6440

SPREADTWO does not Granger Cause HML	116	0.21757	0.9281
HML does not Granger Cause SPREADTWO		2.53582	0.0443
PRICE IMPACTTWO does not Granger Cause SMB	116	0.84284	0.5010
SMB does not Granger Cause PRICE IMPACTTWO		1.76766	0.1407
VOLUMETWO does not Granger Cause SMB	116	0.65972	0.6213
SMB does not Granger Cause VOLUMETWO		0.98285	0.4202
RESILIENTTWO does not Granger Cause SMB	116	0.32378	0.8615
SMB does not Granger Cause RESILIENTTWO		1.13237	0.3452
SPREADTWO does not Granger Cause SMB	116	0.46147	0.7638
SMB does not Granger Cause SPREADTWO		0.15914	0.9585
VOLUMETWO does not Granger Cause PRICE IMPACTTWO	116	2.57607	0.0416
PRICE IMPACTTWO does not Granger Cause VOLUMETWO		0.93071	0.4491
RESILIENTTWO does not Granger Cause PRICE IMPACTTWO	116	1.59023	0.1822
PRICE IMPACTTWO does not Granger Cause RESILIENTTWO		0.87551	0.4812
SPREADTWO does not Granger Cause PRICE IMPACTTWO	116	0.59082	0.6700
PRICE IMPACTTWO does not Granger Cause SPREADTWO		0.19222	0.9420
RESILIENTTWO does not Granger Cause VOLUMETWO	116	1.49814	0.2079
VOLUMETWO does not Granger Cause RESILIENTTWO		0.78415	0.5379
SPREADTWO does not Granger Cause VOLUMETWO	116	0.55875	0.6931
VOLUMETWO does not Granger Cause SPREADTWO		1.09942	0.3607
SPREADTWO does not Granger Cause RESILIENTTWO	116	0.47996	0.7504
RESILIENTTWO does not Granger Cause SPREADTWO		0.23305	0.9192

Granger causality portfolio Three

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
MARKETRET does not Granger Cause RETURNTHREE	116	0.14250	0.9659
RETURNTHREE does not Granger Cause MARKETRET		1.04741	0.3864
HML does not Granger Cause RETURNTHREE	116	0.67318	0.6120
RETURNTHREE does not Granger Cause HML		1.01240	0.4044
SMB does not Granger Cause RETURNTHREE	116	1.29970	0.2749
RETURNTHREE does not Granger Cause SMB		0.34358	0.8480
PRICE IMPACTTHREE does not Granger Cause RETURNTHREE	116	0.16358	0.9564

RETURNTHREE does not Granger Cause PRICE IMPACTTHREE		0.56585	0.6879
VOLUMETHREE does not Granger Cause RETURNTHREE	116	1.26906	0.2867
RETURNTHREE does not Granger Cause VOLUMETHREE		2.67705	0.0357
SPREADTHREE does not Granger Cause RETURNTHREE	116	0.56526	0.6884
RETURNTHREE does not Granger Cause SPREADTHREE		1.17393	0.3265
RESILIENTTHREE does not Granger Cause RETURNTHREE	116	1.34080	0.2596
RETURNTHREE does not Granger Cause RESILIENTTHREE		1.37817	0.2464
HML does not Granger Cause MARKETRET	116	0.39143	0.8144
MARKETRET does not Granger Cause HML		2.16737	0.0776
SMB does not Granger Cause MARKETRET	116	1.09410	0.3633
MARKETRET does not Granger Cause SMB		0.77633	0.5430
PRICE IMPACTTHREE does not Granger Cause MARKETRET	116	0.13712	0.9682
MARKETRET does not Granger Cause PRICE IMPACTTHREE		0.47963	0.7506
VOLUMETHREE does not Granger Cause MARKETRET	116	0.42866	0.7877
MARKETRET does not Granger Cause VOLUMETHREE		1.55802	0.1908
SPREADTHREE does not Granger Cause MARKETRET	116	0.47624	0.7531
MARKETRET does not Granger Cause SPREADTHREE		0.99413	0.4141
RESILIENTTHREE does not Granger Cause MARKETRET	116	0.48460	0.7470
MARKETRET does not Granger Cause RESILIENTTHREE		1.10779	0.3568
SMB does not Granger Cause HML	116	0.22234	0.9254
HML does not Granger Cause SMB		1.15753	0.3338
PRICE IMPACTTHREE does not Granger Cause HML	116	1.59442	0.1811
HML does not Granger Cause PRICE IMPACTTHREE		0.52412	0.7182
VOLUMETHREE does not Granger Cause HML	116	2.02030	0.0967
HML does not Granger Cause VOLUMETHREE		0.78222	0.5392
SPREADTHREE does not Granger Cause HML	116	0.47121	0.7568
HML does not Granger Cause SPREADTHREE		0.98218	0.4205
RESILIENTTHREE does not Granger Cause HML	116	0.88652	0.4747
HML does not Granger Cause RESILIENTTHREE		0.79575	0.5305
PRICE IMPACTTHREE does not Granger Cause SMB	116	1.18220	0.3228
SMB does not Granger Cause PRICE IMPACTTHREE		0.01984	0.9992
VOLUMETHREE does not Granger Cause SMB	116	1.52242	0.2008
SMB does not Granger Cause VOLUMETHREE		1.37738	0.2467

