Impact of Volatility Premium on Stock Returns in Asian Emerging Markets

By

Mahwish Azeem MMS151011

SUPERVISOR
Dr. Ahmed Fraz

A research thesis submitted to the Department of Management Sciences,
Capital University of Science & Technology, Islamabad
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT SCIENCES

(FINANCE)

DEPARTMENT OF MANAGEMENT SCIENCES
CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY
ISLAMABAD

`ABSTRACT

The purpose of this study is to explore the relationship between stock returns and market volatility by using sample of eighty companies listed at Karachi Stock Exchange, National stock exchanges of India and Shanghai stock exchange each for the period 2002 to 2014. The companies are selected randomly. Time series regression based on OLS estimation technique is used to investigate the role of market state, volatility and business cycle in estimating the market returns portfolio. Market premium is significant and positive. Market volatility is also significantly influencing the return which shows more volatile stocks earn more returns.

Keywords: Market premium, Size premium, Value premium and Market volatility.

Table of Contents

CHAPTER 01

Introduction

In equity markets, one of the major debates is the set of common factors that explain the individual stock return. The three-factor model introduces by Fama and French in (1993) that includes the market, size and value factors is widely used in portfolio management. After that Jegadeesh and Titman (1993) introduces the momentum as the fourth factor. In portfolio risk new factor volatility has begun to be used. After the introduction of volatility anomaly it gains the importance.

Anomaly is the deviation from the market premium. Market anomalies are the market patterns that do seem to lead to abnormal returns. Volatility anomaly is used as a factor in describing portfolio risk. Volatility is the fluctuations in the stock prices and measured by the standard deviation of returns. When the stock market goes up and down and then up again, this up and down movement is called market volatility. Market volatility is a significant asset pricing factor as shown by Ang et al. (2006). Their model includes two factor market volatility and market return and it reduces the pricing errors as compared to Capital asset pricing model (CAPM) as well as Fama and French model.

Modern portfolio theory is the theory about how the risk averse investors can construct the portfolio such that give them maximum return on a given level of market risk. The concept of the modern finance is given by the Markowitz who starts the discussion about the risk and return

of portfolios. Markowitz (1952, 1959) major contributions are diversification, systematic risk and computation of total risk and return of the portfolio of risky assets. He argues that investors are the risk averse and they select the less risky portfolio as compared to risky one for a given level of return. He argues that investors avoid from hazard therefore select their portfolio giving priority to mean-variance theory. Mean variance theory derives the formula to calculate the variance of portfolio.

William sharp (1964) extends the discussion of Markowitz, which quantifies systematic risk using the portfolio of risky and risk-free assets and provides the foundation of Capital asset pricing model. Investors hold well diversified portfolios having systematic as well as unsystematic risk.

Systematic risk has the great importance because of its commonality in nature among all securities. Systematic risk is also known as undiversifiable or the market risk which is the risk common to all the securities whereas unsystematic risk is diversifiable or company specific risk which is the risk associated to individual assets. Investors prefer the systematic risk and expect the higher rate of return to compensate the risk.

According to CAPM variation in the stock return is only determined by market beta. But later the CAPM is criticized by many researchers that the single factor model is not suitable to explain the relationship between risk and return. Different studies show that there is very little relation between CAPM market beta and stock returns (Reinganum, 1981, Breeden, Gibbons and Litzenberger, 1989, Fama and French, 1992). Various studies show the relationship between return and the different variables such as size, book to market, momentum etc.

After the CAPM, a discussion started about the rate of return demanded by investors holding risky securities. CAPM is extended to another multi-factor model"Fama and French 1992, Carhart 1997 and Chen 2010". They extended the single factor model to multi-factor model by including factors like size, value, momentum etc. With passage of time CAPM is criticized by many researchers.

The first critique Stephen Ross (1976) introduces the APT (Arbitrage pricing theory). According to this theory there are number of factors that affect the returns but Ross don't identify these factors. Banz (1981) and Reinganum (1981) introduces the size effect by arguing that the return is more on small size firms than on large size firms. Later, Blume and Stambaugh (1983) work on the US data to confirm the size effect and Brown, Keim, Kleidon and Marsh (1983) use Australian data. Basu (1977) introduces the P/E effect that firms having the high P/E ratio have higher return than low P/E ratio. Some other researchers documents some more variables e.g. momentum (Jegadeesh and Titman, 1993), research and development (Al-Horani, Pope and Stark, 2003), and idiosyncratic volatility (Drew, Naughton and Veeraraghavan, 2004).

Above theories show how different factors affect the return and riskiness of portfolio selection. An assets true riskiness is how its prices move up and down when the whole market goes up and down because risk comes from the broad factors. A stocks idiosyncratic volatility matters a lot for how much it's worth. According to CAPM return is the linear function of beta. More risk more return and less risk less return. But volatility is opposite to it. More volatile stocks have more risk and less return. In 2006, Andrew Ang, Robert Hodrick, Yuhang Xing and Xiaoyang Zhang state "Stocks with past high idiosyncratic volatility have abysmally low returns, but this cannot be explained by exposure to aggregate volatility risk".

Volatility is causing the problem for the finance theory, the authors find that at some period of time low volatility stock tend to do better and at some period of time that don't, implying that the pattern might be related to the overall business conditions.

This study aims to investigate the impact of volatility on stock returns in Asian emerging markets like Pakistan, India and China. Due to the fast growing economy now a days emerging markets gain the importance. Volatility is taken because it is one of the main attribute of securities in capital market. In recent years, volatility has attracted the attention as a component of asset pricing model. Economic theory assumes that volatility and equity returns have positive relationship. Investors demand high return from securities having high volatility and low return from stable securities. Volatility is also considered as the risk factor.

Theoretical background:

1.1.1 Modern Portfolio Theory (MPT):

Markowitz presents the "modern portfolio theory" in 1952. Portfolio theory is about to find the balance between minimizing your risk and maximizing your return in portfolio selection. The main purpose of portfolio selection is to diversify risk while not reducing your expected return. Diversification is the main contribution of Markowitz in literature. Diversification refers to "Do not put all the eggs in one basket". Diversification is to select the group of assets that collectively have the lower risk than the individual assets. Risk is controlled by diversifying the securities. Efficient portfolio is that portfolio that gives higher level of return at given level of risk or lower level of risk at higher level of return". William Sharp extends his work by calculating the systematic risk in 1964. He presents the Capital asset pricing model.

1.1.2 Capital Asset Pricing Model (CAPM):

We can diversify our investment to minimize the risk but we can't totally avoid the risk of investment. CAPM helps us to calculate the investment risk and expected return from an investment. It calculates the relationship between systematic risk and return. Systematic risk is undiversifiable risk which is common to all securities and common to the whole market so also known as market risk. CAPM is the single factor model. Security market line is used to show the risk and return of security. Security having more returns and less risk is preferred.

There are many criticisms on the CAPM from other researchers. According to some researchers a single factor model can't explain the risk and return relationship.

1.1.3 Arbitrage Pricing Theory (APT):

Another theory "arbitrage pricing theory" (APT) has been offered by a researcher Ross in 1976 to overcome the limitations face by CAPM. CAPM is a single factor model that considers only beta. But APT assumes that there are a large number of factors that affect the return. In APT the

return of an asset can be measured using the relationship between portfolio return and many common risk factors. Advantages of the APT over CAPM are that it has the fewer assumptions; Secondly, it is more logical in a sense that there are many other factors than beta that affect the return and lastly, it can explain some market anomalies better than the CAPM. But there are also some disadvantages it is more complex than CAPM, it does not explains all the market anomalies, in it factors are not identified that which factors affect the return.

1.2 Research questions:

- Does volatility has the effect on the equity returns of Pakistan, India and China?
- How volatility anomaly effect the equity markets of Pakistan, India and China and does high volatile stocks outperform low volatile stocks?
- Whether single factor and two factor models are appropriate for valuation of equity in equity markets of Pakistan, India and China?

Research objectives:

- To explore the role of volatility premium in effecting the equity returns of Pakistan, India and China.
- To explore the role of size and market premium in influencing equity returns of Pakistan, India and China.
- A proper asset pricing model that captures asset pricing of equity market of Pakistan, India and China.

Significance of the study:

Portfolio theory gains the lot of attention from investors to know about the integration between different equity markets around the globe. This motivates investors to explore different equity

markets. Knowledge of market conditions helps the investors to prevent from market imperfections. There is lot of work on the multifactor model in the advance markets but no or little evidence in the emerging markets especially in Pakistan, India and China. There is not much work on volatility anomaly in this region. As this region grow and foreign direct investment starts the investors show concern to invest in this region. The special focus in this study is volatility. To explain whether volatility premium is systematic risk or not, whether it is priced or not. Investor must look into it while selecting the portfolio. Fama (2013), first time studies volatility anomaly in US market. The recent studies (IImanen 2012; Chow et al., 2011 and Li et al., 2014) focus on determinants of volatility and these studies ignore the role of volatility as systematic risk. This study explains the role of volatility in said dimension and it is a pioneering study from an emerging market.

1.5 Plan of the study

The plan of this study includes following steps: First part of the study includes introductory text about market volatility, size and value premium, research questions and objectives and significance of study. Second part gives insights into the existing literatures and their findings. Third part comprises of the methodology and data description. Fourth part of the study includes empirical results and discussions. Finally, the fifth part is of conclusion and future research directions.

CHAPTER NO 2

Literature Review

This part of the study insight on the existing literature and collect empirical evidence about stock returns fluctuations, CAPM, small minus big factor, high minus low factor and volatility in the context of Pakistan, India and China. It also identifies the major factors that bring variation in the stock-prices. In past various studies has been conducted to analysis this association. There is in-depth literature available on the subject of stock-returns fluctuations, small minus big factor, high minus low factor and volatility factor.

In 1950's Henry Markowitz introduces the modern portfolio theory. This is the first study which provides the initiative to the different researchers to develop the capital asset pricing model such as Treynor (1961, 1962), Sharpe (1964), Linter (1965) and Mossin (1966). Markowitz theory is about risk and return relationship. This theory describes the concept of taking lower risk for the given level of return. In 1972 Black develops another model of Capital asset pricing which is called as Black CAPM or zero-beta CAPM. After CAPM different multi factor models are introduced and there are many empirical flaws in this model but CAPM remains popular because of its simplicity and applicability in various situations.

With the addition of an asset in any investment portfolio the total risk of that portfolio declines continuously. Here risk can be measured by the variance or standard deviation of an investment. The expected return of the portfolio is a weighted average of the expected returns of the individual asset. In other words, by investing in portfolio rather than in individual assets, the investor can lower the total risk of investment without sacrificing returns (Markowitz, 1952). The basic portfolio theory of Markowitz (1952, 1959) provided way for measuring expected rate of returns for a portfolio of assets and expected-risk simultaneously. According to him variance

in rate of returns is a significant measure of portfolio risk under a reasonable set of assumption. He also derived the formula for calculating the variance of a portfolio. The main assumption of Markowitz model regarding investors behavior is that investors prefer higher return for given risk level and similarly they prefer less risk for given level of expected returns.

Since the publication of sharp's paper on CAPM, it has gain popularity in finance literature. CAPM is the first model which describes and quantifies capital market risk. Mossin (1966) research is more helpful and provides useful information to the investors. He is of view that by using equilibrium model one can identify the market line. Through slope of this line risk factor can be measured accordingly. In such pricing mechanism the investors can identify the riskiness of any asset in portfolio. While Pastor and Stambaugh (2000) describe that many investors update their prior beliefs based on some other asset pricing models. CAPM gain popularity among investors for optimal portfolios risk. Black Sholes and Jensen (1972) test many alternative hypotheses in New York stock exchange from 1926 to 1966. They use some assumptions of traditional capital asset-pricing model. Black, Jensen and Sholes (1972) examine the relationship between stock returns and volatility in US market by employing cross-section regressions on monthly data for the period 1931 to 1965. Results indicated that there is significant and positive relationship between returns and beta. So, it has been reported that Sharpe's CAPM is applicable in US market.

Fama and Macbeth (1973) also study the behavior of common stocks in US market for the period 1926-1968. For monthly return calculation, stock prices were taken from companies listed at New York stock exchange. Results were consistent with Black, Jensen and Sholes (1972) as it found significant and positive relationship between returns and volatility. But with the passage of time, capital asset pricing model faced a great criticism on its efficiency. As Roll's critique about

the applicability of CAPM was important one. It demonstrates that theoretical CAPM is different from the practical one. Roll argued that the CAPM was not testable because the market portfolio, which consisted of all risky assets, was unobservable. So this raised the question for scholars around the world to test the applicability of CAPM, contradiction had proven empirically, especially by Famous work of Fama and French. So, Fama and French (2004) evaluated usefulness of capital asset pricing model concluded that there were many problems associated with applications of CAPM. However zero-beta CAPM of Black (1972) was more useful than traditional CAPM of Sharpe. It has also identifies that some other factors such as size, price ratios and momentum also take part in the explanatory power of average return volatility.

