BETTING AGAINST BETA: AN INSIGHT INTO ASSET PRICING DYNAMICS OF EMERGING ASIAN ECONOMIES

By

Fazal Hadi
MMS-151004

MASTER OF SCIENCE IN MANAGEMENT SCIENCES

(Finance)

DEPARTMENT OF MANAGEMENT SCIENCES

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY

ISLAMABAD

August, 2017

BETTING AGAINST BETA: AN INSIGHT INTO ASSET PRICING DYNAMICS OF EMERGING ASIAN ECONOMIES

by

Fazal Hadi
MMS-151004

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
August 2017

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY
ISLAMABAD
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

CERTIFICATE OF APPROVAL

Betting Against Beta: An Insight into Asset Pricing Dynamics of Emerging Asian Economies

By

Fazal Hadi

MMS151004

THESIS EXAMINING COMMITTEE

S No	Examiner	Name	Organization
(a)	External Examiner	Dr. Sumayya Chughtai	IIU, Islamabad
(b)	Internal Examiner	Dr. Arshad Hassan	CUST, Islamabad
(c)	Supervisor	Dr. Ahmad Fraz	CUST, Islamabad

_____

Dr. Ahmad Fraz

Thesis Supervisor

August, 2017

_____

Dr. Sajid Bashir

Head of Department

Department of Management Sciences

Dated : August, 2017

_____

Dr. Arshad Hassan

Dean

Faculty of Management and Social Sciences

Dated : August, 2017

STATEMENT BY THE CANDIDATE

This thesis includes no material that has already been accepted for the award of any degree or Diploma in any university. I confirms to the best of my knowledge that the thesis include no material previously been published or written by any other person, except where due reference is made in the text of the thesis.

FAZAL HADI

(MMS151004)

_____

CERTIFICATE

This is to certify that **Mr.Fazal Hadi** bearing Registration No.MMS151004 has incorporated all observations, suggestions and comments made by the external evaluators as well as the internal examiners and thesis supervisor **Dr. Ahmad Fraz** at Capital University of Science and Technology, Islamabad. The title of his Thesis is**: Betting against Beta: An Insight into Asset Pricing Dynamics of Emerging Asian Economie**s.

Forwarded for necessary action

Dr. Ahmad Fraz
(Thesis Supervisor)

DEDICATION

Dedicated to my parents, brothers, sisters and wife. Especially to two little stars: Mr. Zaryan Hadi and Mr. Haji Qasim.

ACKNOWLEDGEMENT

I would like to thank Allah, Almighty for giving me the courage and power to complete this assignment. Looking at the positive side, I'm thankful to economic challenges, resource limitations, other crises and problems for making me stronger, vigilant and proactive to face and accept all the odds in life.

My sincere thanks to my supervisor Dr. Ahmad Fraz (Assistant Professor, Faculty of management Sciences, CUST Islamabad) for his kind support, continuous mentoring and valuable instruction throughout this journey of thesis. I would like to thank Dr. Arshad Hassan (Dean, Faculty of Management Sciences, CUST) for his lasting support, valuable suggestions during the complete time at CUST as well as other professors who helped during this time.

I am thankful to my parents, wife, brothers and sister for their persistent support, kind prayers and good wishes in every walk of life. My lovely son whom have torn my books whenever I tried to study at home and reminded me his love that I scarified while living away from family.

I am indebted to the everlasting support of Idara Baraye Taleem-o-Taraqi (IBT) for its financial support, relax timing schedule and other resource allocation and facilities. Special thanks to my sweet colleagues at IBT i.e. Mr. Zubair Torwali, Mr. Aftab Ahmad, Mr. Sajjad Ahmad, Mr. Mujahid, Mr. Rahim Sabir and Mr. Noor Rahman for their great company, love and support in every ups and down of life. Without their good wishes this achievement would not be possible.

At last but not least, I'm highly thankful to my sweet friend Mr. Muhammad Hassan for his great company, evergreen gossip, celebrating each and every good and bad moment of life. His driving of the bike during scorching heat or stunning cold, during shining or raining made us never late a second for classes. His ambition, motivation and commitment to studies motivated and mobilized me to work hard.

At the end I'm would like to thanks for FLI especially Mr. Fakhruddin for providing cold space at the office during the research. I am also thankful for those who helped me direct or indirect during this stage of research.

Fazal Hadi

August, 2017

Table of Contents

LIST OF TABLES

LIST OF ABBREVIATIONS

BTM	Book to Market
EMH	Efficient Market Hypothesis
CAPM	Capital Asset Pricing Model
APT	Arbitrage Pricing Theory
PSX	Pakistan Stock Exchange
KSE	Karachi Stock Exchange
SSE	Shanghai Stock Exchange
BSE	Bombay Stock Exchange
MKT	Market
SMB	Size Premium (Small minus Big)
HML	Value Premium (High minus Low)
BAB	Betting Against Beta
LBA	Low Beta Anomaly
PE	Price Earning Ratio
MV	Mean Variance approach
FF	Fama and French
SML	Security Market Line
MPT	Modern Portfolio Theory
TJE	Taiwan Economic Journal
CMIE	Centre for Monitoring Indian Economy
IFS	International Features Standard
IMF	International Monetary Fund

ABSTRACT

The aim of this study is to investigate the impact of betting against beta (BAB) in the stock markets of emerging Asian countries. Contrary to the conventional capital asset pricing model of high risk high return tradeoff. The recent empirical evidences show that the security market line (SML) is flatter than predicted by the CAPM. This flatness indicates that portfolio short in high beta stock and long in low beta stock earn a positive return. BAB is a market neutral and self-financing portfolio, which is short in high beta stock and long low beta stock. A fifteen-year data set in Shanghai and Pakistan Stock Exchange while ten year dataset for Bombay Stock Exchange have been obtained from the respective exchanges. BAB portfolio is constructed by using the (Frazzini & Pedersen, 2014) methodology while Fama and French market, size and value premiums are used in multivariate regression analysis to capture the cross-sectional return and relationship among the portfolios. Our results reveal that BAB is a significant factor of China Stock Market while Pakistan and Indian stock markets do not price it. The historical outperformance of low beta stock has opened new horizons for regulators, policy maker and investor to think.

Keywords: Size Premium, Value Premium, Betting Against Beta, Low Beta.

CHAPTER 01

INTRODUCTION

Beta plays a significant role in determining the asset prices. Investor consider it as an important factor while making their investment decision. This factor has attracted considerable attention from investors and researchers in the past five decades. The financial crises and the elongated economic turbulence that resulted in strict regulations in the banking and pension sector caused higher aversion to asset volatility. These economic forces and financial crises compelled the investor to search for new and improved strategies. The new factor based on macro-economic variable and firm's based variable has got significant attention throughout the academia and in the corporate sector as well. It is based on providing excess returns available in the financial markets which is called "factor premiums" and diversification across these factor premiums instead of the asset categories.

The basic objective of the capital asset pricing model (CAPM) is that all investor invest in the optimal portfolios with lower risk and higher expected return. CAPM links the risk with return linearly i.e. security with high risk will yield high return and low risk low return. The only factor which explains the return is the market premium. Latter on Black (1974) was the first to find that the security market line (SML) is flatter than predicted by the CAPM of Sharpe (1964) and Lintner (1965).The findings of Black (1974) are not consistent with standard CAPM and shows its weaknesses. On the other hand, the other researcher has also reported anomalies based on different firm based variables other than

market premium. Banz (1981) has identified that on average the smaller companies has high risk adjusted return than larger one. This is called the size effect. While Basu (1977) found that companies with higher Price Earning Ratio (P/E ratio) has captured more return than CAPM. The effect of book to market ratio was found by (Rosenberg, Reid, & Lanstein, 1985; Stattman, 1980). Bhandari (1988) investigated the leverage effect that is companies with higher leverage have captured higher returns than expected on the basis of their market betas. Moreover, Fama and French (1992, 1993); Jegadeesh and Titman (1993) and Carhart (1997) investigated factors based on size (small vs. big), book-to-market value (value vs. growth) and return momentum (winners vs. losers) of equities respectively.

Black (1972) investigated that that the security market line (SML) is flatter than predicted by CAPM. This study was latter on revisited by Frazzini and Pedersen (2014) who argued that unlike the CAPM, which is based on efficient market hypothesis (EMH), investor face restrictions while borrowing and this explains the flatness. In line with the Black (1972) they developed a factor called "Betting against Beta" (BAB) factor and found that BAB factor captured a significant returns in equity market, Treasury bond market, credit market, ad future markets.

The objective of this study is to empirically test the "Betting against the Beta" portfolio strategy presented by Frazzini and Pedersen (2014) in emerging countries' market and check it empirically that low beta high return and high beta low return anomaly exists in emerging countries financial markets or not. Investor invest in the optimal portfolios with lower risk and higher expected return. Investor select the leverage or de-leverage the

portfolios according to their risk bearing capacity. Although, some investor either institutions or individuals are leveraged constrained and they overweight the risky securities instead of using the leverage to diversify their risks. Frazzini and Pedersen (2014) argues that most of the pension and mutual funds are "normal" funds which invests more in bonds and less in stocks, where as the "aggressive" funds invest more in stock and less in bonds. If the "normal" is efficient then investor could leverage it and invest in it to achieve the expected trade-off between the risk and expected return instead of investing in "aggressive" funds and it will tilt towards the stock. This tilting phenomena of "aggressive" fund towards stock (high beta) assets suggests that risky high-beta assets require lower risk- adjusted returns than low beta assets, which require leverage. Empirical evidence on the beta–return relation are investigated in US and developed countries only. However, the study of this relation in emerging markets is still rarely done. Therefore, this study investigates the relation between beta and return in emerging markets of Asia by using the stock prices of Shanghai Stock Exchange (SSE) equity market of China, Bombay Stock Exchange (BSE) equity market of India, and Pakistan Stock Exchange (PSX) which are the stock markets of China, India and Pakistan respectively

Our results reveals that betting against beta (BAB) portfolio earns significant positive returns in Shanghai Stock Exchange only which is consistent with (Frazzini & Pedersen, 2014). We have not found any significant returns associated with BAB factor in Pakistan Stock Exchange and Bombay Stock exchange. More specifically, the portfolios of high beta stocks have lower alphas and lower Sharpe ratios compared to portfolios of low beta stocks.

1.1 Theoretical Background

1.1.1 Modern Portfolio Theory (MPT)

The seminal work of Markowitz (1952) revolutionized the field of finance and gave birth to the modern finance as an independent area of study. Modern Portfolio theory has been the backbone of the modern finance. The procedures developed for efficient frontier, estimating expected returns, corresponding (co)variance for the stand alone asset, and then minimizing the ex-ante portfolio risk for a given level of risk by altering security weight as presented by Markowitz (1952), appears to approach the end of its lifetime. The methods he developed for quantifying the concept of risk which was merely a concept before his seminal paper. Markowitz formulated the mathematical framework to construct a portfolio of assets such that the expected return is maximum for a given level of risk or minimum level of risk for a given return. The individual asset's risk and return is not considered itself but how it contributes to the overall risk and return of a portfolio. The main theme of the theory is to diversify the risk and get more return on selected portfolio. Diversification is to select the group of securities for investment that have lower risk. Efficient portfolio gives high return at a given level of risk or lower risk at high level of return. Modern Portfolio theory (MPT) is also called management portfolio theory that measures the advantages of diversification called "not putting all your eggs in one basket". The extension of this theory by Sharpe (1964) and Treynor (1961) lead the foundation of capital asset pricing model (CAPM).

1.1.2 Capital Asset Pricing Model (CAPM)

The capital asset pricing model for single period suggests a simple linear relationship between the market risk and the expected return of a security. This theory i.e. CAPM is presented by Treynor (1961), Sharp (1964) and Lintner (1965). This theory expresses the

relationship between stock return and risk. According to CAPM a single factor market premium (Rm-Rf) affect the portfolio return. Investors can diversify its risk but cannot totally avoid the risk related to their investment because systematic risk (market risk) is common for the whole market. This single factor is criticized by too many researchers and states that CAPM cannot better explain the relationship of risk and return.

1.1.3 Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory of Ross (1976) states that there are number of factors on which stock return depends. Theoretically this anomaly challenges the capital asset pricing model (CAPM). The empirical studies indicate that there is not a single factor affecting the return of securities. The results of direct tests have been unsatisfying, current evidences from studies explores the presence of additional factors, which are applicable for asset pricing of the securities. According to the evidence presented by Banz (1981) in his study, indicates that the capital asset pricing model is miss specified. Furthermore, this argument has been tested by too many researchers and found the presence of additional factors but this does not allocate the problem of portfolio efficiency. The APT theory has been empirically tested in numerous markets of the world but this does not identified the factors associated to the stock returns variations. For this purpose various studies have been adopted in all part of the world in order to identify these factors.

The capital asset pricing model is the dominant asset pricing model but however some other multi-factor asset pricing models have additionally been examined in literature.

1.1.4 Fama and French three factor model

The contributions of Fama and French (1992 1993, 1996,1998) proposed significant substitute model for asset pricing based on Arbitrage Pricing Theory framework. That is Fama and French three-factor model. This model suggests that stock return is defined by market premium, size premium and value premium. For the first time Fama and French (1992) found that E/P, Size, leverage and book to market ratio of stocks have significant high explanatory power in explaining the variations of stocks returns. They explained that pricing of the stocks is determined through these factors.

According to Fama and French (1998) and Griffin (2002) size and book to market factors affect are specific to countries and applying these factors internationally on individual equity markets can have different results. In this regard our study is conducted to check the validity of these factors in the equity markets of emerging south Asian countries. Thus the study is conducted to examine the effect of Arbitrage Pricing Theory by using Fama and French three-factor model as well as by establishing a multi factor model for additional factor betting against beta.

1.1.5 Betting against Beta (BAB)

Frazzini & Pedersen (2014) presented a model in which some restrictions are imposed. Some investors are allowed to use leverage and some investors' leverage is limited by margin requirements. The leverage constrained investor bid-up for high beta stock while the other investor who are allowed to use the leverage trade the low beta stock to profit from it and will de-lever when they hit by their margin constrains. This model is tested in developed countries by using the data of U.S equities, Corporate Bonds, Treasury bonds, futures comodities and

other 20 global equity markets. Betting against beta factor which is a long portfolio of low-beta assets and short portfolio of high beta assets results a positive and significant risk adjusted returns. Beta compacted to one when the funding tightens and the return associated with the BAB factor becomes low. The BAB factor is market neutral because the long component is leveraged up to a beta of one and the short component is de-leveraged to a beta one, so the net market exposure is zero. This zero-cost portfolio expresses the excess return differential similar to the Carhart (1997) factors. A positive and significant risk adjusted returns are found in consistent with time and cross-section of countries and asset classes.