SPREADTHREE does not Granger Cause SMB	116	0.84239	0.5013
SMB does not Granger Cause SPREADTHREE		0.49340	0.7406
RESILIENTTHREE does not Granger Cause SMB	116	0.95795	0.4338
SMB does not Granger Cause RESILIENTTHREE		0.75845	0.5546
VOLUMETHREE does not Granger Cause PRICE IMPACTTHREE	116	2.19886	0.0740
PRICE IMPACTTHREE does not Granger Cause VOLUMETHREE		1.80275	0.1336
SPREADTHREE does not Granger Cause PRICE IMPACTTHREE	116	0.54454	0.7034
PRICE IMPACTTHREE does not Granger Cause SPREADTHREE		0.96338	0.4308
RESILIENTTHREE does not Granger Cause PRICE IMPACTTHREE	116	0.59782	0.6650
PRICE IMPACTTHREE does not Granger Cause RESILIENTTHREE		1.18953	0.3197
SPREADTHREE does not Granger Cause VOLUMETHREE	116	0.84819	0.4977
VOLUMETHREE does not Granger Cause SPREADTHREE		2.64282	0.0376
RESILIENTTHREE does not Granger Cause VOLUMETHREE	116	0.18811	0.9441
VOLUMETHREE does not Granger Cause RESILIENTTHREE		1.73220	0.1482
RESILIENTTHREE does not Granger Cause SPREADTHREE	116	0.56998	0.6850
SPREADTHREE does not Granger Cause RESILIENTTHREE		2.74282	0.0322

Granger Causality Portfolio Four

Lags: 12

Null Hypothesis:	Obs	F-Statistic	Prob.
MARKETRET does not Granger Cause RETURNFOUR	108	0.69356	0.7532
RETURNFOUR does not Granger Cause MARKETRET		1.01125	0.4464
HML does not Granger Cause RETURNFOUR	108	0.66248	0.7820
RETURNFOUR does not Granger Cause HML		0.67254	0.7728
SMB does not Granger Cause RETURNFOUR	108	1.06756	0.3978
RETURNFOUR does not Granger Cause SMB		0.71020	0.7374
PRICE IMPACTFOUR does not Granger Cause RETURNFOUR	108	1.30743	0.2301
RETURNFOUR does not Granger Cause PRICE IMPACTFOUR		0.68557	0.7607
RESILIENTFOUR does not Granger Cause RETURNFOUR	108	0.76562	0.6834
RETURNFOUR does not Granger Cause RESILIENTFOUR		0.61939	0.8201
SPREADFOUR does not Granger Cause RETURNFOUR	108	1.47705	0.1494
RETURNFOUR does not Granger Cause SPREADFOUR		1.11786	0.3572
VOLUMEFOUR does not Granger Cause RETURNFOUR	108	0.57154	0.8590
RETURNFOUR does not Granger Cause VOLUMEFOUR		0.73653	0.7120
HML does not Granger Cause MARKETRET	108	0.73016	0.7182