With the introduction of CAPM, a new debate is started about premium that is demanded by investors for holding risky securities. This premium is termed as market premium. With the passage of time, Ross (1976) suggests that there is K many factors that may affect the return. According to Klein and Bawa (1977), higher returns of the small firms may be due to lack of information about small firms and it leads to limited diversification and therefore to higher returns for the 'undesirable' stocks of small firms.

Many patterns emerge from empirical studies which are not explained by the CAPM; such as: expected returns and earnings to price ratio have a positive relationship (Basu1977), small capitalizations have higher expected returns than big ones Banz(1981). He investigates the relationship between market value of common stocks and return. The undertaken study contains all common stocks of US firms listed at NYSE for the period 1926 to 1975. Findings indicate that large size firms have lower risk adjusted return than smaller size firms. The size effect has been persisted for last four decades and, it has been observed that CAPM is misspecified during

that period. It is also examined that the size effect is nonlinear in nature. It has been observed a little difference exists between the averages returns of large firms and average sized firms.

Reinganum (1981) investigates whether; APT predicts the differences in both large firms and small firms average returns, which are not captured by CAPM. Chen (1983) compares APT and CAPM and report contrary results with Reinganum (1981) findings. Cook and Rozeff (1984) study the negative impact of size and P/E effect in NYSE stock returns. The undertaken study uses, Basu (1977) and Banz (1981) methodology for period of 1964-1981. This study suggests that size effect has an advantage over the P/E effect and these are not consistent with Reinganum (1981) and Basu (1981). Cho et al.(1986) and Korajczyk (1988) results support arbitrage pricing theory than that of CAPM by employing principle component model and factor analysis. French et al. (1987) investigates risk and return relationship by using GARCH and ARIMA model for the period of 1928 to 1984 in NYSE. The study reports that the volatility and the stock returns have inverse relation. In contrast market risk is positively related with beta while, preceding studies reveals that there is no appropriate model for estimating risk effect.

Chan et al., (1991) examines the changes in cross sectional return with the help of size, earning yield, BTM ratio and cash flow yield. This study is conducted on Tokyo stock exchange and used both manufacturing and non-manufacturing monthly returns. Fama and French in 1992 study size and book to market equity jointly to capture the cross section variation in stock returns associated with market beta, size, leverage, book to market equity and EPS ratio.

Fama and French (1992) study the impact of size, book to market ratio, market beta, leverage and P/E ratio on average stock returns in NYSE, NASDAQ and AMEX stocks for the period of 1963-1990. Fama and Mcbeth (1973) methodology is used to test the process of return generation. Size, P/E, leverage and book to market ratio have significant relationship with

average return and no explanatory power is observed in case of beta. Meanwhile size and book to market equity are seen to absorb the effect of leverage and P/E in explaining the average stock returns.

Fama and French (1993) further extend their study to five factors comprising market effect, size effect, value effect, term effect and default effect by using time series regression approach. Furthermore, the undertaken study is extended to bonds and stocks of listed companies on NYSE. Market effect, size effect and the value effect are found significant in case of stocks and term and default effect are found significant in case of bonds. On the basis of result of this study, Fama and French (1993) proposes a three factor asset pricing model for stocks that consists of market, size and the value effect. The size effect predicts that firms having small size or low market capitalization earn higher average returns than that of large size firms. The value effect indicates that firms with higher book to market ratio have higher returns than that of lower book to market ratio firms.

Conflicting opinions are ascribed by Herrera and Lockwood (1994) in his study. Listed –Firms are selected from Mexican stock-exchange to study the correlation among size as well as stock-returns. Besides, Berk (1997) declared that size-factor has significant impact on smaller-stocks compare to larger-stocks. Furthermore, firms with low-value generate higher-profits than high-value organizations, whenever comparison made among them. Reason behind is that whenever B/M ratio is low companies generate higher profits and give higher returns to investors for their investments in distress period. Furthermore, HML can be use a substitution factor to 3-factor model. Good-performing bodies generate higher incomes resulting B/M proportion too low. Graphically evidence suggests that it has –ve slope when draw it upon HML. Similarly, Bad-

performing bodies generate lower incomes resulting B/M proportion too high. Graphically, evidence suggest that it has +ve slope when draw it upon HML.

Fama and French (1998) apply 3 factor-model covering time1975-1995 for 13 stock-markets to drive out conclusion. They study the relationship between risks and associated returns. Outcomes of literature suggested that twelve stock-markets from thirteen affect7.68% annually to value-stock. Empirically 7 markets strongly influence risks of BM as well as ME. However, Daniel and Titman (1997) results contradict the opinions of Fama and French (1992, 1993, and 1996). By using loading-factors authors explore the degree of assimilation among betas as well as returns for tenure1973-1993. Consequences suggest that loading-factors do not directly affect risk.

Furthermore, Hodoshima et al. (2000) investigates the relationship of instability-returns for Japanese stock-markets comprising cross-section regression technique. Statistical results revealed that risk insignificantly integrated to stock-returns. Higher the risk associated with stock, higher the returns get by investors. But, weak-correlation encounter when positive as well as negative association employed among betas risk plus its outcomes.

Aleati et al., (2000) study the relationship among 2 factors (stock-market return and risk) in Italian equity-market. The study tests this relation comprising thirteen years like 1981-1993 through consuming Fama and Macbeth (1973). Author of the study documented that Size and value has greater impact on stock-returns to greater extent for similar-time. Size considerably affects the returns. If size caused high variations in data then results contradict the opinions and theory of Fama and French (1992).

Wang (2000) explain the anomaly that small-stocks give higher-returns comparative to larger-stocks. AMEX besides NYSE selected to test integration concerning1975-1994. Consequences

of the study pointed out that small-stocks produce large-returns. Larger-stocks produce lower-returns for any portfolio. Size of any firm can strongly disturb the returns.

Liew and Vassalou (2000) study the relationship among B/M, size as well as momentum are growth-factors in every economy. The study tests this relation for economies (France, Germany, Australia, Canada, Japan, Italy, Switzerland, the Netherlands, the United Kingdom, and the United states) comprising eighteen years like 1978-1996. Focus of the study lies on determining the integration among HML as well as SMB economies impact on development. Through applying Fama and Macbeth (1973) analysis study testify its results. Outcomes are correlated to the results of Fama and French (1998). SMB along with HML variables positively affect growth.

Horowitz et al. define instability of size for Japanese stock-market. They specify that larger-firms originate more fruitful results contrary to small-firms in Japan economy. Chan et al. (1991) pointed out size seriously hamper stock-return activities. Two studies give contradiction opinions although conducted for same region. Faff (2001) finds direct association exists among size. The Australian region is selected in current study. Monthly observations for 24 industries nominated. GMM model constructed to test the data. However, inverse association exists for MKT as well as value-effect.

Faff (2001) examine the importance of Fama French model. He selected Australian stock-exchange comprising era since 1991-1994. 762 interpretations handpicked by him. Monthly-data obtained covering tenure 1991-1999. Consequences of study disclose that B/M proportion along with size has more describing analytical power for returns. Substantial and +ve association exists between these factors.

Furthermore, Lee et al. (2001) observed the integration among risk plus equity-markets returns. They use data having tenure 1990-1997. They use GARCH-M to test the hypothesis. Time-varying instability can be detected through GARCH & EGARCH method. However, Faff (2001) employed another test namely one-step multivariate technique to investigate the link among variability and outcomes. By selecting Australian-market he picked data for tenure1974 to 1995.Faff discovers positive association among risk-return for Australian-market. Direct correlation discovers between variability and betas of stock when study conducted by Elsas et al. (2003) for Germon stock-markets. They select time 1960 to 1995 through incorporated Pettengill methodology.

Besides it, Griffin and Lemmon (2002) inspects the interconnection for two variables (factors) i.e risk and value-effect. Through employing Fama and Macbeth (1973) approach, reviewer select non-financial institution's stocks (NASDAQ, NYSE) covering period 1965-1996. Positive as well as substantial correlation exists among instability and average-returns. Instability in returns is chiefly caused by size plus Book/MKT ratio. Small firms having low capital generate higher-returns compare to larger (big) firms comprising high capital. Likewise, B/M stalwartly affects stock-returns and elucidates their actions for growing-firms.

Lam (2002) study the relationship among 4 factors (stock-market return BTM ratio, size, earning to price ratio and leverage) in Hong Kong equity-market. The study tests this relation for seventeen years like 1980-1997 through consuming Fama and Macbeth (1973). Lam documented that Size, P/E and B/M distress the stock-returns to greater extent for similar-time horizon. Size considerably affects the stock-returns these results contradict the opinions of Fama and French (1992).Outcomes are consistent with work conducted by Malin and Veeraraghavan (2004). They are of view that there is substantial correlation among above variables. Returns are more instable

for small-companies in France-economy and Germany-markets. However, big-firms are give stable returns for United Kingdom.

Drew, Naughtan and Veeraraghavan (2003) study the relationship among risk-returns for Shanghai stock-exchange by employing 3-factor model effect .The study comprising on eight years like 1993-2000. Author of the study documented that Size distress stock-returns to greater degree. If size caused high variations in data then B/M can't cause too much variation and vice versa. Drew and Veeraraghavan pointed out that small-firm originate higher outcomes compare to large-size firms. The study contradict their own opinions of the study conducted by them in 2002 (Drew and Veeraraghavan (2002)) as well as Fama and French (1996) i.e larger-firms give more and stable-returns. Along with beta there are other factors that can calculate variability for Chinese state.

Stock-return volatility is tested by Ali, Hwang and Trombly (2003) via using arbitrage variable. AMEX-stock exchange and NYSE- economies was selected in this respect. Data since 1976-1997 is used to check the prepositions. Fama and Macbeth (1973) model is use to test the regression analysis. Mispricing can cause instability in B/M quotient. However, if investors take into account arbitrage-risk measure with B/M ratio future-returns can be predicted too much.

Through employing 3-factors (size, liquidity and beta) along with stock-returns Marshall and Young (2003) investigate this association for Australian-market. Three models are selected to identify the relation like (unrelated regressions (SUR) and cross-sectional correlated time wise autoregressive (CSCTA) models). Different proxies are used i.e size for market-value along with 3 proxies for "liquidity bid-ask spread, turnover rate and amortize spread".

Daniel et al. (2004) examines performance for size as well as value impact for United Stock-markets both for ups and down-markets. Size-affect and value-affect can considerable distress returns cross-sectional. They employ CAPM to empirically test the association. However, another study conducted by pattengill et al. (1995) show contrary results when employing CAPM methodology. For down-market size is inconsequentially distress the returns. Because, down-market generate higher-returns in case of smaller-firms. Conversely, size can't change the returns too much.

A study conducted by Tang and Shum (2004) for Singapore covering time 1986-1998. Result of the study points out that in up-market beta is positively and directly associated to expected-returns. While, negatively correlated in down-market Likewise, Leon et al. (2007) observe identically positive integration between SD (Standard Deviation) and stock-returns. Through employing "mix-data specimen method" (MIDAS) for European countries daily-returns, they observe that positive integration lies between SD and stock-returns. MIDAS is preferable over GARCH model. MIDAS is more elastic and have large no of applicability over others.

In 20024 Gaunt study the correlation among size and value-effect for developed stock-market (Australia). In order to realize fallouts Fama and Macbeth (1973) model takes on to empirically assess all prepositions. 1991-2000 data is selected. Fallout elucidates that B/M quotient and size considerably positively integrated to stock-returns. Instability n size is caused through stock-returns movements. Findings of the study support notion of Fama and French (1993). Companies having lower B/M percentage with minor size can tolerate greater threat. Furthermore, impact of size is not meaningful contrary to B/M percentage. B/M has stronger influence on instability of stock-returns. These results are inconsistent to the outcomes presented by Halliwell, Heany and

Sawicki (1999). CAPM is less significant relative to 3 factor-models. While, B/M seriously work in CAPM and produce anticipated results.

Guan et al. (2004) investigates the correlation between CAPM-variables (price earning, book to market ratio and stable beta) and stock-returns. For this purpose they selected "NYSE, NASDAQ and AMEX" markets covering tenure thirty years 1967 to1997. Outcomes of the study shows that expected-returns are correlated to selected factors (price earning, book to market ratio and stable beta). This association generates fruitful results for investors. In addition, beta can be used as explanatory variables in this study.

Another study conducted by writer Gaunt (2004) to further enlighten the relationship. This work is elaborated the previous work done by Halliwell, Heaney and Sawicki (1999) by further adding ten more years to draw out conclusion. Gaunt (2004) is of view that Australian-markets are not influenced through size variable. Besides, Durack et al. (2004) find out integration among price alongwith size. He employs two methodologies CAPM plus Fama and French. However, contrary results are obtain when another study conducted by Shum and Tang (2005). They discovered that MKT affect is highly correlated to returns. size has insignificant association with value.