1.2 Problem Statement

Multifactor model can better explain the variation in stock return and to find a better asset pricing model is a good subject of interest. Along with size and value other factor can also be used to judge the variations in stock return. Mispricing of the securities in the market calls for a better asset-pricing model. The factors are also sector and country specific according to many researchers so it could be also tested in non-financial sectors (Fama & French, 2012). All the empirical evidences regarding the betting against the beta factor comes from the developed markets of USA, Europe and Australia where the financial markets are mature while that in emerging countries i.e. Pakistan, India and China, financial markets has not a long history. These financial markets are now developing and passing through transition phases. The model is not tested in emerging markets and it's repercussions in the emerging markets are yet to be checked.

Thus it is necessary to examine these factors in South Asian equity market on the approach of Fama and French three-factor model. As well as by adding an additional factor of Betting

against beta (BAB) by adopting multi factor model approach. The basic motivation behind this study is to extend the work of (Frazzini & Pederson, 2014) in the equity markets of emerging Asian countries.

1.3 Research Questions

i. Does size and value premium explains equity return of non-financial firms in emerging Asian markets?

ii. Is betting against beta factor is priced in emerging Asian markets?

1.4 Objectives of the Study

i. To examine the relationship of size and value premium in Pakistan, India and China.

ii. To investigate the effect of the BAB factor in the non-financial sector of Pakistan, India and China.

iii. To explore the presence of Fama and French three factor model in emerging Asian markets of Pakistan, India and China.

1.5 Significance of the Study

Importance of low volatility strategy of construction has noticed substantially, especially in the last few decades. The economic and financial crisis in the elongated economic recession that resulted with strict rules in the financial sector which has created a higher abhorrence to asset volatility.

These economic forces sets the trend for low-volatility equity strategies such as minimum variance and betting against beta. Historically the low volatility performed well in turbulent markets. Over a long period of time this strategy is used as a defensive and has gained a premium over the market, contradicting with the basic theories of finance that low risk will

yield low return and vice versa. During the global financial crisis in 2008, low or minimum volatility, has got attention from institutional and individual investors.

The popularity of minimum variance portfolios resulted in the development of MSCI Minimum Volatility Indices for some national, international, and global markets (Luo et al., 2011). In the recent time Germany and UK have launched low volatility indices, the DAXplus and the FTSE 100 Minimum Variance Index respectively. A more important reason that added to the rapid acceptance of minimum variance strategies are the perceived risk-adjusted outperformance relative to the market portfolio.

This study is helpful for investors, regulators, economic policy makers and academia. The historical outperformance of low beta stock has opened new horizons for regulators, policy maker and investor to think. The basic motivation behind this study is to extend the work of (Frazzini & Pederson, 2014) in the emerging markets of Asia and test its propositions and will provide insight about the risk and return trade off in emerging markets of Pakistan, China and India and contribute to literature and empirical evidences in the domain of finance. The empirical tests by Frazzini & Pedersen (2014) the BAB portfolios for US and global stocks have delivered significantly positive returns and significantly positive alphas with respect to the CAPM, the three-factor model. If the BAB anomaly exists in emerging countries financial markets so the investor can take benefited.

In this study, the performance, composition, and risk-return properties of the BAB portfolio will be identified and will be compared to the other benchmark portfolio. In this study, we will discuss the role of the BAB portfolio in contrast to the market portfolio as benchmark for conducting properly risk-managed equity strategies.

1.6 Organization of the Study

This paper is organized as Chapter 1 introduces the motivation for the study, Chapter-2 literature review, Chapter-3 describes the methodology. Chapter 4 describes results and findings. Chapter 5 discusses the conclusions and discussion, limitations and future direction of this stud

CHAPTER 02

LITERATURE REVIEW

The Low-beta stock anomaly contradicts the expectations that arise from the Efficient Markets Hypothesis and the Capital Asset Pricing Model. In this section we have presented the relevant studies related to efficient market hypothesis, Capital Asset Pricing Model, Size premium, Value Premium, and low beta anomaly.

2.1 Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis (EMH) has been the fundamental assumptions in finance since the last three decades (Shleifer, 2000). In an efficient market all the information are fully reflected by the prices. On the arrival of new information the prices are fully adjusted Fama (1970), but this definition is general in nature for and does not provide any inferences for empirical studies and the detailed descriptions are to be needed to consider for reflecting the full information. For the weak form of market efficiency the historical prices are taken only.

Fama (1970) explained that EMH tests of semi-strong form are when the stock prices are continuously adjusted for all publicly accessible information i.e. dividends announcement, new share issue, stock splits etc., while EMH of strong form tests are considered when some traders or investors have access to the private information which effects the share prices. He found no significant confirmations against the EMH of semi strong and weak forms but a few against its strong form.

Later on Jensen (1978) tested the efficient market hypothesis in stock markets, commodity future markets, option markets, over the counter markets, and with the corporate and government bonds. He found all the results consistent with the EMH theory. He proposed that the solid evidences available in favor of EMH are not available for other economic theories. This study of Jensen (1978) motivated Fama to review and update his existing theory of EMH. In his updated version of EMH Fama (1991) extended his work and concluded that weak form of EMH tests should include general concept of returns predictability. These empirical studies should include the capability to forecast future returns based on stock past characteristics and among these one can added the stock beta as well.

While Shleifer (2000) argued that central consequence of quick and accurate price adjustment to the arrival of new information is that the past information are useless to get the significant returns. The anomalies such as size effect, value effect, end of the week effect, which are reported in various studies since the Fama (1970) study of EMH, are either weakened or disappeared after the publication of the papers in which they are identified (Shleifer, 2000). Shleifer (2000) reported that these anomalies disappeared due to the strategies of the marginal investors who take benefits from anomalous behavior of the market by making inefficient market efficient.

This argument put emphasis on the role of arbitrageur. An arbitrageur is a market agent who take benefits from the rise and fall of the security prices. Shleifer (2000) narrated that that the emotions, feelings and thinking strategies of non-rational investors are interrelated so they take the opposite side of the demand which brings the security prices back to its

fair value. That is the solid argument in favor of market efficiency which depends on the efficiency of the arbitrageur.

Capital Asset Pricing Model of Sharpe (964) and is an essential tool to test the Efficient Market Hypothesis. According to Fama (1991) when the available information are reflected in the securities' prices in context of the pricing model that is considered as "properly". As a result, when we observe any anomaly in the behavior of the return this nature may be due to the inefficiency of the market or in appropriate equilibrium model of the market.

In an efficient market the securities' prices are not biased and reflect the actual value of the investment. It is not necessary that the market value of the asset may always be equal to the fair value, but the difference should not be biased (Damodaran, 2012). This argument make sense in the context of undervalued or overvalued stock. The prices may higher or lower than the securities' fair value but the deviation is not linked to any variable that the investor may exploit the prices by any strategy and this undervalue and overvalue are consistent over time.

2.2 Capital Asset Pricing Model (CAPM)

The capital asset pricing model for single period suggests a simple linear relationship between the market risk and the expected return of a security. The CAPM is provided by (Lintner, 1965; Sharpe, 1964; Treynor, 1961).

The basic objective of the capital asset pricing model is that all investor invest in the optimal portfolios with lower risk and higher expected return. Capital Asset Pricing Model links the risk with return linearly i.e. security with high risk will yield high return and low

risk low return. The only factor which explains the return is the market premium. Latter on Black (1972) was the first to find that the security market line is flatter than forecasted by the CAPM of Sharp (1964) and Litner (1965). The findings of Black (1972) were not consistent with standard CAPM and showed its weaknesses. On the other hand, the other researcher has also reported anomalies based on different firm based variables other than market premium. Banz (1981) has identified that on average the smaller companies has high risk adjusted return than larger one. This is called the size effect. While Basu (1977) found that companies with higher Price Earning Ratio (P/E ratio) has captured more return than CAPM. The effect of book to market ratio was found by (Rosenberg et al., 1985; Stattman, 1980). Bhandari (1988) investigated the leverage effect that is companies with higher leverage have captured higher returns than expected on the basis of their market betas. Moreover, Fama and French (1992, 1993); Jegadeesh and Titman (1993) and Carhart (1997) investigated factors based on size (small vs. big), book-to-market value (value vs. growth) and return momentum (winners vs. losers) of equities respectively. Fama and French (1992) found that E/P, Size, leverage and book to market ratio of stocks have significant high explanatory power in explaining the variations of stocks returns. They explained that pricing of the stocks is determined through these factors.

2.3 Size Premium

Size premium is the inclination of the stock of small market cap outperform the high market cap stock. Banz (1981) argued that stock of companies with small market capitalization will perform better than that with high market capitalization and he call it size premium. Size premium is latter on added to Fama and French three factor model and has been test in various markets around the world. In 1981 Banz studies the size effect in the US market

and found a negative relationship between size and market capitalization. Size factor is also studies by Basu (1983), Fama and French (1993) in various studies.

Fama and French (1993) also found the same result consistent with Banz (1981) while testing the model in stock and bond by using a time series regression approach. The Fama and French three factor model which is an extension of CAPM employs the size as an additional factor along with book to market ratio. FF three factor model has more explanatory power than CAPM has tested by Fama and French (1993) and the result showed a significant impact of size and value on the stock return.

Halliwell et al. (1999) tested the Fama and French (1993) three factor model in Australian stock market and found results consistent with Fama and French (1993). He reported that the size and value effects are observed in small size firms and high book to market ratio and vice versa. The same study taken up by Connor and Sehgal (2001) in Indian market and found the same result about the size and book to market ratio.

The same model is test and replicated by various studies around the world. Faff (2001) test the model empirically in the Australian market by using a nine years data (1991 to 1999), Drew and Veeraraghavan (2002) used the model in Malaysian market. Both the studies have found the strong evidences on the validity effect of size and value premiums on stock return. The same results are found by Keith (2002) in Hong Kong stock market by investigating the 13 years data from 1984 to 1997. This study investigated three factors i.e. Size, Book to market ratio (BTM), and Earning per share (EPS) and found that all the three factor significant. This study extended the work by using the earning per share (EPS) and found empirical evidences significant in Hong Kong Stock market.

The south Asian markets are studied by Drew (2003) and reported the significant results of size and value effect. The results were consistent with that of the previous studies. Sehgal and Tripathi (2005) empirically tested the model in Indian equity market by using different proxies that are market capitalization, total sale, net working capital, total assets, next fixed assets and value of firm. The result reported that by using the market capitalization the size premium is substantially high. While, Guan, Hansen, Leikam, and Shaw (2007) had studied the idiosyncratic variable which were size, book to market and price earning to study these in the US market for the variation of stock's average cross-sectional returns.

The non-financial sector of Pakistan is studied by Mirza (2008) and reported significant results of size premium in Karachi Stock exchange, while the same empirical evidences were found in Australian Stock Exchange (O'Brien, Brailsford & Gaunt, 2010) They had employed a large data of 300 firms for a period of 24 year and divided the samples into small, median and large portfolio on the basis of market capitalization (Size) and book to market ratio (BTM). They have used GMM and multivariate regression for analysis and found that size has significant negative relationship with stock return and on the other hand, the book to market ratio (BTM) has significant and positive. Similar results were found in a study by Van Dijk (2011) by employing the data of small cap companies listed on New York Stock Exchange (NYSE) for a period of forty years. The result showed that the size effect was not linear but found in the smaller firms, also the effect is not stable in different periods. Hassan and Javed (2011) found the empirical evidences for size premium in Pakistan equity market and found the results significant for small cap stocks. They also observed consistency in the size effect, while Amel - Zadeh (2011) reported conflicting

results and proposed a conditional relationship between the size premium and stock return. He argued that the firms' stock return is conditional to the past performance of the firm.

Khan, Hassan and Ali (2012) explored the effect of size premium and leverage premium by using market capitalization and book to market value respectively in Pakistan Stock exchange by employing a data of 200 stocks from 2001 to 2007. They reported the significant and positive results for the size premium while insignificant results are reported for leverage premium. Their results were in agreement with major studies in the area with positive and significant relation between size and stock return. The impact of size on stork return is empirically test by different researcher in different areas. The study in Belgrade Stock Exchange, Serbia and Zimbabwe stock market were studied Minović and Živković (2012) and Mazviona and Nyangara (2014) respectively.

2.4 Value Premium

Financial experts and economists tried to find proxies and variables that accurately forecast stock returns. Fama and French (1992) identified and empirically showed that book-to market ratio of each stock can predict the cross-sectional variation in returns of individual stock. Kothari and Shanken (1997) showed that book-to-market ratio of the Dow Jones Industrial Index (DJIA) forecasts significant and positive market returns over 1926 to 1991. They proved empirically that sometime BTM forecast negative expected return but this behavior is only observed in their first half of the sample not later on. This anomaly is also observed by Pontiff and Schall (1998) in their sample from 1926 to 1994 in DJIA. They have also added other variables to predict the market returns i.e. dividend yield, term structure, interest rates, and default spreads etc. to estimate the cross-sectional variation in

market returns and they had found that book-to-market ratio (BTM) forecasted small firm significant return during this period.

In agreement with the arguments of Ball (1978), Berk (1995) and Sharathchandra and Thompson (1994) that book-to-market ratio (BTM) detected the information about future expected returns as BTM was a proxy used for cash flows, the same results were found by (Pontiff & Schall, 1998). As BTM was used as a proxy for the cash flows and when the discount rate was changed the prices changed and the same way the BTM changed. Retaining the cash flow freeze and increase in discount rate results in decrease in market value which ultimately increased the BTM and this phenomena had explained a positive a significant relationship in BTM and future returns.

Value premium was betterly explained by Fama and French (1993) called three factor model in 1993. Both Fama and French identified the value premium in 1992 and created a measure called HML (High minus Low) for detecting the variation in stock return based on value. The return associated with high and low stock is different from each other. It is argued that for checking the value premium the high growth stock will produce high risk adjusted return compares to the firms with low one.

The firms will produce high returns when their market prices are higher compared to their book values. In Fama and French three factor model HML (high minus low) will better explain the variation in the stock return based on BTM which is further correlated to size and risk factor. The companies with high book-to market ratio (BTM) tend to be persistently distressed and those with low BTM are in a state of profitability (Fama &

French, 1995). Some other studies claim that high returns of high book to market stocks are used to be taken as low profitable and high risker stocks.