MARKETRET does not Granger Cause HML		1.34052	0.2120
SMB does not Granger Cause MARKETRET	108	1.00838	0.4489
MARKETRET does not Granger Cause SMB		0.81639	0.6330
PRICE IMPACTFOUR does not Granger Cause MARKETRET	108	0.70374	0.7436
MARKETRET does not Granger Cause PRICE IMPACTFOUR		1.14453	0.3368
RESILIENTFOUR does not Granger Cause MARKETRET	108	0.22908	0.9964
MARKETRET does not Granger Cause RESILIENTFOUR		0.76633	0.6827
SPREADFOUR does not Granger Cause MARKETRET	108	0.75843	0.6905
MARKETRET does not Granger Cause SPREADFOUR		0.44532	0.9398
VOLUMEFOUR does not Granger Cause MARKETRET	108	0.51331	0.9006
MARKETRET does not Granger Cause VOLUMEFOUR		1.84823	0.0534
SMB does not Granger Cause HML	108	0.39214	0.9629
HML does not Granger Cause SMB		0.70083	0.7463
PRICE IMPACTFOUR does not Granger Cause HML	108	0.57127	0.8592
HML does not Granger Cause PRICE IMPACTFOUR		0.74409	0.7046
RESILIENTFOUR does not Granger Cause HML	108	0.94728	0.5051
HML does not Granger Cause RESILIENTFOUR		1.94395	0.0404
SPREADFOUR does not Granger Cause HML	108	0.55914	0.8684
HML does not Granger Cause SPREADFOUR		0.68765	0.7588
VOLUMEFOUR does not Granger Cause HML	108	1.61293	0.1037
HML does not Granger Cause VOLUMEFOUR		1.02929	0.4305
PRICE IMPACTFOUR does not Granger Cause SMB	108	1.25120	0.2635
SMB does not Granger Cause PRICE IMPACTFOUR		1.46589	0.1539
RESILIENTFOUR does not Granger Cause SMB	108	1.55531	0.1213
SMB does not Granger Cause RESILIENTFOUR		0.41179	0.9551
SPREADFOUR does not Granger Cause SMB	108	0.33551	0.9803
SMB does not Granger Cause SPREADFOUR		1.08110	0.3866
VOLUMEFOUR does not Granger Cause SMB	108	0.95377	0.4990
SMB does not Granger Cause VOLUMEFOUR		1.12499	0.3517
RESILIENTFOUR does not Granger Cause PRICE IMPACTFOUR	108	1.21810	0.2848
PRICE IMPACTFOUR does not Granger Cause RESILIENTFOUR		0.58100	0.8516
SPREADFOUR does not Granger Cause PRICE IMPACTFOUR	108	1.15712	0.3275
PRICE IMPACTFOUR does not Granger Cause SPREADFOUR		2.52261	0.0070
VOLUMEFOUR does not Granger Cause PRICE IMPACTFOUR	108	0.58888	0.8453

PRICE IMPACTFOUR does not Granger Cause VOLUMEFOUR		1.11896	0.3564
SPREADFOUR does not Granger Cause RESILIENTFOUR	108	0.74328	0.7054
RESILIENTFOUR does not Granger Cause SPREADFOUR		1.07870	0.3886
VOLUMEFOUR does not Granger Cause RESILIENTFOUR	108	1.55175	0.1225
RESILIENTFOUR does not Granger Cause VOLUMEFOUR		0.89723	0.5531
VOLUMEFOUR does not Granger Cause SPREADFOUR	108	1.90397	0.0454
SPREADFOUR does not Granger Cause VOLUMEFOUR		0.69407	0.7527

Granger causality portolioFive

Lags: 12

Null Hypothesis:	Obs	F-Statistic	Prob.
MARKETRET does not Granger Cause RETURNFIVE	108	1.32865	0.2184
RETURNFIVE does not Granger Cause MARKETRET		0.83909	0.6104
HML does not Granger Cause RETURNFIVE	108	0.47915	0.9216
RETURNFIVE does not Granger Cause HML		0.81351	0.6359
SMB does not Granger Cause RETURNFIVE	108	1.01365	0.4442
RETURNFIVE does not Granger Cause SMB		1.09385	0.3762
PRICE IMPACTFIVE does not Granger Cause RETURNFIVE	108	0.74240	0.7063
RETURNFIVE does not Granger Cause PRICE IMPACTFIVE		1.75212	0.0703
LTUNOVERFIVE does not Granger Cause RETURNFIVE	108	0.87050	0.5793
RETURNFIVE does not Granger Cause LTUNOVERFIVE		1.76662	0.0675
RESILIENTFIVE does not Granger Cause RETURNFIVE	108	0.50035	0.9089
RETURNFIVE does not Granger Cause RESILIENTFIVE		1.38728	0.1885
SPREADFIVE does not Granger Cause RETURNFIVE	108	1.89722	0.0463
RETURNFIVE does not Granger Cause SPREADFIVE		0.38420	0.9657
HML does not Granger Cause MARKETRET	108	0.73016	0.7182
MARKETRET does not Granger Cause HML		1.34052	0.2120
SMB does not Granger Cause MARKETRET	108	1.00838	0.4489
MARKETRET does not Granger Cause SMB		0.81639	0.6330
PRICE IMPACTFIVE does not Granger Cause MARKETRET	108	0.61069	0.8274
MARKETRET does not Granger Cause PRICE IMPACTFIVE		1.27261	0.2503
LTUNOVERFIVE does not Granger Cause MARKETRET	108	1.10520	0.3672
MARKETRET does not Granger Cause LTUNOVERFIVE		0.77261	0.6765