Homsud et al. (2009) examine the importance of Fama and Macbeth (1973) variables model. He selected monthly-returns of three Asian-emerging stock-exchanges (Hong Kong, Singapore, Taiwan) It comprising on 12 years era since 1986-1998. Consequences of study disclose that 3 factor-model has more describing analytical power.

Djajadikerta and Nartea (2005) study the relationship among 3-factor model and stock- returns in New Zeeland equity-market. The study tests this relation comprising on five years like 2000-

2007. Author of the study documented that Size and B/M distress stock-returns in opposite directions for similar-time. If size caused high variations in data then B/M can't cause too much variation and vice versa. Outcomes are inconsistent with work conducted by Eleswaparu (1997), Vos and Pepper (1997) and Bryant(1997).Furthermore, they are of view that there is substantial correlation among book/ MKT stocks plus size. Time concerning 1991-1995 statistically selected and employed to originate results. Another study conducted by Bryant and Elsewaparu (1997) and finds that book/ MKT effect is considerably present. However, impact of size is pathetic since 1971-1993

Stock-return volatility checks out by Estrada and Serra (2005) via using several factors. 30 economies were selected in this respect. Data of 1600 institutions is used to check the prepositions. Results indicate downsize risk is directly affect the stock-returns. It has significant contribution in its instability. Size along-with B/M also cause instability in returns but its contribution is not significant. Likewise, Rahman and Baten (2006) studies risk as well as return association for equity-securities. He selects 5 factors like (stock market return, beta, book to market ratio, size). Through implicated Fama French-model he finds that these 5 variables are strongly correlated each-other for Bangladesh markets.

Two scholars Mirza and Shahid (2008) scrutinize the proficiency of "Fama and French three factor model". For this they selected KSE (Karachi stock exchange). Outcomes elucidate that "Fama and Macbeth (1973)." has more explanatory power compare to CAPM. Current study is strongly associated with work done in past by many authors. They are also of view that in emerging economies present model is more applicable to CAPM. Another study conducted by Pakistani author Khan (2009) to test the hypothesis. To scrutinize the linkage of equity-returns with price-earnings for Pakistani-markets (KSE), he employed "Fama and Macbeth (1973)"

process. Results shows P/E is not correlated with value. Both are independent on each other and are inconsistent to one another.

Besides it, Senthilkumar (2009) inspected the interconnection for two variables (factors) i.e size along-with value-effect. Through employing Fama and Macbeth (1973) approach, , Senthilkumar selects Indian stock-markets covering period 2002-2008. Positive as well as substantial correlation exists among size and average-returns. Instability in returns is chiefly caused by size plus Book/MKT ratio. Small firms having low capital generates higher-returns compare to larger (big) firms comprising high capital. Likewise, B/M stalwartly affects stock-returns and elucidates their actions.

Homsud et al. (2009) examine the importance of Fama French and CAPM model. He selected 421 organizations from Thailand stock-exchange consisting of 6 bunches. 4 years data since 2002-2997 selected. Consequences of study disclose that 3 factor-model has more describing analytical power comparative to CAPM. Furthermore, Zhang and Wihlborg (2010) observed the integration among risk of equity-markets comprising 6 emerging-markets for European regions. They use data of 1,131 firms concerning tenure 1996-2006. They use CAPM to test the hypothesis. Consequences of data revealed that risk factor can be best analyses through beta. Investors can get the desired results through it. CAPM is more significant and important in national boundary to international boundary.

Hassan and Javed (2011) study the affect of size, value and market effect on returns in Pakistani equity-markets. The study analysis this relation for 250 firms listed at KSE (Karachi stock exchange). It comprises on seven years i.e 2000-2007. The author documents that value-effect directly and positively associated to different portfolios. Furthermore, they are of view that there

is insignificant correlation among low book/ MKT stocks. Encouraging results obtained for country like Pakistan. Here lower book/ MKT association exists in this region. Stocks having higher book/MKT ratio give low results and returns compare to lower book/ Market ratio. Size-effect also interrelated with smaller portfolios. These portfolios give lower-returns. They are not seriously affect the returns. Study pointed out that low risk is associated with lower-size stocks resulting give lower outcomes. However contrary results observed when same tests are applied on the big-stocks. They supported these results by giving their views that this abnormality in results is due to anomalies and irregularity finds in tenure 2005 to 2006. Furthermore, outcomes support "Fama and French three factor model" as it has more explanatory power compare to CAPM.

Two scholars Fama and French (2012) scrutinize the relation among value, size and volatility for different stock-markets. To analyze this association they selected three developed countries (America, Europe, and Japan) and Asia region. Results demonstrate that value as well as momentum directly correlated with price in selected countries. However value is inversely proportion to risk. Value is also inversely proportion to size in large stock-markets. Literature supported the above results that countries are somehow interconnected with each other. Another author Liu (2013) is of view that MKT effect has not significant contribution in volatility and instability of returns. However, value as well as size significantly affects returns variability. Liu suggested that for Chinese equity-markets large-stock and value-stock give higher outcomes contrary to growing as well as small-stocks.

The instability in stock-market has been equally popular in finance subject. Lot of work has been done by many authors in different eras. Most frequently asked questions are: "what are the key factors of stock market volatility? Is it increase over the time? And what role, regulators should

play in the stock market?" These problems are discussed in many ways. Like, Officer (1973) scrutinizes the influence of instability on business-cycle. Christie (1982) as well as Black (1976) documents the correlation of stock-volatility with most important factor financial-leverage. Furthermore, Poterba and Summers (1986) Merton (1980), then French et al. (1987) study the stock-volatility with stock-returns. Schwert (1989) scrutinize the effect of macroeconomic-variables on stock instability. The level at which international monetary as well as capital-markets transfer volatility is investigated by (Koch and Koch, 1991), (Rahman and Yung, 1994), (Malliaris and Urrutia, 1992) and (Chan et al., 1992). 6

Likewise, Timmermann (1993) Peel et al. (1993) and Scott (1991) finds that how much change in volatility of stock affect the value of stock. The consequence of instability (volatility) has been reviewed and discussed in literature as an important abnormality especially in CAPM chapter. Similarly, two writers Fama and French in 1993give extension to CAPM by presenting 3 factor-models through including P/E effect, size effect and value effect.

Currently, Frazzini and Pedersen (2014) document the inter-linkage of volatility with leverage constraint. Furthermore, they not only investigate the risk-return relationship cross-sectional but also find when funding constraints become intense. Graph show that beta approaches to 1 by increasing constraint on funds. However, correlation between risk-return becomes flatter at this stage. In addition, their model argue that" less leverage-constrained investors (e.g., private equity) hold low-beta stocks, while more leverage-constrained investors (e.g., mutual funds) prefer high beta stocks".

Baker, Bradley, and Illmanen (2012), Blitz and Van Vliet (2007), Wurgler (2011), Falkenstein (2009) and Kumar (2009) discuss the association of skewness and instability. They are of view

that stocks that are low-priced are positively skewed and high-priced stocks are not positively skewed. Campbell (1996) argues that stock-prices volatility seems to be related with predictable time-variation in abnormal stock returns. This excess volatility challenges the market efficiency. Blitz et al. (2007) significantly add to our understanding of the low volatility effect in global equity-markets. They documents that volatility effect disentangle and distinguish from classic size, its value and momentum effect, and suggesting possible explanations for the success of this strategy.

Baker et al. (2011) investigates those anomalies that largely affect the low-volatility as well as low-beta's portfolios in long-term concerning numerous equity-stocks. Beyond this bold statement, the authors use different behavioral models for lotteries and arbitrage. They study the effect of biases behavior that is used by investor's preferences in lotteries as well as their confidence and conjunction on limited arbitrage activity. However, Blitz and van Vliet (2011) use "Sharpe or Jensen ratios" statistical tools argue to evaluate the low volatility strategies against cap weighted indexes.

In Haugen's final paper with Baker (2012), the author finds that the effect of low volatility exists in all equity-markets around the globe, including emerging as well as developed markets. Blitz et al. (2012a) also identifies "the clear presence of volatility effect in emerging markets and report a low correlation between the volatility effects in emerging and developed equity markets". An article published in 2012 focusing low beta strategies for investment written by Blitz naming "smart beta". In this article, smart-beta defines as "passively following an index in which stock weights are not proportional to their market capitalization, but based on some alternative weighting scheme". Chow et al. (2011) explore the investing "costs" for low-volatility

investments, which includes “underperformance in an upward-trending market….substantial tracking error…limited capacity, less liquidity and higher turnover rates.”

Li et al. (2014) scrutinize the practical applicability of low volatility strategies. They find no abnormal returns for equally weighted higher intimidation and lower danger portfolios and removed alpha whenever discharge low-price stocks. “The realized alphas of low beta (high-beta) portfolios are reduced (increased) when a separate beta factor is included.” (Clarke et al., 2014).Furthermore, Guner and Onder (2002) examine and decided that trading-volume significantly linked with instability. At morning-session greater instability connected with low-volume stocks. Higher-volume stocks connected with high instability because Higher-volume stocks trading are highly dependent on information arising at morning period. However, Lipson (1994) denied above conclusions and elaborate that size of stock and volatility affects are important and affect the low size firms only. Additionally, information in mourning period does not seriously affect the trading transactions and does not seriously hamper it.

However, conflicting results obtain when another study conducts by Lamoureux and lastrapes (1990) and Foster (1995). They elaborate that in the presence of volume as explanatory variable volatility always sustains in return-series. These findings show similar results for contemporaneous volume by putting its value in variance equation. (Karolyi (2001) suggests that stock-return is a good measure of standard-deviation. It can be used as an important indicator to show perfect intrinsic-value for any organization. Share-prices of United States reduce in 1970 owing to intensification in instability (Pindyck, 1984). Likewise, conditional volatility show significant rapport with stock-returns (Bollrsle et al., 1988). Literature identifies that return as well as volatility linkage is studied by many scholars like Choudhry (1996) Kearns and Pagan (1993), Odossiou and Lee (1995) and French et al. (1987) for various equity-markets around the

globe. Besides it Schwert (1989) tests the correlation of volatility for many macroeconomic-variables. For this purpose he selects the US markets. Likewise, another study conducted by Kearney in 1988. He describes that in the period of one month instability transferred from London stock-market to Irish-market.

Besides, Adrian et al. (2008) investigates the association of equity-instability with price instability. They discover that MKT value of equity correlates with price instability in long-term as well as in short horizon. Short-term volatility affected and influenced by unsteadiness of financial hurdles. Similarly, long-term instability inter-linked with risk (business risk). Alike Leon et al. (2007), Elsas et al. (2003), Faff (2001), Elsas et al. (2003), Tand and Shum (2004), Zhu (2009) scrutinizes the relation between stock-returns with other volatility-components. He uses 2 components of instability model for ten different markets of Asia region. Zhu describes that although these components of the model are very important but show no statistical significant correlation with stock-returns.

Another researcher Schwert (1989) scrutinizes the instability and cumulative actions of macroeconomic-variables. He also points out that overall MKT returns are alike with each other. Furthermore, business cycle also inter-links with market explosiveness. In 1989 Schwert depicts stock-returns show less volatility in good-period of time relative to bad-period. Campbell and Hentschel (1992) reports that volatility is negatively associated with returns and propose two possible explanations: firstly, dividend news affected by risk premium. Secondly, dividend news can also be affected by stock -return.

Campbell and Hentshel (1992), and Duffee (1995) suggest that negative relationship exists among two variables “market explosiveness and market returns”. Similarly, Leverage effect is

also negatively linked to market-returns. Black (1976) and Christie (1982) suggest that instability arises in returns owing to reduction in prices. This retardation in prices may affect the leverage ratio of the firm. Afterwards, three scholars namely French, Schwert, and Stambaugh (1987), elaborate this scrutiny that positive association exists between systematic volatility and risk premium. Whenever, unavoidable risk intensifies, risk premium associated with stock also magnifies in this respect. Business worth decreases owing to volatility.

CHAPTER 03

Data and methodology

3.1 Data Description:

The focus of study is to explore the relationship among four factors market, size, value and volatility effect on the stock-returns in Pakistan, India and China. Monthly closing prices of 80 non-financial companies from each of the country for the period of 2002-2015 are used for the analysis. The companies are selected on the basis of market capitalization. The data used in this study is collected from "Karachi stock exchange, National stock exchange of India, shanghai stock exchanges". The risk free rate data has been collected from state bank of each country. The volatility of return is calculated through using the SD (standard deviation) of daily returns.

Non-financial sector is considered because the capital structure of both sectors are different and in case of financial sector accounting period closes at December and accounting period closes at July in case of non-financial sector. Eighty companies are taken from each of the country because according to Fama and French (1996) large portfolio should be used that must contain minimum four stocks.