Different studies are conducted in different markets of the world to check the impact of value premium. Mirza (2008) studied this value anomaly in Pakistan Stock Exchange (KSE) and found significant impact of value premium. They have used Fama and French three factor model and studied the non-financial firms listed on KSE. Their results confirmed the presence of value and size premium. Hassan and Javed (2011) also studied the Karachi Stock Exchange (KSE) and found that high book to market stock produced high risk adjusted return compared to stock with low –book-to market ratio. This study also referred that value premium is positively significant for all portfolios except for those with low book to market ratios. Furthermore, the study indicate strong evidences that book to market effect was increasing constantly when going from lowest to highest portfolios based on book to market ratios. The study also explained the trends of SMB factor moving from large size to small size portfolio.

In 2012 Fama and French studied the three factor model in four regions of the world to confirm the impact of size, book to market ratio (BTM) and momentum with risk adjusted returns in 23 countries of the world. Their result showed that size and value premium are significant in all regions of the world except Japan where the result are insignificant. This study was replicated in emerging markets along with the third variable of liquidity factor strongly confirms with the result of Fama and French (Lischewski & Voronkova, 2012).

Different studies were conducted in different parts of the world. Minović and Živković (2012) studied Belgrade Stock Exchange, Chaibi, Alioui, and Xiao (2015) taken up the

study on the Russell 3000 market index, Baek and Bilson (2015) in non-financial listed firms in U.S stock market. The results of all the studies were consistent with that of the Fama and French results.

2.5 Low Beta Anomaly

Black (1972) was the first to find that the security market line (SML) of US was flatter than predicted by the CAPM of Sharp (1964) and Litner (1965). The findings of Black (1972) were not consistent with standard CAPM and showed its weaknesses. Later on, the same phenomena was studied by Haugen and Heins (1975), Haugen and Baker (1991), Haugen and Baker (1996), Blitz, Pang, and Vliet (2013) and Frazzini and Pedersen (2014) showed empirical evidence that risk and return are not positively correlated but showed the negative relation between risk and return. The low beta anomaly is also studied by Choueifaty and Coignard (2008), Baker, et al. (2011), Baker, et al. (2014) who also found negative relation between the risk and return and the similar result were found in a study by Blitz, et al. (2013) in emerging markets.

The forms of low risk or low beta volatility were varying from study to study and focus on some measures. Black, et al., (1972) considered market beta as a measure of volatility, Baker et al., (2011) focused on total volatility, Falkenstein (1994) and Blitz and Van Vliet (2007) studies residual volatility, Frazni and Perderson (2014) and some other studies focused on low beta portfolio. In this study we have focused on market beta due to its close linkages with the economic theory. Some researcher argue that volatility is due to investor behavior and other claims some economic reasons. On the other hand, some studies claim that low beta anomaly is connected with some methodological choices.

Baker et al. (2011) argued that in an efficient market the return should be linked to risk positively, that is when an investor take above that average risk he should be compensated with above than market return. The riskier stock should be compensated with more return as compared to safer stock. But on the basis of the author's empirical evidences from the US stock market this proposition did not stand true. In their paper in 2011 they have employed data from US stock market from the period 1968 to 2008 and found that low beta stock outperformed than high beta stock i.e. low risk stock performed well than high risk stock over the examined period.

Black (1993) reported the study which was conducted by Black et al. (1972) and Miller and Scholes (1972) that studied the phenomena captured by the low-beta stock in the United States which has outperformed compare to the high beta-stock as well as CAPM in the examined period. Black (1993) also established that flat security market line of the US stock is really provides a good opportunities for investment for those investor who select stock on the basis of beta. While the idiosyncratic volatility is studied by Ang, Hodrick, Xing and Zhang (2009) by using the FF three factor model. Their results claim that higher idiosyncratic volatility stock have small return compared to low one and this is a global phenomenon. Some researcher argue that volatility is due to investor behavior and other claims some economic reasons. On the other hand, some studies claim that low beta anomaly is connected with some methodological choices.

In a paper published by Frazzini and Pedersen (2014) empirically showed that historically the portfolios with high beta stock have lower alpha and smaller sharp ratio compared to the stock with lower beta with high sharp ratio and high alpha in the US as well as in the

international market. They tested their model in Stock markets of the 18 countries. They have developed a factor called betting against beta Factor (BAB) which is constructed by taking long position in the high beta assets and short position in the low beta assets. This model proposed that agents with restricted marginal activity and leverage search abnormal return by investing more in riskier assets which ultimately reduces the expected return of the assets and investor with no restriction taking short position in risky assets.

Baker and Haugen (2012) observed a superior performance of low beta stocks in 33 different stock markets and reported that low beta stock outperform the high beta stock, the same result were reported by Blitz and Van Vliet (2007) who presented empirical evidences of significant and positive abnormal returns in different stocks with low beta. They have studies the American, European and Japanese markets. They argued that investor should added the low beta stocks while allocating assets. Similar results were found by Blitz et al. (2013) in emerging markets, , Rostagno, Costa Soares and Oliveira Soares (2008) in Brazilian market.

2.6 Research Hypotheses

On the basis of above theoretical framework of the study, several hypotheses can be developed.

Hypothesis 1: *There exist a relationship between Market premium and equity return.*

Hypothesis 2: *There exist a relationship between Size premium and equity return.*

Hypothesis 3: *There exist a relationship between value premium and equity return.*

Hypothesis 4: *There exists a relationship between betting against beta and equity return.*

CHAPTER 03

DATA AND METHODOLOGY

This study explore the betting against beta (BAB) model in emerging Asian countries. The concept of Betting against Beta (BAB) is developed by Frazzini and Pedersen (2014) in their seminal paper published in the Journal of Financial Economics. Betting against Beta (BAB) factor is a self-financing and market neutral portfolio by taking long in low risky assets and short in high risky assets.

3.1 Data Description

This study employs the data of 391 non-financial firms from the emerging Asian markets listed on the Pakistan Stock Exchange (PSX), Bombay Stock Exchange (BSE) and Shanghai Stock Exchange (SSE). The sample contains the firms from non-financial sector. Stock are selected on the basis of their market capitalization from each country. Stock selected for the period (t) is on the basis of their market capitalization at the end of their accounting period (t-1).

The sample of China consists of 123 non-financial firms listed on Shanghai Stock Exchange (SSE). The dataset contain daily, monthly and annual adjusted stock prices, the annual number of outstanding shares and book to market ratio (BTM) from January 2000 to December 2015. All the datasets for China are collected from Taiwan Economic Journal Database (TJE). The Indian sample contains 106 non-financial firms listed on Bombay Stock Exchange (BSE). The daily, monthly and annual adjusted stock prices are

downloaded from the website of Bombay Stock Exchange (BSE) from April 31, 2006 to March 31, 2016. Annual number of outstanding shares and book to market ratio (BTM) is taken from the Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE). Pakistan sample consists of 148 stocks of non-financial firms listed on Pakistan Stock Exchange (PSX) and the data employed from July 01, 2000 to Jun 30, 2015. Stock Prices are downloaded from the website of Business Recorder and the number of shares and book to market ratio (BTM) is constructed from accounting data collected from 'analysis sheets' published by Pakistan Stock Exchange (PSX).

Data for the market index for all the three emerging Asian countries is downloaded from the Yahoo finance website while the risk free rate for all the three countries is downloaded from the website of International Features Standard (IFS) maintained by the International Monetary Fund (IMF). Due to unavailability of risk free rate for China, we have used discount rate as a proxy for risk free.

Table 1: Sample size of selected Countries

Sr.	Country	End of FY	From	To	No. of Stock
1	China	December	January 01, 2000	December, 2015	123
2	India	March	April 30, 2006	March 31, 2016	106
3	Pakistan	June	July 01, 2000	Jun 30, 2015	148

Note. This Table reports the sample size, financial year, number of stock selected and sample time from for each country.

3.2 Selection Criteria

Stocks in all the three emerging Asian countries are selected on the basis of bellow criteria which is:

i. Sample consists of companies from non-financial sector.

ii. No stock has negative value of equity

iii. Stock with at least 8-10 months of trade history during a year.

iv. Stock which is listed before the start date of our sample for each country.

3.3 Variable Description

This study imperially tests the validity of betting against beta (BAB) factor as presented by Frzzini & Pedersen (2014) along with the Fama and French three factor model to compare the return for each factor.

i. Return

We assume for the continuouly compuned return and it is calculated by the following formula.

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \qquad (3.1)$$

Where R_t = continuously compounded return.

P_t = Price at time "t"

P_{t-1} = Price at time "t-1"

Ln= Natural Logarithm

ii. **Book to Market Ratio (BTM)**

Book to Market Ratio (BTM) determines the value of the security. The investor use the BTM to find either the security is overvalued or undervalued for investment. The effect of

this ratio is documented by (Stattman, 1980) for the first time. The formula is for construction of BTM is below.

$$\text{Book to Market Ratio (BMR)} = \frac{\text{Book Value of Equity}}{\text{Market Value of Equity}} \quad (3.2)$$

iii. **Size**

Size determines the capitalization of a firm. The size can be find by the following formula

$$\text{Size} = \text{Number of Outstanding Share} * \text{MPS} \quad (3.3)$$

Where MPS= Market Price per Share.

3.4 Portfolio Construction

Capital Asset Pricing Model (CAPM) employs single factor of market premium and compares the performance of a portfolio with the market as a whole. Fama and French (1993) argued that several asset classes perform better than others. So, he added size premium and value premium to CAPM to capture the effect of size and market to book ratio. In order, to capture the effect of market premium (MKT), size premium (SMB), value premium (HML) and betting against beta (BAB) factors, we have adopted the portfolio approach proposed by Fama and French (1993).

The number of stock, accounting year and time period of samples are different for each country as shown in Table 1 , therefore the portfolio construction of each country is different from each other.

3.4.1 Portfolios in Pakistan:

i. For Size sorted portfolios, we have calculated the market capitalization of 148 stocks at the end of Jun for year 't' and arranged the stock in year 't+1' on the basis of market capitalization of year 't'. Then the stock is sorted in ascending order.

ii. The first 74 stocks with a low market capitalization compared to median are grouped as S (Small) and the rest of the 74 stocks with high market capitalization compared to median are grouped as B (Big).

iii. The S (Small) group of 74 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 37 stocks with low book to market ratio (BTM) from the median is named as S/L while the rest of the 37 stocks with high book to market ratio (BTM) compared to median is named as S/H.

iv. The B (Big) group of 74 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 37 stocks with low book to market ratio (BTM) from the median is named as B/L while the rest of the 37 stocks with high book to market ratio (BTM) compared to median is named as B/H

3.4.2 Portfolios in China:

i. For Size sorted portfolios, we have calculated the market capitalization of 123 stocks at the end of Jun for year 't' and arranged the stock in year 't+1' on the basis of market capitalization of year 't'. Then the stock is sorted in ascending order.

ii. The first 61 stocks with a low market capitalization compared to median are grouped as S (Small) and the rest of the 61 stocks with high market capitalization compared to median are grouped as B (Big). The median stock is not consider for sake of equal number of stocks in each portfolio.

iii. The S (Small) group of 61 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 30 stocks with low book to market ratio (BTM) from the median is named as S/L while the rest of the 30 stocks with high book to market ratio (BTM) compared to median is named as S/H. The median stock is not consider for sake of equal number of stocks in each portfolio.

iv. The B (Big) group of 61 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 30 stocks with low book to market ratio (BTM) from the median is named as B/L while the rest of the 30 stocks with high book to market ratio (BTM) compared to median is named as B/H. The median stock is not consider for sake of equal number of stocks in each portfolio.

3.4.3 Portfolios in India:

i. For Size sorted portfolios, we have calculated the market capitalization of 106 stocks at the end of Jun for year 't' and arranged the stock in year 't+1' on the basis of market capitalization of year 't'. Then the stock is sorted in ascending order.

ii. The first 53 stocks with a low market capitalization compared to median are grouped as S (Small) and the rest of the 53 stocks with high market capitalization compared to median are grouped as B (Big).

iii. The S (Small) group of 53 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 26 stocks with low book to market ratio (BTM) from the median is named as S/L while the rest of the 26 stocks with high book to market ratio (BTM) compared to median is named as S/H. The median stock is not consider for sake of equal number of stocks in each portfolio.

iv. The B (Big) group of 53 stocks is further sorted on the basis of its book to market ratio (BTM) in ascending order. The first 26 stocks with low book to market ratio (BTM) from the median is named as B/L while the rest of the 26 stocks with high book to market ratio (BTM) compared to median is named as B/H. The median stock is not consider for sake of equal number of stocks in each portfolio.

3.5 Variable Construction

The average return for all portfolios P, S, B, S/H, S/L, B/H and B/L is calculated to isolate the factor premium from each other. Factor premium are calculated as below.

3.5.1 Market Premium (MKT)

Market premium is the access return of market index over risk free rate. It is calculated bellow.

$$\text{Market Premium (MKT)} = \mathrm{R_m} - \mathrm{R_f} \qquad (3.4)$$

Where R_m= Market index return

R_f=Risk free rate

3.5.2 Size Premium (SMB)

$$\text{Size Premium (SMB)} = 1/2*[(S/H-B/H) + (S/L-B/L)] \qquad (3.5)$$

3.5.3 Value Premium (HML)

$$\text{Value Premium (HML)} = 1/2*[(S/H-S/L) + (B/H-B/L)] \qquad (3.6)$$

3.6 Betting Against Beta

Frazzini & Pedersen (2014) in his seminal paper “betting against beta” presented a model in which some investor are leverage constrained while the investor whose leverage is

limited by marginal requirements. The former bid up high beta assets while the later trade the assets to earn profit until they hit by their marginal constrain. Consistent with the model, he found in each asset class that a betting-against-beta (BAB) factor which is long a leveraged portfolio of low-beta assets and a short portfolio of high-beta assets produces significant risk-adjusted return. When funding constraints tighten, betas are compressed towards one, and the return of the BAB factor is low. The BAB factor is market neutral in the sense that the long component is leveraged up to a beta of one and the short component is de-leveraged to a beta of one.

3.6.1 Constructing the Betting against beta (BAB) Portfolio

We have constructed the standard BAB portfolio exactly as in Frazzini and Pedersen (2014). For the year "t" all the securities are ranked in ascending order on the basis of their estimated beta β_{t-1} at the end of each accounting year for each country. We estimated beta as follows.