RESILIENTFIVE does not Granger Cause MARKETRET	108	2.74874	0.0035
MARKETRET does not Granger Cause RESILIENTFIVE		2.07140	0.0277
SPREADFIVE does not Granger Cause MARKETRET	108	0.94679	0.5056
MARKETRET does not Granger Cause SPREADFIVE		0.74903	0.6998
SMB does not Granger Cause HML	108	0.39214	0.9629
HML does not Granger Cause SMB		0.70083	0.7463
PRICE IMPACTFIVE does not Granger Cause HML	108	0.65066	0.7927
HML does not Granger Cause PRICE IMPACTFIVE		0.52251	0.8945
LTUNOVERFIVE does not Granger Cause HML	108	1.40083	0.1821
HML does not Granger Cause LTUNOVERFIVE		0.83517	0.6143
RESILIENTFIVE does not Granger Cause HML	108	1.11157	0.3621
HML does not Granger Cause RESILIENTFIVE		0.62470	0.8155
SPREADFIVE does not Granger Cause HML	108	0.84971	0.5999
HML does not Granger Cause SPREADFIVE		0.60828	0.8294
PRICE IMPACTFIVE does not Granger Cause SMB	108	1.46980	0.1523
SMB does not Granger Cause PRICE IMPACTFIVE		0.65416	0.7896
LTUNOVERFIVE does not Granger Cause SMB	108	0.72927	0.7190
SMB does not Granger Cause LTUNOVERFIVE		0.34074	0.9790
RESILIENTFIVE does not Granger Cause SMB	108	1.54803	0.1237
SMB does not Granger Cause RESILIENTFIVE		0.89037	0.5598
SPREADFIVE does not Granger Cause SMB	108	0.54693	0.8774
SMB does not Granger Cause SPREADFIVE		1.71928	0.0771
LTUNOVERFIVE does not Granger Cause PRICE IMPACTFIVE	108	0.51004	0.9027
PRICE IMPACTFIVE does not Granger Cause LTUNOVERFIVE		0.87378	0.5761
RESILIENTFIVE does not Granger Cause PRICE IMPACTFIVE	108	1.38918	0.1876
PRICE IMPACTFIVE does not Granger Cause RESILIENTFIVE		1.83010	0.0562
SPREADFIVE does not Granger Cause PRICE IMPACTFIVE	108	0.45067	0.9371
PRICE IMPACTFIVE does not Granger Cause SPREADFIVE		0.91705	0.5339
RESILIENTFIVE does not Granger Cause LTUNOVERFIVE	108	2.38768	0.0106
LTUNOVERFIVE does not Granger Cause RESILIENTFIVE		0.68760	0.7588
SPREADFIVE does not Granger Cause LTUNOVERFIVE	108	1.64466	0.0950
LTUNOVERFIVE does not Granger Cause SPREADFIVE		1.51226	0.1362
SPREADFIVE does not Granger Cause RESILIENTFIVE	108	0.31954	0.9840
RESILIENTFIVE does not Granger Cause SPREADFIVE		0.82007	0.6294

Granger causality portfoliSix

Pairwise Granger Causality Tests
Date: 03/14/17 Time: 12:39
Sample: 2006M01 2015M12
Lags: 12