3.2 Measurement of Variables

The variable of size, BTM and volatility are calculated as under:

3.2.1 Size

Size factor has been introduced by Banz in 1981. Market capitalization is used as the proxy of size. The size is measured by keeping in mind the method used by Fama and French(1992, 1993, 1996). It is measured by using the following formula:

Size = No of shares × MPS

3.2.2 Book to Market Ratio:

Value premium has been introduced by Rosenberg in 1985. For value premium book to market ratio is used as proxy to calculate it. By using the following formula:

$$BTM = \frac{\text{Book value of equity}}{\text{Market value of equity}}$$

3.2.3 Volatility

Volatility of return is estimated by using standard deviation of return.

$$\text{Volatility} = \sqrt{\frac{\sum(R-ER)^2}{n}}$$

3.3 Methodology:

The main focus of this study is to understand the effect of volatility on the stock returns. In the previous studies different researchers determine the effect of different factors as in CAPM the effect of only one factor market premium is determined. In Arbitrage pricing theory it is mentioned that there are k many factors that affect the stock returns. Fama and French introduces the three factor model in which the value premium is the third factor. Jegadeesh and Titman introduces momentum as the fourth factor. Fama and French (2013) also identify the volatility as an important priced factor. Methodology proposed by Fama and French in three factor model is used to understand the volatility affect.

3.4 Portfolio Construction:

3.4.1 Size Sorted Portfolio

For calculation of size the proxy used is market capitalization. Market capitalization is the total market value of the company's outstanding shares. In this first the market capitalization of eighty companies are calculated and then it is arranged in descending order. Largest 40 companies are

as B and smallest 40 companies are grouped as S. Then average returns of both big and small companies are calculated.

3.4.2 Value sorted Portfolios:

In value sorted portfolios the forty small and forty big companies are further sorted on the basis of book/ market percentage. Twenty big corporations having high book to market ratio are named as B/H and twenty big corporations having low book to market ratio are named as B/L. Average-returns for both B/H and B/L are calculated.

Similarly, data for forty small-companies is sorted on the basis of high and low book/ market ratio. Twenty small-companies with higher book/market ratio are named as S/H and twenty small-companies with lower book/ market ratio are named as S/L. Average returns for both S/H and S/L are calculated.

3.4.3 Volatility sorted portfolios:

For creating the volatility sorted portfolios the forty big companies with high book to market ratio B/H are further sorted on the basis of high and low volatility. B/H is further divided into B/H/H and B/H/L. B/H/H is the portfolio of ten big companies having high book to market ratio and high volatility similarly B/H/L is the portfolio of ten big companies having high book to market ratio and low volatility.

Similarly, B/L is further sorted into two groups B/L/H and B/L/L. B/L/H is the portfolio of big companies having low book to market ratio and high volatility. B/L/L is the portfolio of ten big companies having low book to market ratio and low volatility.

In the same way the forty small companies are divided in the two groups containing twenty companies in each group S/H and S/L. S/H is further divided into S/H/H and S/H/L. S/H/H

contains ten small companies having high book to market ratio and high volatility and S/H/L is the ten small companies having high book to market ratio and low volatility.

S/L is further divided into S/L/H and S/L/L. S/L/H is the portfolio of ten small companies having low book to market ratio and high volatility and S/L/L is the ten small companies having low book to market ratio and low volatility.

3.5 Variable construction:

We have the following portfolios the two main portfolios on the basis of size B and S. On the basis of value B/H, B/L, S/H and S/L. On the basis of volatility following portfolio are constructed B/H/H, B/H/L, B/L/H, B/L/L, S/H/H, S/H/L, S/L/H and S/L/L. The return of all the portfolios is calculated and then on the basis of these returns size, value and volatility premium is calculated. For calculation of market premium following formula is used.

Market Premium = MKT= (R_{mt}- R_{ft})

To calculate the size premium small firm effect is used. Return of big size companies is subtracted from the small companies. According to the effect the large companies have a lesser amount of growth opportunities than smaller companies. Smaller firms tend to outperform the larger firms.

Size premium = Small size companies-Big size companies

=1/4((S/H/HV-B/H/HV) + (S/H/LV-B/H/LV) + (S/L/HV-B/L/HV) + (S/L/LV-B/L/LV))

For calculation of value premium the difference between the returns of companies having high book to market ratio and the return of companies having low book to market ratio is taken.

Value premium= High BTM ratio-Low BTM ratio

= ¼ ((S/H/HV-S/L/HV) + (S/H/LV-S/L/LV) + (B/H/HV-B/L/HV) +(B/H/LV-B/L/LV))

According to literature high volatile stocks outperform low volatile stock.

Volatility premium=High volatile stocks – Stable stocks

=1/4 ((B/H/HV-B/H/LV)+(B/L/HV-B/L/LV)+(S/H/HV-S/H/LV)+(S/L/HV-S/L/LV))

3.6 Model Specification

This study is using multivariate regression with two pass regression model proposed by Fama and Mcbeth (1973) methodology.

The relationship among the variables is as follow:

$R_{pt} = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 VMS_t + \mu t$

Where

R_{pt} is return of portrfolio

R_{ft} = Risk free rate at time t

MKT_t = Market Premium = $R_{mt} - R_{ft}$

SMB_t = Size Premium = Small – Big

HML_t = Value Premium = Return of high book to market portfolio –Return of low book to market portfolio

VMS_t = Volatility Premium = Return of high volatile portfolio – Return of stable portfolio

α= The management's impact (Alpha)

μt =error term

For calculation of two pass regression following relationship is used:

$$R_p = \Upsilon_0 + \Upsilon_1\beta_{(MKT)} + \Upsilon_2\beta_{(SMB)} + \Upsilon_3\beta_{(HML)} + \Upsilon_4\beta_{(VMS)} + \mu t$$

Where,

β_{MKT} = β of Market Premium

β_{SMB} = β of Size Premium

β_{HML} = β of Value Premium

β_{VMS} = β of Volatility Premium

μt = error term

CHAPTER NO 4

Results and Discussion

Table 4.1 Descriptive statistics Size, Value and Volatility sorted portfolios (Pakistan)

	Mean	Median	Standard Deviation	kurtosis	Skewness	Minimum	Maximum
P	0.003	0.003	0.062	0.417	-0.413	-0.206	0.145
B	0.002	0.005	0.061	0.770	-0.609	-0.185	0.129
B/H	0.006	0.006	0.063	1.192	-0.555	-0.222	0.169
B/L	-0.001	0.000	0.071	2.271	-1.030	-0.306	0.143
B/H/H	0.005	0.006	0.080	0.634	0.074	-0.185	0.275
B/H/L	0.007	0.011	0.064	4.729	-1.401	-0.289	0.163
B/L/H	0.001	0.008	0.075	0.357	-0.674	-0.222	0.155
B/L/L	-0.003	0.006	0.091	16.940	-3.069	-0.640	0.155
S	0.005	0.000	0.067	0.405	-0.240	-0.225	0.173
S/H	0.008	0.013	0.078	0.306	-0.020	-0.235	0.229
S/L	0.002	0.000	0.065	0.314	-0.375	-0.215	0.149
S/H/H	0.011	0.007	0.102	0.580	-0.032	-0.305	0.305
S/H/L	0.005	-0.002	0.071	-0.004	0.110	-0.165	0.212
S/L/H	0.001	0.000	0.071	-0.410	-0.100	-0.145	0.158
S/L/L	0.004	0.005	0.075	1.670	0.519	-0.289	0.199

According to the small firm affect small size firms have the more return than the big firms. Because these have the capacity to grow. Small firms are the more risky firms. In size sorted portfolio the small firms have higher return than the big firms. Higher return earned by the small stock 17.3% while the return of the big stock is 12.9% in a month. Risk of the small stocks is 6.7% while big stocks have the risk of 6.1%.The result are consistent with the theory and also the view that when there is more risk than there is more return. Moreover, the maximum loss is incurred by small stock which is 22.5% while big stock incurred the loss of 18.5% in a month.

Generally it is considered that the stocks with high book to market ratio earned higher return than the stock with low book to market ratio. The results in this study are consistent with the theory in both small and big stocks. In case of small stocks with high book to market ratio risk is higher than the big stocks. The return reported by SH portfolio is higher than the BH. The maximum loss is reported by BL the portfolio with big stock and low book to market ratio which is 30%. The skewness of portfolios i.e. BH, BL, SH and SL is negative which are in line with size sorted portfolios.

The more volatile stock is the more risky stock and more risky stock offers more return. In volatility sorted portfolios the SHHV reports higher risk and higher return. It is consistent with the theory. BLLV reports that loss through its risk is reasonably high which is 64%. BHLV is found lowest risk portfolio with positive return. However, inconsistent results are observed in BLHV and BLLV and this behavior is also reported by other studies like (Hassan & Javed, 2011 and Mirza, 2008). These results are also in line with Veeraraghavan (2004).

INDIA

4.2 Descriptive statistics Size, Value and Volatility sorted portfolios

	Mean	Median	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
P	0.008651	0.011915	0.071794	2.491742	-0.50267	-0.31382	0.231702
S	0.013653	0.010508	0.077996	1.44057	-0.03114	-0.23946	0.258581
S/H	0.015123	0.013063	0.090549	1.335974	0.172417	-0.24376	0.337502
S/L	0.012184	0.010767	0.080267	1.885666	-0.45885	-0.32829	0.253237
S/H/H	0.019657	0.021101	0.106175	1.482813	-0.20006	-0.35102	0.377848
S/H/L	0.010589	0.00127	0.103073	1.162327	0.485644	-0.26339	0.376204
S/L/H	0.018497	0.014791	0.087989	1.903122	-0.57292	-0.37051	0.227221
S/L/L	0.00587	0.005032	0.0934	1.331041	-0.27273	-0.29968	0.301204
B	0.00365	0.009686	0.074989	4.731534	-1.10274	-0.40532	0.208082
B/H	0.00918	0.011903	0.079015	1.606256	-0.46975	-0.30945	0.235259
B/L	-0.00188	0.007156	0.083864	7.316465	-1.64415	-0.50119	0.217695
B/H/H	0.014443	0.014785	0.079896	0.867319	-0.39776	-0.22579	0.251066
B/H/L	0.003917	0.008418	0.100963	3.650903	-1.06208	-0.42659	0.273855
B/L/H	-0.00531	-0.00217	0.097438	2.897015	-0.98168	-0.41183	0.283433
B/L/L	0.001548	0.015528	0.092908	12.28238	-2.27661	-0.6247	0.199415

According to the small firm affect small size firms have the more return than the big firms. Because these have the capacity to grow. Small firms are the more risky firms. In size sorted portfolio the small firms have higher return than the big firms. Higher return earned by the small stock 25.8% while the return of the big stock is 20.8% in a month. Risk of the small stocks is 7.7% while big stocks have the risk of 7.4%.The result are consistent with the theory and also the view that when there is more risk than there is more return. Moreover, the maximum loss is incurred by small stock which is 23.9% while big stock incurred the loss of 40.5% in a month.

Generally it is considered that the stocks with high book to market ratio earned higher return than the stock with low book to market ratio. The results in this study are consistent with the theory in both small and big stocks. In case of small stocks with high book to market ratio risk is higher than the big stocks. The return reported by SH portfolio is higher than the BH. The maximum loss is reported by BL the portfolio with big stock and low book to market ratio which is 50%. The skewness of portfolios i.e. BH, BL, SH and SL is negative which are in line with size sorted portfolios.

The more volatile stock is the more risky stock and more risky stock offers more return. In volatility sorted portfolios the SHHV reports higher risk and higher return. It is consistent with the theory. BLLV reports that loss through its risk is reasonably high which is 62%. BHLV is found lowest risk portfolio with positive return. However, inconsistent results are observed in BLHV and BLLV and this behavior is also reported by other studies like (Hassan & Javed, 2011 and Mirza, 2008). These results are also in line with Veeraraghavan (2004).

China (Descriptive Statistics)

4.3 Descriptive statistics Size, Value and Volatility sorted portfolios

	Mean	Median	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
P	0.009248	0.008223	0.042006	1.511072	-0.00449	-0.13578	0.141734
S	0.00701	0.005659	0.053861	4.273487	-0.15331	-0.21674	0.222757
S/H	0.009013	0.008919	0.048543	1.864606	0.034466	-0.16265	0.170029
S/L	0.00478	0.005061	0.070694	4.908565	-0.59081	-0.17088	0.276735
S/H/H	0.010686	0.005995	0.056036	3.359893	0.663341	-0.19529	0.224905
S/H/L	0.00734	0.012158	0.062839	3.629759	-1.02053	-0.2504	0.199777
S/L/H	0.000683	-0.00241	0.072315	3.223625	-0.00989	-0.27292	0.29196
S/L/L	0.008876	0.01278	0.050333	8.16089	-1.66514	-0.48935	0.26151
B	0.0116	0.013317	0.039142	0.591272	-0.0674	-0.10592	0.13439
B/H	0.013514	0.013324	0.040495	2.915532	-0.17871	-0.13532	0.149332
B/L	0.009687	0.0136	0.051167	0.758663	-0.31384	-0.32331	0.137322
B/H/H	0.011954	0.008263	0.057671	9.20537	-0.09925	-0.24442	0.261614
B/H/L	0.015074	0.017538	0.045575	2.437014	-0.72279	-0.17711	0.135468
B/L/H	0.010437	0.007637	0.064789	1.803614	-0.35479	-0.25088	0.194314
B/L/L	0.008937	0.011544	0.093849	2.296605	0.015128	-0.20647	0.20881

According to the small firm affect small size firms have the more return than the big firms. Because these have the capacity to grow. Small firms are the more risky firms. In size sorted portfolio the small firms have higher return than the big firms. Higher return earned by the small stock 22% while the return of the big stock is 13% in a month. Risk of the small stocks is 5.3% while big stocks have the risk of 3.9%.The result are consistent with the theory and also the view that when there is more risk than there is more return. Moreover, the maximum loss is incurred by small stock which is 21% while big stock incurred the loss of 10% in a month.