3.6.2 Estimating the Beta ($\hat{\beta}$)

We constructed standard BAB portfolios that has be long low-beta securities and short high-beta securities, exactly as in (Frazzini & Pedersen, 2014).We have ranked all securities in ascending order on the basis of their estimated beta at the end of each financial year. The beta is calculated at the end of each accounting year by using the weekly data. For each accounting year the beta is estimated on the basis of previous "t-1" 52 weeks return as following.

$$\widehat{\beta}_{it} = \frac{Cov(R_i, R_m)}{Var(R_m)} \qquad (3.7)$$

Where R_i and R_m are the estimated return of stock and the market

3.6.3 Betting against beta Factor (BAB)

We have constructed a the standard BAB factor as in Frazzini & Pedersen (2014). For the year "t" all the securities are ranked in ascending order on the basis of their estimated beta β_{t-1} at the end of each accounting year for each country. The stocks are ranked on the basis of beta and their weight are calculated as per their rank in ascending order. The portfolio weights W_i of each stock is calculated by $W_i = K(Z - \overline{Z})$.

K is a normalizing constant and $K = 2/1_n' \left| Z - \overline{Z} \right|$ "z" is the n x 1 vector of beta ranks $Z_i = rank(\beta_i)$ at portfolio formation, and be the average rank, "n" is the number of securities and $1_n'$ is n x 1 vector of ones.

The BAB factor is constructed as follows

$$\text{(BAB)}\, r_{t+1}^{BAB} = \frac{1}{\beta_t^L}(r_{t+1}^L - R_f) - \frac{1}{\beta_t^H}(r_{t+1}^L - R_f) \qquad (3.8)$$

Where W_L is the relative portfolio weight of lower beta assets with return $r_{t+1}^L = W_L r_{t+1}$ where W_H is for higher beta assets with return $r_{t+1}^H = W_H r_{t+1}$. The betas of the portfolio are β_t^L, β_t^H and $\beta_t^L < \beta_t^H$.

3.7 Model Specification and Estimation

The aim of this study to measure the abnormal return associated with each factor by using the Sharp (1964), and Linter (1965) single factor capital asset pricing model (CAPM) on the basis of market premium (MKT) as well as Fama and French (1993) three factor model by employing the size premium (SMB) and market premium (HML). We have also used the BAB factor as a fourth factor with the Fama and French (1993) three factor model to find the abnormal return associated with the BAB factor as claimed by Frazzini & Pedersen (2014) that BAB factor outperform the other three factor namely MKT, SMB and HML. We have also included the BAB factor to check either it is found in the emerging markets or not or not or in other words will BAB be priced by emerging markets or not?

We have used simple regression to estimate our equations. The algebraic representation of the model that we have run are below.

$$E(R_t) - R_{ft} = \alpha + \beta_i (MKT)_t + \varepsilon_t \qquad 3.9\ (a)$$

$$E(R_t) - R_{ft} = \alpha + \beta_1 (MKT)_t + \beta_2 (SMB)_t + \beta_3 (HML)_t + \varepsilon_t \qquad 3.9\ (b)$$

$$E(R_t) - R_{ft} = \alpha + \beta_1 (MKT)_t + \beta_2 (SMB)_t + \beta_3 (HML)_t + \beta_4 (BAB)_t + \varepsilon_t \qquad 3.9\ (c)$$

Where $E(R_{it})$ = Expected rate of return of portfolio for time "t"

R_{ft} =Risk free rate of return

α =Excess return or management's impact (Alpha)

MKT=Market Premium (R_m-R_f)

SMB= Size premium (Small-Big)

HML= Value Premium (High-Low)

BAB= Betting against beta

This study employs the data of China (123) from January 2000 to December 2015. The first year is used for Beta (t-1) calculation and the actual analysis is done from Jan 31, 2001 to December 31, 2015 with BAB (180). Both monthly and Weekly data is used. India (120) from April 30, 2006 to March 31, 2016.Actual Regression applied from April 30, 2007 to March 31, 2016. Without BAB (120 month) for BAB (108 months). Pakistan data employed from July 01, 2001 to Jun 30, 2015. The year July 01, 2000 to Jun 30, 2001 is reserved only for calculating the Beta (t) used as a ranking tool for constructing the BAB and the actual Analysis is don on (148) firms from non-financial sector.

CHAPTER 04

RESULTS AND DISCUSSIONS

4.1 Results

Descriptive statistics is used to show the distribution and behavior of data. The central tendency is used by mean while the deviation from the mean is captured by standard deviation. Minimum is used to show the lowest value, maximum indicates the highest value and median shows the middle value. Skewness shows the relative distribution of data while kurtosis reflects the peakedness or flatness relative to the normal distribution. The descriptive statistics of the tables shows the real feel of the data.

Table 2. Descriptive Statistics Size and BTM ratio sorted portfolios (China)

Variable	P	S	B	S/H	S/L	B/H	B/L
Mean	0.0049	0.0064	0.0033	0.0042	0.0012	0.0078	0.0050
Median	0.0049	0.0104	0.0034	0.0113	0.0016	0.0077	0.0016
Std. Dev.	0.0795	0.0823	0.0792	0.0878	0.0813	0.0846	0.0776
Minimum	(0.2242)	(0.2240)	(0.2452)	(0.2497)	(0.2104)	(0.2949)	(0.2175)
Maximum	0.2652	0.2874	0.2415	0.3283	0.2843	0.2544	0.2443
Skewness	0.1065	0.1389	0.0144	0.0210	0.3675	(0.2341)	0.1646
Kurtosis	0.8785	0.7465	0.9722	0.8234	1.1166	1.2656	0.6242

Note. P shows the average portfolio of 123 companies while S and B are 61 small and big companies sorted on the basis of size respectively. S/H and S/L are the portfolios of 30 small companies each when by sorted S on the basis of book to market ratio respectively. The B/H and B/L indicates the big companies each of 30 companies when sorted B by book to market ratio.

The statistical distribution and behavior of portfolios sorted on the basis of size and book to market ratio (BTM) for China are reported in Table 2. Result shows that B/H produces

high return with low risk compared to S/H. So, B/H is efficient and outperforms the S/H in the sample of China.

The portfolio P shows the average return of 123 companies and S and B are the portfolios of small and large companies on the basis of size. The average return and risk of portfolio P is 0.0049 and 0.0795 respectively. Similarly, the average return produced by S is 0.0064 with a standard deviation of 0.0823 and the mean value of return of B is 0.0033 and its standard deviation is 0.0792. The portfolios which are sorted by market to book ratio are S/H with mean return 0.0042 and standard deviation 0.0878, S/L with mean return 0.0012 and standard deviation 0.0813, B/H with mean return 0.0078 and standard deviation 0.0846 and B/L with mean return 0.0050 and standard deviation 0.0776.

The minimum value for P is (0.2242), S is (0.2240), and B is (0.2452). For the portfolios sorted on book to market ratio the minimum value for S/H is (0.2497), S/L is (0.2104), B/H is (0.2949), and B/L is (0.2175). Similarly the maximum value for P is 0.2652, S is 0.2874 and B is 0.2415. The portfolio sorted on the basis of market to book ratios are S/H with maximum value of return is 0.3283, S/L is 0.2843, B/H is 0.2544 and B/L is 0.2443.

Skewness shows the direction and distribution. The data will be normally distributed or symmetrical if the skewness is zero. A normally distributed data will have a belled shaped curve. The positive value of skewness shows that data is skewed towards the right and it will have a longer tale towards the right of the mean, on the other hand, the negative value of skewness will indicate that the data will have a longer tail towards the left compared to the right tail from the mean point. The skewness in the range of -1, +1 is considered a symmetrical distribution while the skewness higher than +1 is considered highly positive

skewed while the value less than -1 is considered highly negative skewed. In the Table 2 the results shows that all data is positively skewed for all portfolios other than B/H which has a negative value for skewness. The skewness values for all the portfolios are: P is 0.1065, S is 0.1389, B is 0.0144, S/H is 0.0210, S/L is 0.3675 and B/L is 0.1646. All the portfolios are positively skewed and their tails are longer towards the right. The single portfolio with negatively skewed is B/H with a value of (0.2341). All the results fall in the range of -1, +1 so the distribution of data is symmetrical and skewness is marginal.

Kurtosis is used to show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. When the value of kurtosis is less than 3 then it is consider as platykurtic or very flat and it can produce less extreme outliers compared to normal distribution. However, when its value is greater than 3 then it is considered as leptokurtic or very tall and compared to normal distribution it produces more extreme outliers. The results in Table 1 shows that the data distribution is platykurtic or smooth for all the portfolios. The value of portfolios is P 0.8785, S 0.7465, B 0.9722, S/H 0.8234, S/L 1.1166, B/H 1.2656, and B/L 0.6242 which are less than 3.

The results in Table 2 shows that portfolio S with small size and high risk perform better than portfolio B with high size and low risk and the results are consistent with various studies of size effect conducted around the world. The size results confirm the findings of a study conducted by Hassan and Javed (2011) in Karachi Stock Exchange (KSE) and also aligned with (Banz, 1981). The S/H and B/H are the high risk and high return portfolio with high book to market ratio. The portfolio with high book to market ratio outperform

the portfolio with low book to market ratio. The portfolio also agree with high risk high return in consistent with (Fama & French, 1992; Hassan & Javed, 2011).

Table 3. Descriptive Statistics Size and BTM ratio sorted portfolios (India)

Variable	P	S	B	S/H	S/L	B/H	B/L
Mean	0.0043	0.0064	0.0048	0.0060	0.0043	0.0064	0.0058
Median	0.0127	0.0138	0.0134	0.0220	0.0124	0.0041	0.0125
Std. Dev.	0.0759	0.0812	0.0751	0.0976	0.0720	0.0862	0.0723
Minimum	(0.3428)	(0.3806)	(0.3050)	(0.4311)	(0.3312)	(0.3468)	(0.2574)
Maximum	0.2767	0.2866	0.2668	0.3283	0.2463	0.3163	0.2210
Skewness	(0.8167)	(1.0108)	(0.5795)	(0.9132)	(0.8383)	(0.4391)	(0.5244)
Kurtosis	4.9135	5.3107	3.5464	4.1800	4.2866	3.3127	2.4155

Note. P shows the average portfolio of 106 companies while S and B are 53 small and big companies sorted on the basis of size respectively. S/H and S/L are the portfolios of 26 small companies each when by sorted S on the basis of book to market ratio respectively. The B/H and B/L indicates the big companies each of 26 companies when sorted B by book to market ratio.

The statistical distribution and behavior of portfolios sorted on the basis of size and book to market ratio (BTM) for India are reported in Table 3. Result shows that B/H produces high return with low risk compared to S/H. The portfolio B/H is efficient which offers high return with low risk and outperforms the S/H in the sample of India. On the other hand B/L outperforms S/L. B/L offer high return as compared to S/L. So, among the two portfolios the B/L perform better than S/L.

The portfolio P shows the average return of 106 companies and S and B are the portfolios of small and large companies on the basis of size. The average return and risk of portfolio P is 0.0043 and 0.0759 respectively. Similarly, the average return produced by S is 0.0064 with a standard deviation of 0.0812 and the mean value of return of B is 0.0048 and its

standard deviation is 0.0751. The portfolios which are sorted by market to book ratio are S/H with mean return 0.0060 and standard deviation 0.0976, S/L with mean return 0.0043 and standard deviation 0.0720, B/H with mean return 0.0064 and standard deviation 0.0862 and B/L with mean return 0.0058 and standard deviation 0.0723.

The minimum value for P is (0.3428), S is (0.3806), and B is (0.3050). For the portfolios sorted on book to market ratio the minimum value for S/H is (0.4311), S/L is (0.3312), B/H is (0.3468), and B/L is (0.2574). Similarly the maximum value for P is 0.2767, S is 0.2866 and B is 0.2668. The portfolio sorted on the basis of market to book ratios are S/H with maximum value of return is 0.3283, S/L is 0.2463, B/H is 0.3163 and B/L is 0.2210.

Skewness shows the direction and distribution. The data will be normally distributed or symmetrical if the skewness is zero. A normally distributed data will have a belled shaped curve. The positive value of skewness shows that data is skewed towards the right and it will have a longer tale towards the right of the mean, on the other hand, the negative value of skewness will indicate that the data will have a longer tail towards the left compared to the right tail from the mean point. The skewness in the range of -1, +1 is considered a symmetrical distribution while the skewness higher than +1 is considered highly positive skewed while the value less than -1 is considered highly negative skewed. In the Table 2 the results shows that all data is negatively skewed for all portfolios. The skewness values for all the portfolios are: P is (0.8163), S is (1.0108), B is (0.5795), S/H is (0.9132), S/L is (0.8383), B/H is (0.4391) and B/L is (0.5244). All the portfolios are negatively skewed and their tails are longer towards the left. All the results fall in the range of -1, +1 so the distribution of data is symmetrical and skewness is marginal.

Kurtosis is used to show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. When the value of kurtosis is less than 3 then it is consider as platykurtic or very flat and it can produce less extreme outliers compared to normal distribution. However, when its value is greater than 3 then it is considered as leptokurtic or very tall and compared to normal distribution it produces more extreme outliers. The results in Table 2 shows that the Kurtosis values for are less greater than 3 for all the portfolios except B/L which has a value less than 3. Therefore the data distribution is leptokurtic or very tall for all the portfolios except B/L which has a platykurtic distribution. The value of B/H is marginal higher than 3 which show that it has a normal distribution. The Kurtosis value for portfolio P is 4.9135, S is 5.3107, B is 3.5464, S/H is 4.1800, S/L is 4.2866, B/H is 3.3127, and B/L is 2.4155.

The results in Table 2 shows that portfolio S with small size and high risk perform better than portfolio B with high size and low risk and the results are consistent with various studies of size effect conducted around the world. The size results confirm the findings of a study conducted by Hassan and Javed (2011) in Karachi Stock Exchange (KSE) and also aligned with (Banz, 1981). The extra return might be due to the risk associated with the growth stocks. The S/H and B/H are the high risk and high return portfolio with high book to market ratio. The high book to market portfolio are S/H and B/H. Both these portfolio with high book to market ratio perform better than low book to market portfolio S/L and B/L. Hence the result are consistent with (Fama & French, 1992; Hassan & Javed, 2011; Stattman, 1980).

Table 4. Descriptive Statistics Size and BTM ratio sorted portfolios (Pakistan)

Variable	P	S	B	S/H	S/L	B/H	B/L
Mean	0.0100	0.0098	0.0081	0.0094	0.0065	0.0131	0.0111
Median	0.0091	0.0028	0.0023	0.0048	(0.0007)	0.0128	0.0136
Std. Dev.	0.0653	0.0700	0.0681	0.0752	0.0726	0.0702	0.0708
Minimum	(0.1953)	(0.1856)	(0.2100)	(0.2274)	(0.1973)	(0.1779)	(0.2469)
Maximum	0.1663	0.2085	0.1851	0.2446	0.2052	0.2085	0.1657
Skewness	(0.1838)	0.1193	(0.1965)	0.0595	0.2889	(0.2637)	(0.4476)
Kurtosis	0.1278	0.4272	0.0398	0.7708	0.2901	0.0820	0.5382

Note. P shows the average portfolio of 148 companies while S and B are 74 small and big companies sorted on the basis of size respectively. S/H and S/L are the portfolios of 37 small companies each when by sorted S on the basis of book to market ratio respectively. The B/H and B/L indicates the big companies each of 37companies when sorted B by book to market ratio.