Null Hypothesis:	Obs	F-Statistic	Prob.
MARKETRET does not Granger Cause RETURNSIX	108	0.99092	0.4647
RETURNSIX does not Granger Cause MARKETRET		2.40245	0.0101
HML does not Granger Cause RETURNSIX	108	0.39331	0.9624
RETURNSIX does not Granger Cause HML		0.94382	0.5084
SMB does not Granger Cause RETURNSIX	108	0.88213	0.5679
RETURNSIX does not Granger Cause SMB		1.30724	0.2302
PRICE IMPACTSIX does not Granger Cause RETURNSIX	108	0.79007	0.6592
RETURNSIX does not Granger Cause PRICE IMPACTSIX		1.29401	0.2377
LTUNOVERSIX does not Granger Cause RETURNSIX	108	0.79600	0.6533
RETURNSIX does not Granger Cause LTUNOVERSIX		2.65831	0.0046
RESILIENTSIX does not Granger Cause RETURNSIX	108	1.12274	0.3534
RETURNSIX does not Granger Cause RESILIENTSIX		0.47753	0.9226
SPREADSIX does not Granger Cause RETURNSIX	108	1.13793	0.3418
RETURNSIX does not Granger Cause SPREADSIX		0.83681	0.6127
HML does not Granger Cause MARKETRET	108	0.73016	0.7182
MARKETRET does not Granger Cause HML		1.34052	0.2120
SMB does not Granger Cause MARKETRET	108	1.00838	0.4489
MARKETRET does not Granger Cause SMB		0.81639	0.6330
PRICE IMPACTSIX does not Granger Cause MARKETRET	108	0.92705	0.5243
MARKETRET does not Granger Cause PRICE IMPACTSIX		2.26342	0.0155
LTUNOVERSIX does not Granger Cause MARKETRET	108	0.97794	0.4765
MARKETRET does not Granger Cause LTUNOVERSIX		1.23601	0.2731
RESILIENTSIX does not Granger Cause MARKETRET	108	0.24290	0.9953
MARKETRET does not Granger Cause RESILIENTSIX		0.26880	0.9925
SPREADSIX does not Granger Cause MARKETRET	108	1.38855	0.1879
MARKETRET does not Granger Cause SPREADSIX		1.86019	0.0516
SMB does not Granger Cause HML	108	0.39214	0.9629
HML does not Granger Cause SMB		0.70083	0.7463

PRICE IMPACTSIX does not Granger Cause HML	108	1.33664	0.2141
HML does not Granger Cause PRICE IMPACTSIX		0.97166	0.4823
LTUNOVERSIX does not Granger Cause HML	108	1.84083	0.0545
HML does not Granger Cause LTUNOVERSIX		1.34233	0.2111
RESILIENTSIX does not Granger Cause HML	108	0.78061	0.6686
HML does not Granger Cause RESILIENTSIX		0.73101	0.7174
SPREADSIX does not Granger Cause HML	108	0.74205	0.7066
HML does not Granger Cause SPREADSIX		0.84098	0.6085
PRICE IMPACTSIX does not Granger Cause SMB	108	0.20580	0.9979
SMB does not Granger Cause PRICE IMPACTSIX		1.15587	0.3284
LTUNOVERSIX does not Granger Cause SMB	108	1.26232	0.2566
SMB does not Granger Cause LTUNOVERSIX		0.91759	0.5334
RESILIENTSIX does not Granger Cause SMB	108	0.80554	0.6438
SMB does not Granger Cause RESILIENTSIX		1.58192	0.1129
SPREADSIX does not Granger Cause SMB	108	1.56985	0.1166
SMB does not Granger Cause SPREADSIX		0.61903	0.8204
LTUNOVERSIX does not Granger Cause PRICE IMPACTSIX	108	1.38032	0.1919
PRICE IMPACTSIX does not Granger Cause LTUNOVERSIX		1.11194	0.3618
RESILIENTSIX does not Granger Cause PRICE IMPACTSIX	108	0.41526	0.9537
PRICE IMPACTSIX does not Granger Cause RESILIENTSIX		0.34522	0.9778
SPREADSIX does not Granger Cause PRICE IMPACTSIX	108	0.51778	0.8977
PRICE IMPACTSIX does not Granger Cause SPREADSIX		1.05558	0.4079
RESILIENTSIX does not Granger Cause LTUNOVERSIX	108	0.27652	0.9915
LTUNOVERSIX does not Granger Cause RESILIENTSIX		0.52440	0.8932
SPREADSIX does not Granger Cause LTUNOVERSIX	108	1.56678	0.1176
LTUNOVERSIX does not Granger Cause SPREADSIX		0.86650	0.5833
SPREADSIX does not Granger Cause RESILIENTSIX	108	0.88672	0.5634
RESILIENTSIX does not Granger Cause SPREADSIX		0.36390	0.9724