Generally it is considered that the stocks with high book to market ratio earned higher return than the stock with low book to market ratio. The results in this study are consistent with the theory in both small and big stocks. In case of small stocks with high book to market ratio risk is higher than the big stocks. The return reported by SH portfolio is higher than the BH. The maximum loss is reported by BL the portfolio with big stock and low book to market ratio which is 32%. The skewness of portfolios i.e. BH, BL, SH and SL is negative which are in line with size sorted portfolios.

The more volatile stock is the more risky stock and more risky stock offers more return. In volatility sorted portfolios the SHHV reports higher risk and higher return. It is consistent with the theory. BLLV reports that loss through its risk is reasonably high which is 9.3%. BHLV is found lowest risk portfolio with positive return. However, inconsistent results are observed in BLHV and BLLV and this behavior is also reported by other studies like (Hassan & Javed, 2011 and Mirza, 2008). These results are also in line with Veeraraghavan (2004).

4.4 Size Sorted Portfolio (Pakistan)

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
P	0.002	0.622				0.512	167.131	0.000
T Statistic	0.179	13.001						
P	0.001	0.620	0.120	0.000		0.580	55.142	0.000
T statistic	0.084	12.820	1.054	0.003				
P	0.001	0.633	0.012	-0.072	0.300	0.610	46.597	0.000
T statistic	0.185	12.641	0.111	-0.702	2.086			
B	0.001	0.320				0.162	23.310	0.000
T Statistic	0.149	4.830						
B	0.000	0.330	-0.320	0.068		0.180	8.845	0.000
T statistic	0.235	4.053	-2.130	0.469				
B	0.001	0.349	-0.390	0.017	0.200	0.185	7.990	0.000
T statistic	0.280	5.240	-2.490	0.120	1.460			
S	0.003	0.341				0.145	21.490	0.000
T statistic	0.670	4.630						
S	0.001	0.320	0.700	0.015		0.270	15.250	0.000
T statistics	0.315	4.700	4.450	0.111				
S	0.001	0.340	0.620	-0.030	0.205	0.280	11.810	0.000
T statistics	0.360	4.985	3.820	-0.210	1.430			

Result shows that market premium is significantly positive and explains 51.2% of the total variation in returns of portfolio of all the stocks at 95% confidence level so capital asset pricing model is a valid model for portfolios of all the stocks. Overall when size premium is added, its effect on the portfolio of all stocks is insignificant. Similarly, the impact of value premium is also insignificant. Volatility premium is that high volatile stock has high risk and high return. So the results of study are consistent with the theory in the way that when volatility premium is added it has the significant impact on the returns.

CAPM appears to be a valid model for portfolios of big stocks because at 95% confidence level market premium is significantly positive and explains 16.2% of total variation in returns of portfolios. When size premium is added it has the significantly negative impact on the return and explains 18% of total variation in return of big stock portfolios. When value premium is added it has insignificant impact on portfolio of big stocks. Volatility premium also has the insignificant impact on portfolios in spite of an increase in explanatory power.

In small stock portfolios, market premium is significantly positive at 95% confidence level and explains 14.5% of total variations in return of portfolios. Size has significantly positive impact on the portfolios and explains 27% of total variation whereas value premium has insignificant impact on the returns of portfolios. In spite of an increase in explanatory power when volatility premium is added it has the insignificant impact on the return of portfolios.

Table 4.5 Value sorted Portfolio (Pakistan)

Dependant variale	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H	0.004	0.340				0.169	24.340	0.000
T statistics	0.940	4.032						
B/H	0.001	0.330	-0.318	0.500		0.240	13.560	0.000
T statistics	0.470	5.140	-2.090	3.490				
B/H	0.002	0.350	-0.410	0.440	0.260	0.255	11.311	0.000
T statistics	0.540	5.440	-2.600	3.011	1.900			
B/L	-0.002	0.290				0.092	13.700	0.000
T statistics	-0.500	3.700						
B/L	0.001	0.315	-0.280	-0.469		0.190	10.420	0.000
T statistics	0.150	4.160	-1.590	-2.820				
B/L	0.001	0.320	-0.330	-0.500	0.141	0.190	8.020	0.000
T statistics	0.180	4.250	-1.800	-2.950	0.920			
S/H	0.006	0.340				0.105	15.600	0.000
T statistics	0.980	3.985						
S/H	0.001	0.315	0.718	0.528		0.330	20.013	0.000
T statistics	0.150	4.160	4.111	3.169				
S/H	0.001	0.325	0.665	0.490	0.145	0.330	15.950	0.000
T statistics	0.180	1.250	3.625	2.875	0.920			
S/L	0.001	0.336				0.154	22.500	0.000
T statistics	0.185	4.740						
S/L	0.002	0.335	0.680	-0.490		0.280	16.825	0.000
T statistics	0.470	5.139	4.480	-3.420				

S/L	0.003	0.350	0.585	-0.550	0.260	0.300	13.320	0.000
T statistics	0.540	5.440	3.735	-3.800	1.906			

In next step the portfolios are further sorted on the basis of value premium, small firms with high book to market and small firm with low book to market. In case of small stock with high book to market ratio CAPM explains 10.5 % of the total variation. Market premium is significant and positive with low explanatory power. Size and value premium both have the significantly positive impact on return which show Fama and French is better model than single factor model. The explanatory power of model is now 33%.When volatility premium is added it is insignificantly influencing the returns.

In case of small stock with low book to market ratio, CAPM explains 15.4% of variations in return. Market premium is significant and positive but low explanatory power. When size premium is added it influence significantly positive but value premium is influencing significantly negative. The explanatory power of model is 28%. In case of volatility premium the explanatory power of model is 30% and it effects significantly positive.

Big stocks are further sorted on the basis of value premium big stocks with high book to market ratio and big stocks with low book to market ratio. In case of big stocks with high book to market ratio CAPM explains 16.9% of the variation which show that it is a valid model. Market premium is significant and positive but explanatory power is low. Size and value premium both are negative it means that size and value premium is priced in case of big stocks. Volatility premium is found significant and positive. The explanatory power of model increased by 25.5%.it means volatility has the impact on the returns of stocks.

In case of B/L, CAPM explains only 9.2% variations in returns. Market premium is significant and positive which is consistent with theory. Size premium is influencing insignificantly and

negative while value premium is influencing significantly negative. The explanatory power of model is 19%. Volatility premium is influencing insignificantly positive and no obvious effect on the explanatory power of model is observed. It shows that volatility premium does not capture the additional information from the portfolio studied.

Table 4.6 Volatility Sorted Portfolio(Pakistan):

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H/HV	0.003	0.275				0.062	9.061	0.000
T statistics	0.595	3.009						
B/H/HV	0.001	0.265	-0.425	0.662		0.138	7.435	0.000
T statistics	0.132	3.025	-2.085	3.409				
B/H/HV	0.001	0.320	-0.665	0.501	0.670	0.225	9.810	0.000
T statistics	0.262	3.775	-3.260	2.645	3.790			
B/H/LV	0.005	0.410				0.235	38.420	0.000
T statistics	1.115	6.190						
B/H/LV	0.003	0.405	-0.205	0.342		0.260	15.338	0.000
T statistics	0.770	6.210	-1.375	2.385				
B/H/LV	0.003	0.395	-0.154	0.378	-0.149	0.262	11.739	0.000
T statistics	0.735	5.950	-0.979	2.570	-1.081			
B/L/HV	-0.001	0.285				0.075	11.109	0.000
T statistics	-0.095	3.332						
B/L/HV	0.002	0.297	0.051	-0.397		0.098	5.374	0.000
T statistics	0.285	3.480	0.265	-2.112				
B/L/HV	0.002	0.355	-0.203	-0.572	0.734	0.219	9.419	0.000
T statistics	0.445	4.410	-1.061	-3.200	4.362			

B/L/LV	-0.004	0.303				0.055	8.439	0.000
T statistics	-0.685	2.903						
B/L/LV	0.001	0.333	-0.610	-0.543		0.194	10.600	0.000
T statistics	-0.005	3.425	-2.728	-2.540				
B/L/LV	-0.001	0.295	-0.450	-0.435	-0.435	0.219	9.375	0.000
T statistics	-0.075	3.075	-1.973	-2.025	-2.160			
S/H/HV	0.009	0.400				0.080	11.760	0.000
T statistics	1.050	3.428						
S/H/HV	0.001	0.350	1.100	0.785		0.385	26.365	0.000
T statistics	0.105	3.710	5.011	3.773				
S/H/HV	0.001	0.409	0.890	0.645	0.590	0.429	23.508	0.000
T statistics	0.207	4.290	4.005	3.111	3.045			
S/H/LV	0.004	0.290				0.089	12.960	0.000
T statistics	0.620	3.599						
S/H/LV	0.001	0.275	0.338	0.265		0.142	7.620	0.000
T statistics	0.172	3.510	1.850	1.539				
S/H/LV	0.001	0.252	0.440	0.338	-0.290	0.155	6.610	0.000
T statistics	0.115	3.200	2.325	1.915	-1.775			
S/L/HV	0.001	0.230				0.053	7.905	0.000
T statistics	-0.065	2.810						
S/L/HV	0.001	0.225	0.775	-0.504		0.189	10.385	0.000
T statistics	0.125	3.000	4.430	-3.020				
S/L/HV	0.002	0.292	0.490	-0.702	0.815	0.362	18.145	0.000
T statistics	0.324	4.285	3.005	-4.620	5.730			

S/L/LV	0.003	0.445				0.200	30.785	0.000
T statistics	0.403	5.545						
S/L/LV	0.003	0.445	0.580	-0.480		0.272	15.965	0.000
T statistics	0.685	5.823	3.285	-2.855				
S/L/LV	0.003	0.423	0.685	-0.409	-0.285	0.285	13.045	0.000
T statistics	0.635	5.500	3.715	-2.399	-1.820			

The portfolios are further sorted on the basis of volatility premium. Volatility premium is discussed by many researchers including Clarke, De Thorley (2010) and Fama and French (2013). For the big firms with high book to market ratio and high volatility CAPM explains 6.2% of variation in return of portfolios. Size and value premium are also significantly influencing the returns. Volatility is significant and positive indicating that high volatile stocks earn high return. It is consistent with the theory that more volatility, more risk and more return.

For a portfolio comprising big stock with high book to market ratio and low volatility, CAPM captures 23.5% of variation in return of portfolio studied. When size premium is added it effects the returns insignificantly and negatively whereas when value premium is added it effects the returns significantly and positively. When volatility premium is added it effects insignificantly negative, similar results are also reported by Veeraraghavan (2004) in Germany, France and UK market that termed it as low volatility anomaly.

In case of portfolio of big stock with low book to market ratio and high volatility, CAPM only explains only 7.5% of variation in returns of portfolio. In case of size premium returns effect

insignificantly but in case of value premium it affects significantly negative. Volatility premium effects significantly positive it means that high volatile stock earn high return.

For a portfolio comprising big stock with low book to market ratio and low volatility, CAPM explains 5.5% of variation in return of portfolio. Size premium is negative and this trend is observed in all portfolios comprising of big stocks. Volatility premium is significantly negative which is inconsistent with general agreement of risk and return.

For portfolio comprising small stocks with high book to market ratio and high volatility CAPM able to capture returns but it explains only 8% of variation in the returns. When size and value premium are added they influence significantly and return increases to 38.5% of variation of returns. Volatility premium is significantly positive which is consistent with high risk and high return argument.

In case of small stock with high book to market ratio and low volatility, CAPM explains 8.9% of variation in return of portfolio. Size premium affects significantly positive whereas value premium affects insignificantly positive. When volatility premium is added it affects significantly but its impact is negative.