The statistical characteristics, distribution and behavior of portfolios sorted on the basis of size and book to market ratio (BTM) for Pakistan are reported in Table 4. Result shows that B/H produces high return with low risk compared to S/H. The portfolio B/H is efficient which offers high return with low risk and outperforms the portfolio S/H. On the other hand B/L outperforms S/L. B/L offers high return with low risk compared to S/L. So, among the two portfolios the B/L perform better than S/L. Among the big size segment B/H is efficient which earns high return with low risk and S/L is efficient among the low size and low BTM ratio which also offers high return with low risk. The results indicate that S small size stock outperform the B big size stock are aligned with (Banz, 1981). The S small size portfolio are more risky than B big stock which is ultimately due to high risk associated with growth stock.

The portfolio P shows the average return of 148 companies and S and B are the portfolios of small and large stocks on the basis of market capitalization. The average return and risk

of portfolio P is 0.0100 and 0.0653 respectively. Similarly, the average return produced by S is 0.0098 with a standard deviation of 0.0700 and the mean value of return of B is 0.0081 and its standard deviation is 0.0681. The portfolio sorted by market-to-book ratio (BTM) are S/H with mean return 0.0094 and standard deviation 0.0752, S/L with mean return 0.0065 and standard deviation 0.0726, B/H with mean return 0.0131 and standard deviation 0.0702 and B/L with mean return 0.0111 and standard deviation 0.0708.

The minimum value of loss for P is (0.1953) S is (0.1856) and B is (0.2100). For the portfolios sorted on book-to-market ratio (BTM) the minimum value for S/H is 0.0094, S/L is (0.1973), B/H is (0.1779), and B/L is (0.2469). Similarly the maximum value of return for P is 0.1663, S is 0.2085 and B is 0.1851. The portfolio sorted on book-to-market (BTM) ratio are: S/H with maximum value of return is 0.2446, S/L is 0.2052, B/H is 0.2085 and B/L is 0.1657.

Skewness shows the direction and distribution. The data will be normally distributed or symmetrical if the skewness is zero. A normally distributed data will have a belled shaped curve. The positive value of skewness shows that data is skewed towards the right and it will have a longer tale towards the right of the mean, on the other hand, the negative value of skewness will indicate that the data will have a longer tail towards the left compared to the right tail from the mean point. The skewness in the range of -1, +1 is considered a symmetrical distribution while the skewness higher than +1 is considered highly positive skewed while the value less than -1 is considered highly negative skewed. Results in Table 3 shows a mixed distribution of data for all portfolios. The negatively skewed portfolios are: P (0.1838) B is (0.1965), B/H is (0.2637) and B/L is (0.4476).On the other hand, the

positive skewed portfolios are S 0.1193, S/H 0.0595 and S/L 0.2889. The negatively skewed portfolios have their tails longer towards the left while that of positive skewed have their tails longer towards the right. All the results fall in the range of -1, +1 so the distribution of data is symmetrical and skewness is marginal.

Kurtosis is used to show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. When the value of kurtosis is less than 3 then it is consider as platykurtic or very flat and it can produce less extreme outliers compared to normal distribution. However, when its value is greater than 3 then it is considered as leptokurtic or very tall and compared to normal distribution it produces more extreme outliers. The results in Table 4 shows that the Kurtosis values for are less greater than 3 for all the portfolios. Therefore the data distribution is platykurtic or flat for all the portfolios. The Kurtosis value for portfolio P is 0.1278, S is 0.4272, B is 0.0398, S/H is 0.7708, S/L is 0.2901, B/H is 0.0820, and B/L is 0.5382.

The results in Table 4 indicate that portfolio S with small size and high risk perform better than portfolio B with high size and low risk and the results are consistent with various studies of size effect conducted around the world. The size results confirm the findings of a study conducted by Hassan and Javed (2011) in Karachi Stock Exchange (KSE) and also aligned with (Banz, 1981). The extra return might be due to the risk associated with the growth stocks. The S/H and B/H are the high risk and high return portfolio with high book to market ratio. B/H outperform that S/H and is efficient among the high BTM segment stock. In the low book-to-market (BTM) the B/L perform better than S/L. We found S/L

more risky than B/L which is due to high risk associated with growth stock. The result are in agreement with Stattman (1980) that S/H small size with high BTM ratio earns high return than S/L small size with low BTM ratio.

Table 5. Descriptive statistics of Fama and French three factor and multi factor (China)

Variable	Market Premium (MKT)	Size Premium (SMB)	Value Premium (HML)	Betting Against Beta (BAB)
Mean	0.0003	0.0031	0.0029	0.0070
Median	0.0040	(0.0007)	0.0016	0.0027
Std. Dev.	0.0820	0.0436	0.0351	0.1657
Minimum	(0.2862)	(0.1000)	(0.0982)	(0.5408)
Maximum	0.2398	0.2567	0.1771	0.9187
Skewness	(0.4213)	2.3478	0.9602	1.4057
Kurtosis	1.2775	10.5067	4.1994	6.6584

Note. This table reports the market premium (MKT), Size premium (SMB) and betting against beta (BAB) of 123 stocks from 2000 to 2015 of China. Market premium (MKT) shows the premium offered by market over the risk free rate, Size premium (SMB) the premium associated with small and high market capitalization stock, Value premium (HML) indicates the extra return associated with stocks having high book-to-market (BTM) ratio and low book-to-market (BTM) ratio and betting against beta (BAB) shows the premium associated with low risky stock over the high risky stock. Betting against beta (BAB) is a market neutral and self-financing portfolio which is short in high beta stock and long low beta stock. It is formed by ranking the stock on the basis of their beta in ascending order and rebalancing it every calendar year.

Table 5 shows the statistical characteristics, distribution and behavior of variable constructed that includes the market premium (MKT), size premium (SMB), value premium (HML) and betting against beta (BAB). All the portfolio constructed on the basis of the variable reported in Table 4 offers average positive premium in China equity market. The market offer average premium of 0.0003 with standard deviation of 0.0820. On the basis of size the portfolio offers a positive premium of 0.0031 with standard deviation of

0.0436 which is better and less risky than market premium. The average return offered by value premium is 0.0029 and its standard deviation is 0.0351. The value stock offers less premium than size premium but are less risky due the low risk associated with the value stock. The betting against beta (BAB) portfolio provides the highest premium of 0.0070 which is more than twice offered by other portfolios on the basis of market, size and value. But on the other hand it the more risky as well. The risk associated with betting against beta (BAB) is 0.1657 which is also twice more than risk associated with other portfolios. So, it is better explain the risk based relationship of return. We found betting against beta (BAB) more volatile in our sample of china.

The maximum premium offered by the portfolios constructed on the basis of market (MKT) is 0.2398, size (SMB) is 0.2567, value (HML) is 0.1771 and betting against beta (BAB) is 0.9187. Result indicates that betting against beta has earned the highest premium compared to market (MKT), size (SMB) and value (HML) premium. The result of highest premium earned by betting against beta portfolio is in line with (Agarwalla, Jacob, Varma, & Vasudevan, 2014; Asness, Frazzini, & Pedersen, 2014; Frazzini & Pedersen, 2014).The minimum loss incurred by each portfolio on the basis of market (MKT) is (0.2862), size (SMB) is (0.1000), value (HML) is (0.0982) and betting against beta (BAB) is (0.5408). Ultimately the highest loss is associated with betting against beta (BAB) which is high risk and return portfolio.

The skewness is positive for all size, value and betting against beta except market premium which is (0.4213). The values for the positive skewed portfolios are; size (SMB) 2.3478, value (HML) 0.9602 and betting against beta (BAB) is 1.4057. The values of SMB and

BAB are more than the normal range of (-1, +1) shows that their tails are longer towards the right. Whereas that of MKT and HML falls in the normal distribution range.

Kurtosis show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. The results in Table 5 shows that the shape of all the portfolios are leptokurtic or very tall except market premium which has a platykurtic or very flat shape. The values for Kurtosis are; market premium (MKT) is 1.2775, size premium (SMB) is 10.5067, value premium (HML) is 4.1994 and betting against beta (BAB) is 6.6584.

We have found betting against beta (BAB) more volatile compared to market premium (MKT), size premium (SMB) and value premium (HML). Betting against beta (BAB) offers more return with high risk which ultimately best explains the risk based return relationship. Among the other three portfolios values premium is efficient which produces more return with less risk compared to market premium (MKT) and size premium (SMB).

Table 6: Descriptive statistics of Fama and French three factor and multi factor (India)

Variable	Market Premium (MKT)	Size Premium (SMB)	Value Premium (HML)	Betting Against Beta (BAB)
Mean	0.0001	0.0015	0.0012	0.0078
Median	(0.0031)	0.0017	(0.0087)	0.1280
Std. Dev.	0.0701	0.0398	0.0572	0.4794
Minimum	(0.2780)	(0.1114)	(0.0984)	(1.4316)
Maximum	0.2439	0.1055	0.2433	0.9108
Skewness	(0.3613)	(0.1619)	1.1239	(0.9734)
Kurtosis	2.9171	0.2581	2.4600	0.9123

Note. This table reports the market premium (MKT), Size premium (SMB) and betting against beta (BAB) of 106 stocks from 206 to 2016 of India. Market premium (MKT)

shows the premium offered by market over the risk free rate, Size premium (SMB) the premium associated with small and high market capitalization stock, Value premium (HML) indicates the extra return associated with stocks having high book-to-market (BTM) ratio and low book-to-market (BTM) ratio and betting against beta (BAB) shows the premium associated with low risky stock over the high risky stock. Betting against beta (BAB) is a market neutral and self-financing portfolio which is short in high beta stock and long low beta stock. It is formed by ranking the stock on the basis of their beta in ascending order and rebalancing it every calendar year.

Table 6 shows the statistical characteristics, distribution and behavior of variable constructed that includes the market premium (MKT), size premium (SMB), value premium (HML) and betting against beta (BAB). All the portfolio constructed on the basis of the variable reported in Table 6 offers average positive premium in India equity market. The market offer average premium of 0.0001with standard deviation of 0.0701. On the basis of size the portfolio offers a positive premium of 0.0015 with standard deviation of 0.0398 which is better and less risky than market premium. The average return offered by value premium is 0.0012 and its standard deviation is 0.0572. The value stock offers less premium compared to size premium and are more risky. The betting against beta (BAB) portfolio provides the highest premium of 0.0078 which is on the higher side compared to other portfolios on the basis of market, size and value. Although it is more risky as well. The risk associated with betting against beta (BAB) is 0.4794 which is higher than risk associated with other portfolios. So, it better explain the risk based relationship of return as argued by Capital Asset Pricing Model (CAPM) of (Lintner, 1965; Sharpe, 1964).

The maximum premium offered by the portfolios constructed on the basis of market (MKT) is 0.2439, size (SMB) is 0.1055, value (HML) is 0.2433 and betting against beta (BAB) is 0.9108. Result indicates that betting against beta has earned the highest premium compared

to market (MKT), size (SMB) and value (HML) premium. The result of highest premium earned by betting against beta portfolio is in line with (Agarwalla et al., 2014; Asness et al., 2014; Frazzini & Pedersen, 2014).The minimum loss incurred by each portfolio on the basis of market (MKT) is (0.2780), size (SMB) is (0.1114), value (HML) is (0.0984) and betting against beta (BAB) is (1.4316). Ultimately the highest loss is associated with betting against beta (BAB) which is high risk and return portfolio.

The skewness values are negative for market, size and betting against beta premiums except value premium which has a positive skewness of 1.1239.The values for the negative skewed portfolios are; market (MKT) (0.3613), size (SMB) (0.1619) and betting against beta (BAB) is (0.9734). The value of HML is greater than normal range of (-1, +1) shows that its tail is longer towards the right. Whereas that of MKT, SMB and BAB falls in the normal distribution range.

Kurtosis show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. The results in Table 5 shows that the shape of all the portfolios are platykurtic or very flat. The values for Kurtosis are; market premium (MKT) is 2.9171, size premium (SMB) is 0.2581, value premium (HML) is 2.4600 and betting against beta (BAB) is 0.9123.

We have found betting against beta (BAB) more volatile compared to market premium (MKT), size premium (SMB) and value premium (HML). Betting against beta (BAB) offers more return with high risk which ultimately best explains the risk based return relationship. Among the other three portfolios we have found size premium (SMB)

efficient which offers more return with less risk compared to market premium (MKT) and size premium (SMB).

Table 7: **Descriptive statistics of Fama and French three factor and multi factor (Pakistan)**

Variable	Market Premium (MKT)	Size Premium (SMB)	Value Premium (HML)	Betting Against Beta (BAB)
Mean	0.0118	0.0017	0.0024	0.0281
Median	0.0140	(0.0036)	(0.0010)	0.0034
Std. Dev.	0.0800	0.0524	0.0434	0.1162
Minimum	(0.4605)	(0.1183)	(0.0966)	(0.1296)
Maximum	0.2358	0.2531	0.2136	0.5002
Skewness	(1.2915)	1.1073	1.3704	2.2849
Kurtosis	7.0862	3.9570	5.1720	5.2662

Note. This table reports the market premium (MKT), Size premium (SMB) and betting against beta (BAB) of 148 stocks from 2000 to 2015 of Pakistan. Market premium (MKT) shows the premium offered by market over the risk free rate, Size premium (SMB) the premium associated with small and high market capitalization stock, Value premium (HML) indicates the extra return associated with stocks having high book-to-market (BTM) ratio and low book-to-market (BTM) ratio and betting against beta (BAB) shows the premium associated with low risky stock over the high risky stock. Betting against beta (BAB) is a market neutral and self-financing portfolio which is short in high beta stock and long low beta stock. It is formed by ranking the stock on the basis of their beta in ascending order and rebalancing it every calendar year.

Table 7 shows the statistical characteristics, distribution and behavior of variable constructed that includes the market premium (MKT), size premium (SMB), value premium (HML) and betting against beta (BAB). All the portfolio constructed on the basis of the variable reported in Table 6 offers average positive premium in Pakistan equity market. The market offer average premium of 0.0118 with standard deviation of 0.0800. On the basis of size the portfolio offers a positive premium of 0.0017 with standard deviation of 0.0524. The average return offered by value premium is 0.0024 and its standard deviation is 0.0434. The value stock offers less premium compared to size and

market premium and is less risky as well. The betting against beta (BAB) portfolio provides the highest premium of 0.0281 which is on the higher side compared to other portfolios on the basis of market, size and value. Although it is more risky as well. The risk associated with betting against beta (BAB) is 0.1162 which is higher than risk associated with other portfolios. The result indicate that market portfolio is on higher side and it outperform the size and value stock. The result shows a linear relationship between risk and return in all portfolios. The investor demand for higher return will face more risk and vice versa. The results are aligned with the assumptions of Capital Asset Pricing Model (CAPM) of (Lintner, 1965; Sharpe, 1964).

The maximum premium offered by the portfolios constructed on the basis of market (MKT) is 0.2358, size (SMB) is 0.2531, value (HML) is 0.2136 and betting against beta (BAB) is 0.5002. Result indicates that betting against beta has earned the highest premium compared to market (MKT), size (SMB) and value (HML) premium. The outperformance of betting against beta portfolio is in line with (Agarwalla et al., 2014; Asness et al., 2014; Frazzini & Pedersen, 2014).The minimum loss incurred by each portfolio on the basis of market (MKT) is (0.4605), size (SMB) is (0.1183), value (HML) is (0.0966) and betting against beta (BAB) is (0.1296). The highest loss is incurred by market portfolio.

The skewness values are positive for size, value and betting against beta premiums except market premium which has a negative skewness of (1.2915).The values for the positive skewed portfolios are; size (SMB) 1.1073, value (HML) 1.3704, and betting against beta (BAB) is 2.2849. All the positive values are greater than 1which shows that their tail are

longer towards the right. Whereas that of MKT is less than -1 which show its tail is longer towards left.

Kurtosis show the tailedness or the graphical shape of the distribution of data. The standard value for the kurtosis is considered 3 for a univariate normal distribution. The results in Table 6 shows that the shape of all the portfolios is leptokurtic or very tall compared to normal distribution. The values for Kurtosis are; market premium (MKT) is 7.0862, size premium (SMB) is 3.9570, value premium (HML) is 5.1720 and betting against beta (BAB) is 5.2662.

We have found market premium (MKT) and betting against beta (BAB) more volatile compared to size premium (SMB) and value premium (HML). Betting against beta (BAB) offers more return with high risk which ultimately best explains the risk based return relationship. Among size (SMB), value (HML) and market (MKT) we have found MKT more volatile and high risky even though it offers more return than the other two. We have found that value (HML) stock are comparatively safe and less risky among all the portfolios but it offers less return which makes the results aligned with (Banz, 1981).

Table 8. (a) Regression Analysis: Fama and French three factor model (China)

$E(R_{it})-R_{ft}=\alpha+\beta_1(MKT)_t+\beta_2(SMB)_t+\beta_3(HML)_t+\beta_4(BAB)_t+\varepsilon_{it}$

Variable	**P**	**P**	**P**	**S**	**S**	**S**	**B**	**B**	**B**
α	0.0046	0.0027	0.0026	0.0029	0.001	0.0000	0.006	0.005	0.005
t-Value	1.357	0.833	0.802	0.719	0.040	0.005	2.057	1.696	1.674
P-Value	0.176	0.405	0.423	0.473	0.968	0.995	0.041	0.091	0.095
MKT	0.793	0.868	0.859	0.764	0.864	0.855	0.824	0.876	0.867
t-Value	19.000	19.501	19.389	15.575	17.380	17.236	22.001	21.013	20.917
P-Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SMB		0.277	0.255		0.476	0.453		0.082	0.060
t-Value		3.659	3.365		5.621	5.345		1.157	0.856
P-Value		0.000	0.000		0.0000	0.0000		0.248	0.392
HML		(0.343)	(0.312)		(0.405)	(0.374)		(0.286)	(0.256)
t-Value		(2.606)	(2.376)		(2.757)	(2.547)		(2.324)	(2.089)
P-Value		0.0099	0.0186		0.0064	0.0117		0.0212	0.0381
BAB			0.041			0.041			0.039
t-Value			2.117			1.882			2.173
P-Value			0.035			0.061			0.031
Adj. R^2	0.6679	0.7044	0.7102	0.5744	0.6581	0.6630	0.7296	0.7382	0.7437
F-Stat.	360.9	143.2	110.6	242.5	115.8	89.0	484.0	169.2	130.8
F Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note. The portfolios are same as defined in Table 2.

Table 8 (b): Regression Analysis: Fama and French three factor model (China)

Variable	**S/H**	**S/H**	**S/H**	**S/L**	**S/L**	**S/L**
α	0.0028	0.0018	0.0017	0.0029	(0.0016)	(0.0017)
t-Stat.	0.7036	0.4942	0.4604	0.6537	(0.4228)	(0.4556)
P-Value	0.4826	0.6218	0.6458	0.5142	0.6730	0.6492
MKT	0.8546	0.8631	0.8526	0.6753	0.8650	0.8566
t-Stat.	17.6627	16.8932	16.7674	12.415	17.0670	16.9066
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMB		0.4614	0.4360		0.4762	0.4560
t-Stat.		5.3026	5.0099		5.5171	5.2587
P-Value		0.0000	0.0000		0.0000	0.0000
HML		0.1628	0.1985		(0.9670)	(0.9386)
t-Stat.		1.0778	1.3185		(6.4534)	(6.2563)
P-Value		0.2826	0.1891		0.0000	0.0000
BAB			0.0474			0.0377
t-Stat.			2.1060			1.6795
P-Value			0.0366			0.0948
Adj.R^2	0.6347	0.6815	0.6876	0.4611	0.6342	0.6380
F-Stat.	311.971	128.658	99.486	154.13	104.451	79.854
F Sig.	0.000	0.000	0.000	0.000	0.000	0.000

Note. The portfolios are same as defined in Table 2.

Table 8 (C): Regression Analysis: Fama and French three factor model (China)

Variable	B/H	B/H	B/H	B/L	B/L	B/L
α	0.0032	0.0034	0.0033	0.0093	0.0068	0.0067
t-Statistics	1.0573	1.1130	1.0861	2.7006	2.1438	2.1280
P-Value	0.2918	0.2672	0.2789	0.0076	0.0334	0.0347
MKT	0.8973	0.8795	0.8716	0.7579	0.8777	0.8676
t-Statistics	24.1378	20.9581	20.8267	18.0827	20.1475	20.0784
P-Value	0.000	0.000	0.000	0.000	0.000	0.000
SMB		0.0894	0.0703		0.0746	0.0503
t-Statistics		1.2513	0.9816		1.0061	0.6800
P-Value		0.2125	0.3277		0.3158	0.4974
HML		0.1536	0.1805		(0.7166)	(0.6824)
t-Statistics		1.2382	1.4563		(5.5637)	(5.3335)
P-Value		0.2173	0.1471		0.000	0.000
BAB			0.0356			0.0454
t-Statistics			1.9241			2.3724
P-Value			0.0560			0.0188
Adj.R^2	0.7647	0.7655	0.7691	0.6455	0.7007	0.7083
F-Stat.	582.63	195.814	150.041	326.98	140.660	109.676
F Sig.	0.000	0.000	0.000	0.000	0.000	0.000

Note. The portfolios are same as defined in Table 2.

Table 8 shows the multivariate regression results of all portfolio to explore the relationship among the return of all the portfolios by using the market model and Fama and French three factor model. We have found that when P, which is a market portfolio of all the stock, is regressed with market premium (MKT) the results are positive and significant with a t-value of 19.00 and P-value 0.000 which indicates that MKT positively explains the variation in stock return. The value for the Adjusted R^2 is 0.6679 that shows MKT explains the 66.79% variation in the dependent variable. Furthermore, Fama and French three factor model of SMB and HML are significant and positive. But the results for HML are

significant and negative with t-value (2.37) and P value of .018. The HML is discounted in the market portfolio. The value for adjusted R^2 is increased from 0.667 to .7044 shows that independent variable explains the 70.44% variation in the dependent variable. In order to assess the validity of the betting against beta (BAB) factor we have added it with SMB and HML in the model and found a significant and positive results for BAB with t-value 2.117 and P-value 0.035. All the variable are significant and positive except HML is significant and negative. The value of adjusted R^2 is increased from .704 to .710 which shows that the explanatory power of the model increased by adding the fourth factor. The result of adjusted R^2 indicates that independent variable explains the 71% variation in the dependent variable.

Likewise, the small portfolio S is regressed with market premium results are significant and positive with t-value 15.57 which shows that MKT significantly explains the variation in the stock return. The results for the adjusted R^2 is 0.5744 which indicates that MKT explains the 57.44% changes in the dependent variable. By using the Fama and French three factor we have found significant and positive results for MKT and SMB with t-values of 17.3 and 5.62 which shows that both the variable significantly explains the variation in the stock return. The results for HML are significant and negative with a t-value of (2.75). The average explanatory power of the model is increased with an increase in the value of adjusted R^2 from 0.5744 to 0.6581 which is a good increase of 8% approximately. The same portfolio is regressed again by adding another factor of betting against beta (BAB) we have found significant and positive results for MKT, SMB while HML which is significant and negative. The results of BAB are insignificant at confidence level of 95% and significant and positive at a confidence level of 90%. The value for t-statistics for

MKT, SMB, HML and BAB are 17.23, 5.34, (2.54), and 1.88. The adjusted R^2 increased from 0.6581 to 0.6630. S value of adjusted R^2 shows that the independent variable explains the 66.3% variation in dependent variable.

When portfolio B is regressed with market premium (MKT) the results are positive and significant with a t-value of 22.0 and the adjusted R^2 of the model is 0.7296. It means MKT explains the 72.96% variation in the portfolio of big stock. After adding SMB and HML the results of HML are negative and significant with a t-value of 92.34) and MKT positive and significant with t-value 21.0 while SMB became insignificant with a t-value of 1.15. It means that SMB does not explain the variation in return of big stocks. The overall all explanatory power of the model increased from 0.7296 to 0.7382. The explanatory power of the model is further increased from 0.7382 to 0.7437 when we introduced the fourth factor of BAB. The results are significant positive for BAB and MKT with a t-value of 2.17 and 20.91 respectively, but the results of SMB are still insignificant with t-value of 0.85. HML is significant and negative throughout the portfolio. It means that MKT and BAB explains the variation in big stocks positively while the average small stock are at the higher side.

S/H is a portfolio of small cap stock with high book-to-market (BTM) ratio. When it is regressed with market premium (MKT) the results are significant and positive with t-value of 17.66 and adjusted R^2 0.63. The market premium (MKT) explains the 63% variation in dependent variable. The explanatory power is further increased from 0.63 to 0.6815 when the size premium (SMB) and value premium (HML) are added. The result shows that MKT and SMB are positive and significant with t-value of 16.89 and 5.30 respectively. While

the HML is insignificant with t-value of 1.077. It means that HML does not explain the variation of stock return in S/H small cap stocks with high book to market ratio. The BAB factor when added with SMB and HML resulted with a positive and significant with t-value of 2.106 while HML remain insignificant with t-value 1.31. The results of MKT and HML are positive and significant with t-value 16.76 and 5.00. The value of adjusted R^2 is increased from 0.6815 to 0.6876. It means that MKT, SMB and BAB are positively and significantly capture the variation in stock return of S/H while HML remain insignificant.

S/L is a portfolio of small cap stock with low book-to-market (BTM) ratio. The market premium (MKT) is found significant and positive when regressed with MKT only. The t-value is 12.4 with adjusted R^2 0.46. Only 46% variation in the stock return of S/L is captured by MKT. The explanatory power increased to Adjusted R^2 0.6342 when we added the SMB and HML factors in the regression model. We found both MKT and HML positive and significant with t-value 17.06 and 5.51 respectively while HML is significant and negative with t-value (6.45). Betting against beta (BAB) is insignificant when added as another factor. The same way MKT and SMB are positive and significant while HML is significant and negative.

The portfolio with high size and high book-to-market (BTM) ratio is B/H. When regressed with only market premium resulted with a significant and positive t-value of 24.13 and adjusted R^2 0.7647. But after including the rest of the two factors of SMB and HML we found that both the factors are insignificant with t-value 1.25 and 1.23. It means that S/L is best explained by market premium. Even though the value of adjusted R^2 is slightly increased from 0.7647 to 0.7655. Betting against beta (BAB) is insignificant when included

in the regression as a fourth factor with t-value 1.92. Only MKT remained significant while the rest of the factor remained insignificant.

The market premium (MKT) and betting against beta are significant and positive when regressed with B/L high cap stock with low book-to-market (BTM) ratio. The t-value for MKT is 18.02 when regressed alone with MKT. While that of SMB is found insignificant with t-value 1.006and HML negative and significant with t-value (5.56). The value of adjusted R^2 is increase from 0.6455 to 0.700. We found both MKT and BAB positive and significant in four factor model with t-value 20.0 and 2.37 respectively. While SMB is insignificant with t-value 0.6800 and HML is negative and significant with t-value (5.5637). The value of adjusted R^2 is 0.070083 which is a slight increase. The results indicate that BAB and MKT are priced in B/L portfolio while HML is discounted.

The behavior of each portfolio is different in the sample of China. Market premium is positive and significant in all portfolios while SMB is found positive and significant in market and all small size or low cap stock while insignificant in all big size stock portfolios. It means that SMB is only priced by the portfolio with low size only while high market cap stock do not price SMB. HML has an interesting trended detected in China equity market. It is negative and significant in market portfolio, small and big stock. It means small stock remain on the higher side throughout the sample. While we found HML insignificant for S/H and B/H small size and big size and high BTM ratio portfolio. HML is not priced with portfolios with high book-to-market (BTM) ratio both in small and high size stock. Result in Table 6 indicate that betting against beta (BAB) is positive and significant in market portfolio P, high cap stock B, small cap stock with high BTM ratio S/H and big cap stock

with low BTM ratio. Moreover, we have found that α **(**alpha**)** is insignificant throughout the sample except B/L. It is positive and significant in B/L portfolio only.