For a portfolio comprising small stock with low book to market ratio and low volatility,CAPM is able to capture market return but it only explains 20% of variation in return of portfolio studied. Fama and French model extends CAPM and improves this model, as size and value premium are significantly influencing the model and return increases to 19%.The impact of value premium is negative which is inconsistent with the theory. The volatility premium is insignificant and negative. It means said premium is unable to explain the results in portfolio examined

Table 4.7 Size Sorted Portfolio (India)

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
P	0.00381	0.760				0.530	189.701	0.000
T Statistic	0.999495	13.773						
P	0.000	0.796	0.232	0.068		0.560	71.961	0.000
T statistic	0.206	14.631	3.133	0.839				
P	0.001	0.787	0.261	-0.055	0.155	0.568	55.999	0.000
T statistic	0.429	14.565	3.491	-0.680	2.017			
B	0.001	0.822				0.569	222.252	0.000
T Statistic	0.417	14.908						
B	0.000	0.796	-0.268	0.068		0.597	83.480	0.000
T statistic	0.206	14.631	-3.623	0.839				
B	0.001	0.787	-0.239	0.055	0.154	0.604	64.80	0.000
T statistic	0.429	14.565	-3.202	0.680	2.017			
S	0.009	0.697				0.376	102.042	0.000
T statistic	1.930	10.101						
S	0.000	0.796	0.732	0.068		0.627	94.783	0.000
T statistics	0.206	14.631	9.891	0.839				
S	0.001	0.787	0.761	-0.055	0.154	0.634	73.436	0.000
T statistics	0.429	14.565	10.184	-0.680	2.017			

Result shows that market premium is significantly positive and explains 53% of the total variation in returns of portfolio of all the stocks at 95% confidence level so capital asset pricing model is a valid model for portfolios of all the stocks. Overall when size premium is added, its effect on the portfolio of all stocks is insignificant. Similarly, the impact of value premium is also insignificant. Volatility premium is that high volatile stock has high risk and high return. So the results of study are consistent with the theory in the way that when volatility premium is added it has the significant impact on the returns.

CAPM appears to be a valid model for portfolios of big stocks because at 95% confidence level market premium is significantly positive and explains 56.9% of total variation in returns of portfolios. When size premium is added it has the significantly negative impact on the return and explains 59.7% of total variation in return of big stock portfolios. When value premium is added it has insignificant impact on portfolio of big stocks. Volatility premium also has the insignificant impact on portfolios in spite of an increase in explanatory power.

In small stock portfolios, market premium is significantly positive at 95% confidence level and explains 37.6% of total variations in return of portfolios. Size has significantly positive impact on the portfolios and explains 62.7% of total variation whereas value premium has insignificant impact on the returns of portfolios. In spite of an increase in explanatory power when volatility premium is added it has the insignificant impact on the return of portfolios.

Table 4.8 Value Sorted Portfolio (India)

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H	0.004	0.768				0.446	135.862	0.000
T statistics	0.941	11.656						
B/H	0.004	0.778	-0.367	0.551		0.562	72.411	0.000
T statistics	0.972	13.018	-4.518	6.144				
B/H	0.005	0.764	-0.321	0.529	0.249	0.582	59.209	0.000
T statistics	1.321	13.056	-3.964	6.027	3.000			
B/L	0.007	0.876				0.516	179.684	0.000
T statistics	1.652	13.405						
B/L	0.002	0.813	-0.168	-0.414		0.592	82.002	0.000
T statistics	0.582	13.306	-2.031	-4.511				
B/L	0.002	0.811	-0.157	-0.418	0.060	0.591	61.426	0.000
T statistics	0.501	13.190	-1.857	-4.544	0.692			
S/H	0.0101	0.651				0.242	54.172	0.000
T statistics	1.796	7.360						
S/H	0.002	0.814	0.831	0.586		0.649	104.658	0.000
T statistics	0.582	13.306	9.988	6.392				
S/H	0.002	0.811	0.842	0.581	0.060	0.651	78.363	0.000
T statistics	0.501	13.190	9.920	6.304	0.692			
S/L	0.007	0.744				0.405	114.878	0.000
T statistics	1.552	10.718						
S/L	0.004	0.778	0.633	-0.449		0.575	76.470	0.000
T statistics	0.972	13.018	7.783	-5.014				

S/L	0.005	0.765	0.679	-0.471	0.249	0.595	62.402	0.000
T statistics	1.321	13.056	8.398	-5.362	3.000			

In next step the portfolios are further sorted on the basis of value premium, small firms with high book to market and small firm with low book to market. In case of small stock with high book to market ratio CAPM explains 24.2 % of the total variation. Market premium is significant and positive with low explanatory power. Size and value premium both have the significantly positive impact on return which show Fama and French is better model than single factor model. The explanatory power of model is now 64.9%.When volatility premium is added it is insignificantly influencing the returns.

In case of small stock with low book to market ratio, CAPM explains 40.5% of variations in return. Market premium is significant and positive but low explanatory power. When size premium is added it influence significantly positive but value premium is influencing significantly negative. The explanatory power of model is 57.5%. In case of volatility premium the explanatory power of model is 59.5% and it effects significantly positive.

Big stocks are further sorted on the basis of value premium big stocks with high book to market ratio and big stocks with low book to market ratio. In case of big stocks with high book to market ratio CAPM explains 44.6% of the variation which show that it is a valid model. Market premium is significant and positive but explanatory power is low. Size and value premium both are negative it means that size and value premium is priced in case of big stocks. Volatility premium is found significant and positive. The explanatory power of model increased by 58.2%.it means volatility has the impact on the returns of stocks.

In case of B/L, CAPM explains only 51.6% variations in returns. Market premium is significant and positive which is consistent with theory. Size premium is influencing insignificantly and negative while value premium is influencing significantly negative. The explanatory power of model is 59.2%. Volatility premium is influencing insignificantly positive and no obvious effect on the explanatory power of model is observed. It shows that volatility premium does not capture the additional information from the portfolio studied.

Table 4.9 Volatility Sorted Portfolio (India)

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H/HV	0.009	0.724				0.387	106.567	0.000
T statistics	2.028	10.323						
B/H/HV	0.008	0.742	-0.203	0.429		0.443	45.284	0.000
T statistics	1.844	10.890	-2.193	4.201				
B/H/HV	0.007	0.752	-0.237	0.44508	0.184	0.452	35.417	0.000
T statistics	1.637	11.093	-2.535	4.376	1.906			
B/H/LV	0.001	0.813				0.304	73.999	0.000
T statistics	0.193	8.602						
B/H/LV	0.000	0.814	-0.531	0.672		0.421	41.442	0.000
T statistics	0.107	9.270	-4.448	5.103				
B/H/LV	0.003	0.776	-0.404	0.613	-0.682	0.523	46.778	0.000
T statistics	0.545	9.714	-3.655	5.116	-6.012			
B/L/HV	-0.011	0.951				0.449	137.323	0.000
T statistics	-2.028	11.718						
B/L/HV	0.007	0.898	0.099	-0.398		0.489	54.483	0.000
T statistics	1.309	11.293	0.918	-3.342				

B/L/HV	0.009	0.924	-0.189	0.357	0.480	0.543	50.634	0.000
T statistics	1.869	12.245	-1.813	3.154	4.480			
B/L/LV	-0.004	0.803				0.351	91.409	0.000
T statistics	-0.615	9.561						
B/L/LV	0.002	0.729	-0.238	-0.428		0.428	42.656	0.000
T statistics	0.409	9.087	-2.184	-3.562				
B/L/LV	-0.005	0.696	-0.126	-0.481	-0.601	0.521	46.489	0.000
T statistics	-1.078	9.455	-1.239	-4.349	-5.745			
S/H/HV	0.016	0.540				0.117	23.327	0.000
T statistics	2.098	4.829						
S/H/HV	0.002	0.713	0.897	0.605		0.452	46.892	0.000
T statistics	0.303	7.940	7.348	4.492				
S/H/HV	0.000	0.742	0.799	0.650	0.524	0.505	43.580	0.000
T statistics	0.158	8.666	6.760	5.061	4.309			
S/H/LV	0.005	0.762				0.255	58.335	0.000
T statistics	0.832	7.637						
S/H/LV	0.006	0.915	0.764	0.567		0.5293	63.596	0.000
T statistics	1.218	11.316	6.952	4.683				
S/H/LV	0.003	0.879	0.885	0.512	-0.645	0.617	68.266	0.000
T statistics	0.657	12.021	8.756	4.669	-6.210			
S/L/HV	0.014	0.686				0.285	67.496	0.000
T statistics	2.450	8.215						
S/L/HV	0.011	0.720	0.706	-0.533		0.465	49.441	0.000
T statistics	2.068	9.796	7.060	-4.842				

S/L/HV	0.009	0.731	0.670	-0.517	0.192	0.473	38.487	0.000
T statistics	1.866	9.984	6.624	-4.711	1.852			
S/L/LV	0.000	0.803				0.347	89.897	0.000
T statistics	0.129	9.481						
S/L/LV	-0.002	0.835	0.559	-0.364		0.438	44.462	0.000
T statistics	-0.448	10.448	5.141	-3.041				
S/L/LV	0.001	0.797	0.688	-0.424	-0.691	0.562	54.539	0.000
T statistics	0.253	11.255	7.032	-3.990	-6.870			

The portfolios are further sorted on the basis of volatility premium. Volatility premium is discussed by many researchers including Clarke, De Thorley (2010) and Fama and French (2013). For the big firms with high book to market ratio and high volatility CAPM explains 38.7% of variation in return of portfolios. Size and value premium are also significantly influencing the returns. Volatility is significant and positive indicating that high volatile stocks earn high return. It is consistent with the theory that more volatility, more risk and more return.

For a portfolio comprising big stock with high book to market ratio and low volatility, CAPM captures 30.4% of variation in return of portfolio studied. When size premium is added it affects the returns insignificantly and negatively whereas when value premium is added it affects the returns significantly and positively. When volatility premium is added it effects insignificantly negative, similar results are also reported by Veeraraghavan (2004) in Germany, France and UK market that termed it as low volatility anomaly.

In case of portfolio of big stock with low book to market ratio and high volatility, CAPM only explains only 44.9% of variation in returns of portfolio. In case of size premium returns effect insignificantly but in case of value premium it affects significantly negative. Volatility premium effects significantly positive it means that high volatile stock earn high return.

For a portfolio comprising big stock with low book to market ratio and low volatility, CAPM explains 35.1% of variation in return of portfolio. Size premium is negative and this trend is observed in all portfolios comprising of big stocks. Volatility premium is significantly negative which is inconsistent with general agreement of risk and return.

For portfolio comprising small stocks with high book to market ratio and high volatility CAPM able to capture returns but it explains only 11.7% of variation in the returns. When size and value premium are added they influence significantly and return increases to 45.2% of variation of returns. Volatility premium is significantly positive which is consistent with high risk and high return argument.

In case of small stock with high book to market ratio and low volatility, CAPM explains 25.5% of variation in return of portfolio. Size premium affects significantly positive whereas value premium affects insignificantly positive. When volatility premium is added it affects significantly but its impact is negative.

For a portfolio comprising small stock with low book to market ratio and low volatility,CAPM is able to capture market return but it only explains 34.7% of variation in return of portfolio studied. Fama and French model extends CAPM and improves this model, as size and value premium are significantly influencing the model and return increases to 43.8%.The impact of value premium is negative which is inconsistent with the theory. The volatility premium is

insignificant and negative. It means said premium is unable to explain the results in portfolio examined.

China:

Table 4.10 Size Sorted Portfolio (China):

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
P	0.00974	0.078921				0.29521	6.079941	0.000
T Statistic	3.044985	2.465754						
P	0.012009	0.036156	0.19637	0.39976		0.268613	21.44445	0.000
T statistic	4.296164	1.268991	2.680832	5.01901				
P	0.012019	0.036281	0.196608	-0.40033	0.003682	0.264136	15.98599	0.000
T statistic	4.273283	1.26372	2.669193	-4.95075	0.045663			
B	0.011976	0.060242				0.17827	4.031219	0.000
T Statistic	3.993731	2.00779						
B	0.012009	0.036156	-0.30363	0.39976		0.15768	11.42061	0.000
T statistic	4.296164	1.268991	-4.14515	5.01901				
B	0.012019	0.036281	-0.30339	0.40033	0.003682	0.152523	8.513863	0.000
T statistic	4.273283	1.26372	-4.11893	4.95075	0.045663			
S	0.007613	0.096667				0.26411	5.530288	0.000
T statistic	1.853114	2.351656						
S	0.012107	0.0356	0.698195	0.39474		0.556333	70.80273	0.000
T statistics	4.337257	1.251119	9.544425	4.96259				
S	0.012102	0.035532	0.698067	-0.6980	0.00198	0.553612	52.7786	0.000

T statistics	4.308552	1.239284	9.489698	-4.8843	0.02458

Result shows that market premium is significantly positive and explains 29.5% of the total variation in returns of portfolio of all the stocks at 95% confidence level so capital asset pricing model is a valid model for portfolios of all the stocks. Overall when size premium is added, its effect on the portfolio of all stocks is insignificant. Similarly, the impact of value premium is also insignificant. Volatility premium is that high volatile stock has high risk and high return. So the results of study are consistent with the theory in the way that when volatility premium is added it has the significant impact on the returns.

CAPM appears to be a valid model for portfolios of big stocks because at 95% confidence level market premium is significantly positive and explains 17.8% of total variation in returns of portfolios. When size premium is added it has the significantly negative impact on the return and explains 15.7% of total variation in return of big stock portfolios. When value premium is added it has insignificant impact on portfolio of big stocks. Volatility premium also has the insignificant impact on portfolios in spite of an increase in explanatory power.

In small stock portfolios, market premium is significantly positive at 95% confidence level and explains 26.4% of total variations in return of portfolios. Size has significantly positive impact on the portfolios and explains 55.6% of total variation whereas value premium has insignificant impact on the returns of portfolios. In spite of an increase in explanatory power when volatility premium is added it has the insignificant impact on the return of portfolios.

Table 4.11 Value Sorted Portfolio (China):

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H	0.01372	0.033038				0.0678	1.113367	0.000
T statistics	4.384316	1.055162						
B/H	0.012229	0.049426	-0.282	0.066		0.094937	7.180852	0.000
T statistics	4.091009	1.622113	-3.600	0.775				
B/H	0.012249	0.049672	-0.28157	0.0649	0.0072	0.099454	5.354798	0.000
T statistics	4.07249	1.617846	-3.57458	0.7505	0.0840			
B/L	0.010232	0.087446				0.023386	4.99903	0.000
T statistics	2.617688	2.235851						
B/L	0.011788	0.022886	-0.32522	-0.865		0.36338	33.3272	0.000
T statistics	3.722633	0.70903	-3.91913	-9.592				
B/L	0.011788	0.02289	-0.32521	-0.865	0.000	0.36799	24.84299	0.000
T statistics	3.699756	0.70377	-3.89727	-9.448	0.0012			
S/H	0.009239	0.036178				0.086	0.928033	0.000
T statistics	2.461515	0.963345						
S/H	0.011788	0.022886	0.32522	0.865		0.297136	24.53309	0.000
T statistics	3.722633	0.70903	3.91913	9.592				
S/H	0.011788	0.02289	0.32521	0.865	0.0001	0.363499	24.84299	0.000
T statistics	3.699756	0.70377	3.89727	9.448	0.001			
S/L	0.005771	0.159023				0.044927	8.855822	0.000
T statistics	1.080611	2.975873						
S/L	0.012229	0.049426	0.717957	-0.933		0.704674	133.8258	0.000
T statistics	4.091009	1.622113	9.165155	-10.96				

S/L	0.012249	0.049672	0.718426	-0.9351	0.007	0.724875	99.76344	0.000
T statistics	4.07249	1.617846	9.120403	-10.813	0.0840			

In next step the portfolios are further sorted on the basis of value premium, small firms with high book to market and small firm with low book to market. In case of small stock with high book to market ratio CAPM explains 8.6 % of the total variation. Market premium is significant and positive with low explanatory power. Size and value premium both have the significantly positive impact on return which show Fama and French is better model than single factor model. The explanatory power of model is now 29.7%.When volatility premium is added it is insignificantly influencing the returns.

In case of small stock with low book to market ratio, CAPM explains 4.4% of variations in return. Market premium is significant and positive but low explanatory power. When size premium is added it influence significantly positive but value premium is influencing significantly negative. The explanatory power of model is 70.4%. In case of volatility premium the explanatory power of model is 72.4% and it effects significantly positive.

Big stocks are further sorted on the basis of value premium big stocks with high book to market ratio and big stocks with low book to market ratio. In case of big stocks with high book to market ratio CAPM explains 6.7% of the variation which show that it is a valid model. Market premium is significant and positive but explanatory power is low. Size and value premium both are negative it means that size and value premium is priced in case of big stocks. Volatility premium is found significant and positive. The explanatory power of model increased by 9.9%.it means volatility has the impact on the returns of stocks.

In case of B/L, CAPM explains only 23.3% variations in returns. Market premium is significant and positive which is consistent with theory. Size premium is influencing insignificantly and

negative while value premium is influencing significantly negative. The explanatory power of model is 36.3%. Volatility premium is influencing insignificantly positive and no obvious effect on the explanatory power of model is observed. It shows that volatility premium does not capture the additional information from the portfolio studied.

Table 4.12 Volatility Sorted Portfolio(China):

Dependant variable	Intercept	MKT	SMB	HML	VMS	Adj R^2	F stat	F sig.
B/H/HV	0.012	0.001				0.076	0.0003	0.000
T statistics	2.674	0.018						
B/H/HV	0.009	0.035	-0.342	0.243		0.112	8.0859	0.000
T statistics	2.268	0.814	-3.085	2.014				
B/H/HV	0.011	0.049	-0.314	0.175	0.432	0.176	9.939	0.000
T statistics	2.638	1.193	-2.933	1.495	3.692			
B/H/LV	0.015	0.065				0.096	3.478	0.000
T statistics	4.426	1.865						
B/H/LV	0.014	0.064	-0.222	0.110		0.037	3.169	0.000
T statistics	4.274	1.798	-2.438	1.115				
B/H/LV	0.013	0.049	-0.249	0.045	-0.417	0.135	7.495	0.000
T statistics	4.145	1.468	-2.876	0.481	-4.405			
B/L/HV	0.011	0.103				0.109	4.3062	0.000
T statistics	2.234	2.075						
B/L/HV	0.013	0.026	-0.374	-1.024		0.318	27.046	0.000
T statistics	3.116	0.617	-3.430	-8.638				
B/L/HV	0.014	0.035	-0.356	-1.065	0.268	0.335	22.091	0.000
T statistics	3.325	0.838	-3.304	-8.993	2.273			

B/L/LV	0.009	0.071				0.061	3.017	0.000
T statistics	2.268	1.737						
B/L/LV	0.011	0.019	0.276	-0.706		0.213	16.142	0.000
T statistics	2.855	0.517	2.838	-6.677				
B/L/LV	0.009	0.010	-0.293	-0.665	0.268	0.239	14.145	0.000
T statistics	2.692	0.280	-3.059	-6.312	2.553			
S/H/HV	0.011	0.003				0.095	0.005	0.000
T statistics	2.454	0.077						
S/H/HV	0.012	0.015	0.587	0.112		0.159	11.526	0.000
T statistics	3.227	0.378	5.609	0.981				
S/H/HV	0.014	0.003	0.623	0.026	0.554	0.273	16.705	0.000
T statistics	3.870	0.088	6.385	0.244	5.176			
S/H/LV	0.007	0.075				0.081	2.447	0.000
T statistics	1.615	1.564						
S/H/LV	0.010	0.061	0.762	0.157		0.231	17.739	0.000
T statistics	2.489	1.399	6.781	1.286				
S/H/LV	0.009	0.042	0.726	0.243	-0.553	0.321	20.773	0.000
T statistics	2.264	1.028	6.862	2.090	-4.775			
S/L/HV	0.001	0.115				0.019	4.321	0.000
T statistics	0.253	2.078						
S/L/HV	0.007	0.031	0.784	-0.619		0.484	53.14	0.000
T statistics	1.746	0.750	7.402	-5.376				
S/L/HV	0.009	0.056	0.833	-0.737	0.760	0.615	67.932	0.000

T statistics	2.617	1.588	9.097	-7.329	7.579			
S/L/LV	0.010	0.203				0.142	8.829	0.000
T statistics	1.485	2.972						
S/L/LV	0.017	0.067	0.652	-1.248		0.582	78.641	0.000
T statistics	3.830	1.467	5.474	-9.646				
S/L/LV	0.015	0.043	0.603	-1.133	-0.745	0.663	83.262	0.000
T statistics	3.749	1.021	5.632	-9.632	-6.357			

The portfolios are further sorted on the basis of volatility premium. Volatility premium is discussed by many researchers including Clarke, De Thorley (2010) and Fama and French (2013). For the big firms with high book to market ratio and high volatility CAPM explains 7.6% of variation in return of portfolios. Size and value premium are also significantly influencing the returns. Volatility is significant and positive indicating that high volatile stocks earn high return. It is consistent with the theory that more volatility, more risk and more return.

For a portfolio comprising big stock with high book to market ratio and low volatility, CAPM captures 9.6% of variation in return of portfolio studied. When size premium is added it effects the returns insignificantly and negatively whereas when value premium is added it effects the returns significantly and positively. When volatility premium is added it effects insignificantly negative, similar results are also reported by Veeraraghavan (2004) in Germany, France and UK market that termed it as low volatility anomaly.

In case of portfolio of big stock with low book to market ratio and high volatility, CAPM only explains only 10.9% of variation in returns of portfolio. In case of size premium returns effect

insignificantly but in case of value premium it affects significantly negative. Volatility premium effects significantly positive it means that high volatile stock earn high return.

For a portfolio comprising big stock with low book to market ratio and low volatility, CAPM explains 6.1% of variation in return of portfolio. Size premium is negative and this trend is observed in all portfolios comprising of big stocks. Volatility premium is significantly negative which is inconsistent with general agreement of risk and return.

For portfolio comprising small stocks with high book to market ratio and high volatility CAPM able to capture returns but it explains only 9.5% of variation in the returns. When size and value premium are added they influence significantly and return increases to 15.9% of variation of returns. Volatility premium is significantly positive which is consistent with high risk and high return argument.

In case of small stock with high book to market ratio and low volatility, CAPM explains 8.1% of variation in return of portfolio. Size premium affects significantly positive whereas value premium affects insignificantly positive. When volatility premium is added it affects significantly but its impact is negative.

For a portfolio comprising small stock with low book to market ratio and low volatility,CAPM is able to capture market return but it only explains 14.2% of variation in return of portfolio studied. Fama and French model extends CAPM and improves this model, as size and value premium are significantly influencing the model and return increases to 58.2%.The impact of value premium is negative which is inconsistent with the theory. The volatility premium is insignificant and negative. It means said premium is unable to explain the results in portfolio examined.

Regression Analysis

Table 4.13 Two Pass Regression(India)

	Co.efficients	Std. Error	T. Stat	P.value	Adj. R^2
Intercept	0.127	0.525	0.242	0.813	0.605
βMkt Prem	0.006	0.003	2.021	0.071	
βSize Prem	0.010	0.003	3.001	0.013	
βValue Prem	0.003	0.003	0.934	0.373	
βVolatility Prem	0.003	0.004	0.749	0.471	

To understand the power of factor sensitiveness two pass regression is applied. The findings of study indicate market beta is unable to predict portfolio returns. Its mean CAPM is relatively weak in estimating return as it is the single factor model. Beta of size and value premium is significantly positively associated with returns. The results are consistent with Fama and French (1992, 1993, 1996, 1998) it states that size and book to market ratios are priced by market. The explanatory power of model is 60%. Volatility beta is also unable to predict the portfolios return.

Table 4.14 Two pass regression(China):

	Co.efficient	Std. Error	T.Stat	P.Value	Adj R^2
Intercept	0.002	0.002	1.061	0.315	0.820
βMkt Prem	0.034	0.010	3.094	0.012	
βSize Prem	0.004	0.001	5.413	0.001	
βValue Prem	0.002	0.001	2.944	0.016	
βVolatility Prem	0.001	0.001	1.486	0.171	

To understand the power of factor sensitiveness two pass regression is applied. The findings of study indicate market beta is unable to predict portfolio returns. Its mean CAPM is relatively weak in estimating return as it is the single factor model. Beta of size and value premium is significantly positively associated with returns. The results are consistent with Fama and French (1992, 1993, 1996, 1998) it states that size and book to market ratios are priced by market. The explanatory power of model is 82%. Volatility beta is also unable to predict the portfolios return.

Table 4.15 Two pass regression (Pakistan):

	Co.efficient	Std. Error	T.Stat	P.Value	Adj R^2
Intercept	0.001	0.003	0.771	0.456	0.881
βMkt Prem	0.006	0.003	1.771	0.105	
βSize Prem	0.002	0.001	5.780	0.001	
βValue Prem	0.006	0.001	7.956	0.001	
βVolatility Prem	0.001	0.002	1.525	0.000	

To understand the power of factor sensitiveness two pass regression is applied. The findings of study indicate market beta is unable to predict portfolio returns. Its mean CAPM is relatively weak in estimating return as it is the single factor model. Beta of size and value premium is significantly positively associated with returns. The results are consistent with Fama and French (1992, 1993, 1996, 1998) it states that size and book to market ratios are priced by market. The explanatory power of model is 88%. Volatility beta is also unable to predict the portfolios return.

CHAPTER NO 5

Conclusion and Recommendations

In 1960's the first asset pricing model is proposed by Sharpe which introduce the asset pricing model with single factor which is market premium. After that different factors are introduced by different researchers from time to time as P/E ratio anomaly in 1977, size anomaly in 1981,book to market ratio anomaly in 1980-1985, momentum anomaly in 1993 and recently volatility anomaly is discussed by Clarke, Silva and Thorley (2010) and Fama and French (2013).