Table 9 (a): Regression Analysis: Fama and French three factor model (India)

$E(R_{it})-R_{ft}=\alpha+\beta_1(MKT)_t+\beta_2(SMB)_t+\beta_3(HML)_t+\beta_4(BAB)_t+\varepsilon_{it}$

Variable	**P**	**P**	**P**	**S**	**S**	**S**	**B**	**B**	**B**
α	0.004	0.005	0.004	0.003	0.006	0.004	0.004	0.005	0.004
t-Stat.	1.493	1.950	0.880	0.969	1.960	0.882	1.622	1.936	0.876
P-Value	0.138	0.053	0.380	0.334	0.0526	0.380	0.107	0.055	0.382
MKT	1.001	0.969	0.97	1.02	0.96	0.970	0.97	0.96	0.97
t-Value	24.90	21.7	21.62	19.15	21.53	21.43	23.25	21.87	21.77
P-Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SMB		0.1806	0.1826		0.6730	0.6750		(0.3118)	(0.309)
t-Stat.		2.5400	2.5544		9.3898	9.3670		(4.4126)	(4.359)
P-Value		0.012	0.012		0.00	0.00		0.00	0.00
HML		0.0870	0.0845		0.0914	0.089		0.0826	0.0801
t-Stat.		1.1379	1.0973		1.1860	1.145		1.0871	1.0472
P-Value		0.2578	0.2751		0.2383	0.255		0.2795	0.2975
BAB			(0.004)			(0.004)			(0.004)
t-Stat.			(0.473)			(0.479)			(0.466)
P-Value			0.6370			0.633			0.6421
Adj.R^2	0.852	0.860	0.865	0.773	0.876	0.875	0.834	0.859	0.858
F-Stat.	620.13	220.8	164.45	366.88	254.10	189.220	540.72	218.3	162.6
F Sig.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note. The variable are same as defined in Table 3.

Table 9 (b): Regression Analysis: Fama and French three factor model (India)

Variable	S/H	S/H	S/H	S/L	S/L	S/L
α	(0.0046)	0.0065	0.0062	0.0121	0.0058	0.0031
t-Statistics	(0.9707)	1.9284	1.1793	3.0939	1.6582	0.5630
P-Value	0.3339	0.0565	0.2410	0.0025	0.1003	0.5747
MKT	1.2037	1.0094	1.0096	0.8345	0.9207	0.9228
t-Statistics	17.6512	20.5897	20.4542	14.8960	17.9682	17.9227
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMB		0.8303	0.8306		0.5314	0.5346
t-Statistics		10.6255	10.5591		6.5068	6.5156
P-Value		0.0000	0.0000		0.0000	0.0000
HML		0.5706	0.5702		(0.3911)	(0.3951)
t-Statistics		6.7874	6.7333		(4.4509)	(4.4730)
P-Value		0.0000	0.0000		0.0000	0.0000
BAB			(0.0006)			(0.0068)
t-Statistics			(0.0638)			(0.6447)
P-Value			0.9492			0.5205
Adj.R^2	0.7438	0.8981	0.8972	0.6737	0.7900	0.7888
F-Statistics	311.5664	315.4895	234.3522	221.89	135.2012	100.9351
F Sig.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note. The portfolios are same as defined in Table 3.

Table 9 (c): Regression Analysis: Fama and French three factor model (India)

Variable	B/H	B/H	B/H	B/L	B/L	B/L
α	(0.0044)	0.0058	0.0031	0.0143	0.0065	0.0062
t-Statistics	(1.0718)	1.6582	0.5630	4.2048	1.9284	1.1793
P-Value	0.2862	0.1003	0.5747	0.0001	0.0565	0.2410
MKT	1.0703	0.9207	0.9228	0.8826	1.0094	1.0096
t-Statistics	18.1253	17.9682	17.9227	18.1644	20.5897	20.4542
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMB		(0.4686)	(0.4654)		(0.1697)	(0.1694)
t-Statistics		(5.7369)	(5.6715)		(2.1718)	(2.1536)
P-Value		0.0000	0.0000		0.0321	0.0336
HML		0.6089	0.6049		(0.4294)	(0.4298)
t-Statistics		6.9306	6.8480		(5.1087)	(5.0759)
P-Value		0.0000	0.0000		0.0000	0.0000
BAB			(0.0068)			(0.0006)
t-Statistics			(0.6447)			(0.0638)
P-Value			0.5205			0.9492
Adj.R^2	0.7538	0.8574	0.8566	0.7546	0.8078	0.8143
F-Statistics	328.53	215.4107	160.7543	329.95	150.9359	112.1189
F Sig.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note. This portfolios are same as defined in Table 3.

Table 9 shows the regression results of all portfolio to explore the relationship among the return of all the portfolios by using the market model and Fama and French three factor model. We have found that when P, which is a market portfolio of all the stock, is regressed with market premium (MKT) the results are positive and significant which indicates that MKT positively explains the variation in stock return. The value for the Adjusted R^2 is 0.8526 that shows MKT explains the 85.26% variation in the dependent variable. Furthermore, Fama and French three factor model results of SMB and HML are significant and positive. But the results for HML are insignificant with t-value1.13 and P value of 0.257.The value for adjusted R^2 is increased from 0.8526 to .0.8604 shows that independent

variable explains the 86% variation in the dependent variable. In order to assess the validity of the betting against beta (BAB) factor has added along with SMB and HML in the model and found an insignificant results for BAB with t-value (0.4732). The value of adjusted R^2 is increased from 0.8604 to 0.8652 which shows that the explanatory power of the model is slightly increased by adding the fourth factor. The result of adjusted R^2 indicates that independent variable explains the 86.52% variation in the dependent variable.

Likewise, the small portfolio S is regressed with market premium results are significant and positive with t-value 1.15 which shows that MKT significantly explains the variation in the stock return. The results for the adjusted R^2 is 0.7737 which indicates that MKT explains the 77.37% changes in the dependent variable. By using Fama and French three factor we have found significant and positive results for MKT and SMB with t-values of 21.53 and 9.3 which shows that both the variable significantly explains the variation in the stock return. The results for HML are insignificant with a t-value of 1.18. The average explanatory power of the model is increased with an increase in the value of adjusted R^2 from 0.7737 to 0.8765.The same portfolio is regressed again by adding another factor of betting against beta (BAB) we have found significant and positive results for MKT and SMB. The results of BAB and HML are insignificant. The value for t-statistics for MKT, SMB, HML and BAB are 21.49, 9.36, 1.14, and (0.47). The adjusted R^2 decreased from 0.8765 to 0.8756. The value of adjusted R^2 shows that the independent variable explains the 87.56% variation in dependent variable.

When portfolio B is regressed with market premium (MKT) the results are positive and significant with a t-value of 23.25 and the adjusted R^2 of the model is 0.8345. It means

MKT explains the 83.45% variation in the portfolio of big stock. After adding SMB and HML the results of SMB are negative and significant with a t-value of (4.4126) and MKT positive and significant with t-value 21.87 while HML became insignificant with a t-value of 1.0871. It means that HML does not explain the variation in return of big stocks. The overall all explanatory power of the model increased from 0.8345 to 0.8591.The explanatory power of the model is further decreased from 0.8591to 0.8580 when we introduced the fourth factor of BAB. The results are significant and positive for MKT with a t-value of 21.77 and significant and negative for SMB with t-value of (4.3598). We have found HML and BAB insignificant with t-value of 1.04 and (0.466) respectively.

S/H is a portfolio of small cap stock with high book-to-market (BTM) ratio. When it is regressed with market premium (MKT) the results are significant and positive with t-value of 17.65 and adjusted R^2 0.7438. The market premium (MKT) explains the 74% variation in dependent variable. The explanatory power is further increased from 0.7438 to 0.8981 when the size premium (SMB) and value premium (HML) are added. The result shows that MKT, SMB and HML are positive and significant with t-value of 20.58, 10.62 and 6.78 respectively. All the variable explain the variation in return of S/H. The value of adjusted R^2 is increased from 0.7438 to 0.898. We found that BAB is insignificant with t-value (0.06) while MKT, SMB and HML are significant and positive with a t-value of 20.45, 10.5 and 6.73 respectively. The value of adjusted R^2 is increased from 0.8981 to 0.8972.

S/L is a portfolio of small cap stock with low book-to-market (BTM) ratio. The market premium (MKT) is found significant and positive when regressed with MKT only. The t-

value is 14.89 with adjusted R^2 0.6737. Only 67.37% variation in the return of S/L stock is captured by MKT. The explanatory power increased to Adjusted R^2 0.7900 when we added the SMB and HML factors in the regression model. We found both MKT and HML positive and significant with t-value 17.96 and 6.50 respectively while HML is significant and negative with t-value (4.45). Betting against beta (BAB) is insignificant when added as another factor. The same way MKT and SMB are positive and significant while HML is significant and negative. The value of the adjusted R^2 is decreases to 0.788 when BAB is introduces as a new factor. The S/L portfolio does not price BAB and discounts HML.

The portfolio with high size and high book-to-market (BTM) ratio is B/H. When regressed with only market premium resulted with a significant and positive t-value of 18.12 and adjusted R^2 0.7538. But after including the rest of the two factors of SMB and HML we found that SMB is significant and negative while MKT and HML are significant and positive with t-value of (5.73), 17.92 and 6.93 respectively. Even though the value of adjusted R^2 is increased from 0.753 to 0.8574. Betting against beta (BAB) is insignificant when included in the regression as a fourth factor with t-value 0.6447.MKTand HML are significant and positive while SMB is significant and negative.

The market premium (MKT) is significant and positive when regressed with B/L high cap stock with low book-to-market (BTM) ratio. The t-value for MKT is 18.16 when regressed alone with MKT. While that of SMB and HML are found negative and significant with t-value (2.17) and (5.108). The value of adjusted R^2 is increase from 0.7546 to 0.8078. We found BAB insignificant when regressed with Fama and French three factor model. The

same behavior is continued with SMB and HML are significant and negative while MKT is significant and positive.

We have found a mixed behavior of portfolio returns. The market premium (MKT) is found significant and positive in all portfolios. Size premium (SMB) is priced in market, S small size, and S/H and S/L portfolio while negative and significant (discounted) in B, B/H and B/L.HML is positive and significant in S/H and B/H while negative and significant in S/L and B/L and insignificant in MKT, S and B portfolios. We have found BAB insignificant in all portfolios. Moreover, we have found that α (alpha) is found insignificant all portfolios except S/L in which it is significant and positive only in single factor model.

Table 10 (a): Regression Analysis: Fama and French three factor model (Pakistan)

$E(R_{it})-R_{ft}=\alpha+\beta_1(MKT)_t+\beta_2(SMB)_t+\beta_3(HML)_t+\beta_4(BAB)_t+\varepsilon_{it}$

Variable	**P**	**P**	**P**	**S**	**S**	**S**	**B**	**B**	**B**
α	0.002	0.004	0.005	0.001	0.004	0.005	0.004	0.004	0.005
t-Stat.	0.828	1.432	1.559	0.257	1.464	1.590	1.503	1.446	1.573
P-Value	0.408	0.154	0.120	0.797	0.145	0.113	0.134	0.150	0.117
MKT	0.611	0.672	0.669	0.541	0.673	0.670	0.682	0.672	0.670
t-Stat.	14.54	16.80	16.74	10.09	16.83	16.77	17.81	16.81	16.75
P-Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SMB		0.435	0.432		0.936	0.933		(0.062)	(0.065)
t-Statistics		5.872	5.834		12.635	12.601		(0.846)	(0.888)
P-Value		0.00	0.00		0.00	0.00		0.398	0.3756
HML		0.0261	0.0336		0.0241	0.0316		0.027	0.034
t-Stat.		0.2637	0.3396		0.2442	0.3199		0.275	0.351
P-Value		0.7923	0.7346		0.8074	0.7495		0.783	0.726
BAB			0.0308			0.0307			0.0308
t-Stat.			1.1782			1.1742			1.1780
P-Value			0.2404			0.2420			0.2405
Adj.R^2	0.5576	0.6303	0.6311	0.3766	0.6805	0.6813	0.6545	0.6571	0.6577
F-Stat.	211.49	95.89	72.43	101.91	119.57	90.230	317.31	105.26	79.476
F Sig.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note. The portfolios are same as defined in Table 4.

Table 10 (b). Regression Analysis: Fama and French three factor model (Pakistan)

Variable	S/H	S/H	S/H	S/L	S/L	S/L
α	0.0003	0.00710	0.0075	0.0019	0.0021	0.0026
t-Stat.	0.0704	2.18384	2.2793	0.3984	0.6172	0.7556
P-Value	0.9440	0.03039	0.0239	0.6908	0.5379	0.4510
MKT	0.5801	0.69265	0.6907	0.5038	0.6532	0.6506
t-Stat.	10.0458	16.82349	16.7543	8.6216	14.8241	14.7716
P-Value	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000
SMB		0.94320	0.9406		0.9290	0.9255
t-Stat.		12.35663	12.3128		11.3721	11.3403
P-Value		0.00000	0.0000		0.0000	0.0000
HML		0.59461	0.6010		(0.5411)	(0.5324)
t-Stat.		5.84261	5.8914		(4.9681)	(4.8857)
P-Value		0.000	0.000		0.000	0.000
BAB			0.0260			0.0356
t-Stat.			0.9632			1.2354
P-Value			0.3369			0.2185
Adj.R^2	0.3743	0.70617	0.70628	0.3051	0.6350	0.6362
F-Stat.	100.92	134.788	101.2781	74.33	97.85	74.0020
F Sig.	0.000	0.000	0.000	0.000	0.000	0.000

Note. All portfolios are same as defined in Table 4.

Table 10 (c). Regression Analysis: Fama and French three factor model (Pakistan)

Variable	B/H	B/H	B/H	B/L	B/L	B/L
α	(0.0002)	0.0021	0.0026	0.0096	0.0071	0.0075
t-Stat.	(0.0567)	0.6172	0.7556	2.8891	2.1838	2.2793
P-Value	0.9548	0.5379	0.4510	0.0044	0.0304	0.0239
MKT	0.6789	0.6532	0.6506	0.6868	0.6927	0.6907
t-Stat	t-Stat	14.8241	14.7716	16.6419	16.8235	16.7543
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMB		(0.0710)	(0.0745)		(0.0568)	(0.0594)
t-Stat.		(0.8696)	(0.9135)		(0.7441)	(0.7770)
P-Value		0.3858	0.3623		0.4579	0.4383
HML		0.4589	0.4676		(0.4054)	(0.3990)
t-Stat.		4.2136	4.2914		(3.9833)	(3.9118)
P-Value		0.0000	0.0000		0.0001	0.0001
BAB			0.0356			0.0260
t-Stat.			1.2354			0.9632
P-Value			0.2185			0.3369
Adj.R^2	0.5824	0.6199	0.6211	0.6230	0.6533	0.6561
F-Stat.	233.87	91.78	69.4371	276.95	105.91	79.6298
F Sig.	0.000	0.000	0.000	0.000	0.000	0.000

Note. The portfolios are same as defined in table 4

Table 9 shows the multivariate regression results of all portfolio to explore the relationship among the return of all the portfolios by using the market model and Fama and French three factor model. The result shows that P, which is a market portfolio of all the stock, is regressed with market premium (MKT) the results are positive and significant with a t-value of 14.54 and P-value 0.000 which indicates that MKT positively explains the variation in stock return. The value for the Adjusted R^2 is 0.5576 that shows MKT explains the 55.76% variation in the dependent variable. Furthermore, Fama and French three factor

results of SMB and HML are significant and positive results for MKT and SMB with t-value 16.80 and 5.87 and P value 0.000 and 0.00 respectively. But the results for HML are insignificant with t-value 0.26 and P value of 0.792.The value for adjusted R^2 is increased from 0.5576 to 0.6303 shows that independent variable explains the 63% variation in the dependent variable. In order to assess the validity of the betting against beta (BAB) factor we have added it with SMB and HML in the model and found an insignificant results for BAB with t-value (1.1782). The value of adjusted R^2 is increased from 0.6303 to 0.6311 which shows that the explanatory power of the model is slightly increased by adding the fourth factor. The result of adjusted R^2 indicates that independent variable explains the 63.11% variation in the dependent variable.