In this study volatility is combined with other asset pricing model. A sample of 80 companies from each of the country for the period of 2002 to 2015 is used to understand the impact of various factors like size, value and volatility premium on equity return. Descriptive statistics of size, value and volatility premium is calculated for each of the country and they found positive. The single factor model (CAPM), three factor model and volatility model are tested. The results of CAPM are consistent with the theory in each of country but explanatory power is low. The results of three factor model including size and value premium are also consistent with the other studies. The results of value premium are not consistent and its behaviour differs in small and big stock firms. The results of value premium for small stock firms with high book to market are found significant in each of the country.

When volatility premium is added the explanatory power of model is better than CAPM. The volatility premium is influencing significantly positive on small stocks with high book to market ratio. In case of small stocks with low book to market ratio it is influencing negatively. For the big stocks, it is influencing positive on stocks with high book to market ratio and negatively on stocks having low book to market ratio. The volatility effect is positive for high volatile stocks

and negative for low volatile stocks for each of the country. The results are consistent in all the countries including Pakistan, India and China because all three are the emerging markets in the same geographical region.

Recommendation:

1. Investment strategies should be device by investors on the basis of size, value and volatility of stocks. As volatile stock have the different returns from the stable stocks, so arbitrage portfolio can be used.

2. Instead of using single factor model in estimation of cost of capital other factors should also be used.

Directions for future research:

Previously there are the studies on volatility premium which are conducted on the developed countries. This study is conducted on the emerging markets like Pakistan, China and India. The same model may be tested on the other emerging markets.

References:

Adrian, T., & Rosenberg, J. (2008). Stock Returns and Volatility: Pricing the Short-Run and Long-Run Components of Market Risk. *The Journal of Finance*, *63*(6), 2997-3030.

Aleati, A., Gottardo, P., & Murgia, M. (2000). The pricing of Italian equity returns. *Economic Notes*, *29*(2), 153-177.

Ali, A., Hwang, L. S., & Trombley, M. A. (2003). Arbitrage risk and the book-to-market anomaly. *Journal of Financial Economics*, *69*(2), 355-373.

Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2005). The cross-section of volatility and expected returns. *Journal of Finance, forthcoming*.

Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2006). The cross-section of volatility and expected returns. *The Journal of Finance*, *61*(1), 259-299.

Banz, R. W. (1981). The relationship between return and market value of common stocks. *Journal of financial economics*, *9*(1), 3-18.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The journal of Finance*, *32*(3), 663-682.

Blitz, D., & Van Vliet, P. (2007). The volatility effect: Lower risk without lower return. *Journal of Portfolio Management*, 102-113.

Cambell, J. Y., & Hentschel, L. (1990). *An Asymmetric Model Of Changing Volatility In Stock Returns* (No. 118).

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of finance*, *52*(1), 57-82.

Chen, L., Novy-Marx, R., & Zhang, L. (2010).An alternative three-factor model.*Available at SSRN 1418117*.

CHEN, N. F. (1983). Some empirical tests of the theory of arbitrage pricing.*The Journal of Finance*, *38*(5), 1393-1414.

Chiah, M., Daniel, C., & Zhong, A. (2015).A Better Model?An Empirical Investigation of the Fama-French Five-Factor Model in Australia. *An Empirical Investigation of the Fama-French Five-Factor Model in Australia (January 5, 2015)*.

Christie, A. A. (1982). The stochastic behavior of common stock variances: Value, leverage and interest rate effects. *Journal of financial Economics*,*10*(4), 407-432.

Connor, G., & Korajczyk, R. A. (1988). Risk and return in an equilibrium APT: Application of a new test methodology. *Journal of Financial Economics*,*21*(2), 255-289.

Daniel, K., & Titman, S. (1997). Evidence on the characteristics of cross sectional variation in stock returns. *The Journal of Finance*, *52*(1), 1-33.

Daniel, K., & Titman, S. (1997). Evidence on the characteristics of cross sectional variation in stock returns. *The Journal of Finance*, *52*(1), 1-33.

Daniel, K., & Titman, S. (2005). Evidence on the characteristics of cross-sectional variation in stock returns. *2005) Advances in Behavioral Finance*,*2*, 317-352.

Daniel, K., Grinblatt, M., Titman, S., & Wermers, R. (1997). Measuring mutual fund performance with characteristic-based benchmarks. *The Journal of finance*, *52*(3), 1035-1058.

Di Iorio, A., & Faff, R. (2000). An analysis of asymmetry in foreign currency exposure of the Australian equities market. *Journal of Multinational Financial Management*, *10*(2), 133-159.

Djajadikerta, H., &Nartea, G. (2005). *The Size and Book-to-Market Effects and the Fama-French Three-Factor Model in Small Markets: Preliminary Findings from New Zealand* (No. 2005-10).

Drew, M. E., & Veeraraghavan, M. (2002). A closer look at the size and value premium in emerging markets: Evidence from the Kuala Lumpur Stock Exchange. *Asian Economic Journal*, *16*(4), 337-351.

Drew, M. E., Naughton, T., & Veeraraghavan, M. (2003). Is idiosyncratic volatility priced? Evidence from the Shanghai Stock Exchange.

Drew, M. E., Naughton, T., & Veeraraghavan, M. (2004). Is idiosyncratic volatility priced?: Evidence from the Shanghai Stock Exchange. *International Review of Financial Analysis*, *13*(3), 349-366.

Duffee, G. R. (1995). Stock returns and volatility a firm-level analysis.*Journal of Financial Economics*, *37*(3), 399-420.

Durack, N., Durand, R. B., & Maller, R. A. (2004). A best choice among asset pricing models? The conditional capital asset pricing model in Australia. *Accounting & Finance*, *44*(2), 139-162.

Efficiency, S. M. (2001). Returns to Buying Winners and Selling Losers: Implications for.

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, *47*(2), 427-465.

Fama, E. F., & French, K. R. (1993).Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, *33*(1), 3-56.

Fama, E. F., & French, K. R. (1995). Size and book-to-market factors in earnings and returns. *The Journal of Finance*, *50*(1), 131-155.

Fama, E. F., & French, K. R. (1995).Size and book-to-market factors in earnings and returns. *The Journal of Finance*, *50*(1), 131-155.

Fama, E. F., & French, K. R. (1996).Multifactor explanations of asset pricing anomalies. *The journal of finance*, *51*(1), 55-84.

Fama, E. F., & French, K. R. (1998). Value versus growth: The international evidence. *The Journal of Finance*, *53*(6), 1975-1999.

Fama, E. F., & French, K. R. (2014).A five-factor asset pricing model. *Journal of Financial Economics*.

Fama, E. F., &MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy*, 607-636.

Gaunt, C. (2004). Size and book to market effects and the Fama French three factor asset pricing model: evidence from the Australian stock market. *Accounting & Finance*, *44*(1), 27-44.

Griffin, J. M., & Lemmon, M. L. (2002). Book–to–market equity, distress risk, and stock returns. *The Journal of Finance*, *57*(5), 2317-2336.

Hassan, A., &Javed, M. T. (2011).Size and value premium in Pakistani equity market. *African Journal of Business Management*, *5*(16), 6747-6755.

Iqbal, J., & Brooks, R. (2007). Alternative beta risk estimators and asset pricing tests in emerging markets: The case of Pakistan. *Journal of Multinational Financial Management*, *17*(1), 75-93.

Iqbal, J., & Brooks, R. (2007). Alternative beta risk estimators and asset pricing tests in emerging markets: The case of Pakistan. *Journal of Multinational Financial Management*, *17*(1), 75-93.

Javid, A. Y. (2009). Test of higher moment capital asset pricing model in case of Pakistani equity market.

Javid, A. Y. (2009). Test of higher moment capital asset pricing model in case of Pakistani equity market.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of finance,48*(1), 65-91.

Kearns, P., & Pagan, A. R. (1993). Australian stock market volatility: 1875–1987. *Economic Record*, *69*(2), 163-178.

Klein, R. W., & Bawa, V. S. (1977). The effect of limited information and estimation risk on optimal portfolio diversification. *Journal of Financial Economics*, *5*(1), 89-111.

Lam, K. S. (2002). The relationship between size, book-to-market equity ratio, earnings–price ratio, and return for the Hong Kong stock market. *Global Finance Journal*, *13*(2), 163-179.

Lam, K. S. (2002). The relationship between size, book-to-market equity ratio, earnings–price ratio, and return for the Hong Kong stock market. *Global Finance Journal*, *13*(2), 163-179.

Lamoureux, C. G., & Lastrapes, W. D. (1990). Heteroskedasticity in stock return data: volume versus GARCH effects. *The Journal of Finance, 45*(1), 221-229.

Lee, C. F., Chen, G. M., & Rui, O. M. (2001). Stock returns and volatility on China's stock markets. *Journal of Financial Research*, *24*(4), 523-543.

Lintner, J. (1965). Security Prices, Risk, and Maximal Gains from Diversification. *The Journal of Finance*, *20*(4), 587-615.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica: Journal of the econometric society*, 768-783.

Nichol, E., & Dowling, M. (2014).Profitability and investment factors for UK asset pricing models. *Economics Letters*, *125*(3), 364-366.

Pagan, A. R., & Kearns, P. (1990). *Ustralian Stock Market Volatility: 1875-1987* (No. 248). University of Rochester-Center for Economic Research (RCER).

Petkova, R., & Zhang, L. (2005). Is value riskier than growth?. *Journal of Financial Economics*, *78*(1), 187-202.

Poterba, J. M., & Summers, L. H. (1988). Mean reversion in stock prices: Evidence and implications. *Journal of financial economics*, *22*(1), 27-59.

Rahman, M., Baten, M. A., & Alam, A. (2006). An empirical testing of capital asset pricing model in Bangladesh. *Applied Sci*, *6*, 662-667.

Reinganum, M. R. (1983). The anomalous stock market behavior of small firms in January: Empirical tests for tax-loss selling effects. *Journal of Financial Economics*, *12*(1), 89-104.

Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *The Journal of Portfolio Management*, *11*(3), 9-16.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of economic theory*, *13*(3), 341-360.

Schwert, G. W. (1989). Why does stock market volatility change over time?.*The journal of finance*, *44*(5), 1115-1153.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance*, *19*(3), 425-442.

Tsai, L. C., Young, C. S., & Hsu, H. W. (2011).Entrenched controlling shareholders and the performance consequences of corporate diversification in Taiwan. *Review of Quantitative Finance and Accounting*, *37*(1), 105-126.

Μπαλασοπούλου, Ε. (2005). Stock returns and volatility: a firm level analysis.

Baker, M., Bradley, B., & Wurgler, J. (2011). Benchmarks as limits to arbitrage: Understanding the low-volatility anomaly. *Financial Analysts Journal*, *67*(1), 40-54.

Berk, J. B. (1997). Does size really matter?. *Financial Analysts Journal*,*53*(5), 12-18.

Black, F. (1976). {Stuedies of stock price volatility changes}.

Bollerslev, T., Engle, R. F., & Wooldridge, J. M. (1988). A capital asset pricing model with time-varying covariances. *The Journal of Political Economy*, 116-131.

Brandt, M. W., Brav, A., Graham, J. R., & Kumar, A. (2010). The idiosyncratic volatility puzzle: Time trend or speculative episodes?. *Review of Financial Studies*, *23*(2), 863-899.

Cho, D. C., Eun, C. S., & Senbet, L. W. (1986). International arbitrage pricing theory: An empirical investigation. *The Journal of Finance*, *41*(2), 313-329.

Chow, T. M., Hsu, J., Kalesnik, V., & Little, B. (2011). A survey of alternative equity index strategies. *Financial Analysts Journal*, *67*(5), 37-57.

Cook, T. J., & Rozeff, M. S. (1984). Size and earnings/price ratio anomalies: one effect or two?. *Journal of Financial and Quantitative Analysis*, *19*(4), 449-466.

Jones, C. M., Kaul, G., & Lipson, M. L. (1994). Transactions, volume, and volatility. *Review of financial studies*, *7*(4), 631-651.

Karolyi, G. A. (2001). Why stock return volatility really matters. *Strategic Investor Relations*, *1*, 1-20.

Kearney, C. (1998). The causes of volatility in a small, internationally integrated stock market: Ireland, July 1975–June 1994. *Journal of Financial Research*, *21*(1), 85-104.

Officer, R. R. (1973). The variability of the market factor of the New York Stock Exchange. *the Journal of Business*, *46*(3), 434-453.

Pettengill, G. N., Sundaram, S., & Mathur, I. (1995). The conditional relation between beta and returns. *Journal of Financial and quantitative Analysis*,*30*(01), 101-116.

Pindyck, R. S. (1984). Uncertainty in the theory of renewable resource markets. *The Review of Economic Studies*, *51*(2), 289-303.

Rahman, H., & Yung, K. (1994). Atlantic and Pacific stock markets—correlation and volatility transmission. *Global Finance Journal*, *5*(1), 103-119.

Shum, W. C., & Tang, G. Y. (2005). Common risk factors in returns in Asian emerging stock markets. *International Business Review*, *14*(6), 695-717.