Similarly when the small portfolio S is regressed with market premium results are significant and positive with t-value 10.09 which shows that MKT significantly explains the variation in the stock return. The results for the adjusted R^2 is 0.3766 which indicates that MKT explains the 37.66% changes in the dependent variable. By using Fama and French three factor we have found significant and positive results for MKT and SMB with t-values of 16.83 and 12.63 which shows that both the variable significantly explains the variation in the stock return. The results for HML are insignificant with a t-value of 0.24. The average explanatory power of the model is increased with an increase in the value of adjusted R^2 from 0.3766 to 0.6805.Moreover, when the same portfolio is regressed again along with another factor of betting against beta (BAB) the results are significant and positive results for MKT and SMB while BAB and HML are insignificant. The value for t-statistics for MKT, SMB, HML and BAB are 16.77, 12.60, 0.319, and 1.17. The adjusted

R^2 increased from 0.6805 to 0.6813. The value of adjusted R^2 shows that the independent variable explains the 68.13% variation in dependent variable.

However, when portfolio B is regressed with market premium (MKT) the results are positive and significant with a t-value of 17.81 and the adjusted R^2 of the model is 0.6545. It means MKT explains the 65.45% variation in the portfolio of big stock. After adding SMB and HML the results of SMB and HML became insignificant with a t-value of (0.8468) and 0.2751 respectively, while MKT is positive and significant with t-value 16.81. It indicates that SMB and HML does not explain the variation in return of big stocks. The overall all explanatory power of the model increased from 0.6545 to 0.6571.The explanatory power of the model is further increased from 0.6571to 0.6577 when we introduced the fourth factor of BAB. The results are significant and positive for MKT with a t-value of 16.75 and insignificant for all other variables. We found SMB, HML and BAB insignificant with value (0.8468), 0.3511 and 1.17 respectively.

The portfolio S/H is comprised of small cap stock with high book-to-market (BTM) ratio. When it is regressed with market premium (MKT) the results are significant and positive with t-value of 10.04 and adjusted R^2 0.3743. The market premium (MKT) explains the 37.43% variation in dependent variable. The explanatory power is further increased from 0.3743 to 0.70617 when the size premium (SMB) and value premium (HML) are added. The result shows that MKT, SMB and HML are positive and significant with t-value of 16.82, 12.35 and 5.84 respectively. All the variable explain the variation in return of S/H. The value of adjusted R^2 is increased from 0.3743 to 0.70617. We found that BAB is insignificant with t-value 0.96 while MKT, SMB and HML are significant and positive

with a t-value of 16.75, 12.31 and 5.89 respectively. The value of adjusted R^2 is increased from 0.70617 to 0.70628. It indicates that S/H is significantly explained by SMB and HML with MKT.

S/L is a portfolio of small cap stock with low book-to-market (BTM) ratio. The market premium (MKT) is found significant and positive when regressed with MKT only. The t-value is 8.62 with adjusted R^2 0.3051. Only 30.51% variation in the return of S/L stock is captured by MKT. The explanatory power increased to Adjusted R^2 0.6350 when we added the SMB and HML factors in the regression model. We found both MKT and HML positive and significant with t-value 14.82 and 11.37 respectively while HML is significant and negative with t-value (4.96). Betting against beta (BAB) is insignificant when added as another factor. The same way MKT and SMB are positive and significant while HML is significant and negative. The value of the adjusted R^2 is increases to 0.6362 when BAB is introduces as a new factor. The S/L portfolio does not price BAB and discounts HML.

The portfolio with high size and high book-to-market (BTM) ratio is B/H. However, when it is regressed with only market premium resulted with a significant and positive t-value of 15.29 and adjusted R^2 0.5824. But after including the other two factors of SMB and HML we found that SMB is insignificant while MKT and HML are significant and positive with t-value of 14.8241 and 4.2136 respectively. Even though the value of adjusted R^2 is increased from 0.5824 to 0.6199. Betting against beta (BAB) is insignificant when included in the regression as a fourth factor with t-value 1.2354. MKT and HML are significant and positive while SMB is insignificant.

The market premium (MKT) is significant and positive when regressed with B/L high cap stock with low book-to-market (BTM) ratio. The t-value for MKT is 16.64 when regressed alone with MKT. While that of SMB is found insignificant and HML significant and negative. The t-value for MKT, SMB and HML are 16.82, (0.7441) and (3.9833). The value of adjusted R^2 is increase from 0.6230 to 0.6533. We found BAB and SMB insignificant when regressed with Fama and French three factor model. HML significant and negative while MKT is significant and positive with t-value of (3.911) and 16.75 respectively.

The relation and impact of each variable varies across different range of portfolios. Market premium is found positive and significant in all portfolios while SMB is found positive and significant in P market, S small size, S/H small size with high book to market ratio and S/L small size and low book to market ratio. SMB has a positive and significant impact in market and all small size portfolios while it is insignificant in all big size stock portfolios. It indicates that SMB is only priced by the portfolio with low size only while high market cap stock do not price SMB. Value premium (HML) is significant and positive in high book-to-market ratio portfolios. It is positive and significant in S/H and S/L while it is significant and negative in low book-to market ratio portfolios. IT is significant and negative in S/L and B/L. It indicates HML is priced in high BTM ratio stock while discounted in low BTM ratio stock. It is insignificant in P market portfolio, S small and B big stock portfolios in Pakistan. Result in Table 6 indicate that betting against beta (BAB) is insignificant in all portfolios and no evidences are found in Pakistan to claims the availability of this anomaly in Pakistan stock market. Moreover, we have found that α

(alpha**)** is insignificant throughout the sample except S/L 3FF model and all portfolios of B/L while insignificant in all other portfolios.

4.2 Discussion

Low beta anomaly has been explored by constructing a betting against beta (BAB) factor. Three factor model and CAPM has been used to capture the relationship among market premium, size premium, value premium and betting against beta. A multivariate regression analysis has been used to capture the relationship and impact of all variable in China, India and Pakistan.

The value of F statistics is significant at 95% confidence level that shows the goodness of fit or average significance of the model. All the model reported are found fit and significant to describe the association among dependent and independent variables.

In China the market premium is positive and significant in all portfolios while size premium (SMB) is found positive significant in market and all small size or low cap stock while insignificant in all big size stock portfolios. It indicates that SMB is only priced by the portfolio with low size portfolio only. Result shows SMB do not significantly influence the return of big stocks. The results are in line with the findings of (Banz, 1981; Hassan & Javed, 2011). HML is found negative and significant in P market portfolio, S small and B big stock. It means small stock remain on the higher side throughout the sample. While we found HML insignificant for S/H and B/H small size and big size with high BTM ratio portfolio. HML is not priced with portfolios with high book-to-market (BTM) ratio both in small and high size stock. Result in Table 6 indicate that betting against beta (BAB) is positive and significant in market portfolio P, high cap stock B, small cap stock with high

BTM ratio S/H and big cap stock with low BTM ratio the results are consistent with (Asness, Frazzini, & Pedersen, 2012; Bradley, Taliaferro, Low, Link, & Taliaferro, 2013; Frazzini & Pedersen, 2014). Moreover, we have found that α **(**alpha**)** is insignificant throughout the sample except B/L. It is positive and significant in B/L portfolio only.

Result shows that in India sample market premium (MKT) is found significant and positive in all portfolios. Size premium (SMB) is positive significant in P market, S small size, and S/H and S/L portfolio while negative and significant in B, B/H and B/L. Result shows SMB do not significantly influence the return of big stocks. The results are in line with the findings of (Hassan & Javed, 2011). HML is positive and significant in S/H and B/H while negative and significant in S/L and B/L and insignificant in MKT, S and B portfolios. We do not found any evidence of low beta anomaly in Indian stock as BAB is found insignificant in all portfolios the result confirms the findings of Agarwalla et al., (2014) for Indian stock market. Moreover, α (alpha) is significant and positive for S/L while insignificant for all other portfolios.

In Pakistan equity market premium is found positive and significant in all portfolios while SMB is found positive and significant in P market, S small size, S/H small size with high book to market ratio and S/L small size and low book to market ratio. SMB has a positive and significant impact in market and all small size portfolios while it is insignificant in all big size stock portfolios. The results confirms the findings of (Hassan & Javed, 2011) in Pakistan stock exchange. It indicates that SMB is only priced by the portfolio with low size only while high market cap stock do not price SMB. Value premium (HML) is significant and positive in high book-to-market ratio portfolios. It is positive and significant in S/H

and S/L while it is significant and negative in low book-to market ratio portfolios while it is significant and negative in S/L and B/L. It indicates HML is priced in high BTM ratio stock while discounted in low BTM ratio stock it is consistent with Mirza and Shahid (2008). It is insignificant in P market portfolio, S small and B big stock portfolios in Pakistan. Our results do not support the existence of low beta anomaly. Betting against beta (BAB) is insignificant in all portfolios and no evidences are found in Pakistan to claims the availability of this anomaly in Pakistan stock market. Moreover, we have found that α **(**alpha**)** is insignificant throughout the sample except S/L 3FF model and all portfolios of B/L while insignificant in all other portfolios.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

This study investigates the cross-sectional variation in returns in the emerging stock markets of Asian countries to the underlying behavior of size premium (SMB) book-to-market (BTM) ratio and betting against beta (BAB). We have tested these three variables in the stock markets of China, India and Pakistan to explore whether these three strategies can be used to use to recognize and predict the abnormal return across the emerging Asian countries. The empirical result shows that size premium is significant for small portfolio return while insignificant for the stock of big portfolios. The growth stock performed better than value stock. The high book-to-market stock offered higher return than low book to market stock. Value premium is found significant for big stocks except with low book-to-market ratio. Betting against beta is consistently positive and significant in China equity market but no evidences are found for India and Pakistan which share the historical commonalities with each other.

This study focused on the beta anomaly to check weather BAB is found in the emerging countries by employing a large sample of daily and monthly stock prices from 2000 to 2015 for Pakistan and China while from 2006 to 2016 for India. We have introduced used a new factor of betting against beta (BAB) along with the Fama and French three factor model of market, size and value premium. We have used the Fama and French (1992, 1993)

methodology to find out the individual and combined effect of the new variable betting against beta (BAB).

The results of China Market shows the consistency with the with the conventional capital asset pricing model. The premium is positive and significant in all portfolios which shows that market captures the variation in stock returns. Size premium is positive and significant in market and small size stock portfolios and insignificant in all big size stock. These findings confirm the size effect of (Banz, 1981). It indicates that size effect is available in the China stock market. Value premium has interesting findings. It is significant and negative in market and small and big cap stock, but insignificant for high BTM ratio. Value premium is not priced in high book-to-market (BTM) stock of both in small and high size stock. Betting against beta (BAB) is highly significant and positive in all portfolios except S/H small cap stock with high BTM ratio and B/L big cap stock with low BTM ratio. Moreover, we have found that α (alpha) is insignificant throughout the sample except B/L. It is positive and significant in B/L portfolio only.

The empirical results show a mixed behavior of Indian stock. The conventional CAPM is consistent in Indian Stock market. Size premium is priced in market, S small size, and S/H and S/L portfolio while negative and significant in B, B/H and B/L. Value premium is positive and significant in stock with high BTM ratio while negative and significant in S/L and B/L and insignificant in MKT, S and B portfolios. We have found BAB insignificant in all portfolios. The empirical results supports that BAB is not a factor of Indian stock market.

In Pakistan the market premium is positive and significant in all portfolios and size premium is positive and significant in P market, S small size, S/H small size with high book to market ratio and S/L small size and low book to market ratio. Size effect is found in Pakistan equity market and the results agree with (Banz, 1981; Hassan & Javed, 2011).Value premium is significant and positive in high book-to-market ratio portfolios while significant and negative in low book-to market ratio portfolios. Betting against beta (BAB) is insignificant in all portfolios and no evidences found in Pakistan to claims the availability of this anomaly in Pakistan stock market.

The overall finding of the study supports that convention Capital Asset Pricing Model (CAPM) is consistent in all three markets. Size premium and value premium are consistent with the literature that both the effects are present in the three markets. The results and behavior of size value premium changes from portfolio to portfolio across the markets. The empirical evidence for the presence of betting against beta or beta anomaly are stronger in China equity market while no such results are found for Pakistan and Indian stock markets. Betting against beta is a successful strategy in China equity market only. On the basis of these empirical results our study concludes that beta anomaly is not a valid factor in Pakistan and Indian while a stronger factor in China equity market.

5.2 Recommendation

The positive relationship of market premium, size premium, value premium and betting against beta in determining the stock return in China should compel investor, portfolio manager to think about these factors while designing any investment strategy in China equity market. While absence of BAB factor in Pakistan and India equity market the

relevant investor and strategy maker should focus on size and value premium while making any decision regarding investment and resource allocation.

5.3 Direction for Future Research

Much research is need to be done to investigate the reason why BAB factor is not priced in Pakistan and India capital market. Moreover, betting against beta should be checked in each sector instead of overall market. We have investigated the non-financial sector of China, India and Pakistan so the financial sector should also need to be explored to check the presence of beta anomaly.

For calculating the BAB factor we have sorted data annually and it is needed that it should be sorted month wise and explore the presence of this factor.

5.4 Limitation of the Study

Due to time and resource limitation we have investigated three emerging markets only, this study needs to be extended for other countries as well. We have only investigated the non-financial sector and financial sector should also be investigated. BAB factor shall also need to be explored in each industry.

The time and resource limitation are the main hurdles in the study. The technical support for the software and other packages were the main hurdles.

REFERENCES

Agarwalla, S. K., Jacob, J., Varma, J. R., & Vasudevan, E. (2014). *Betting Against Beta in the Indian Market* (No. 2014-7–1). *SSRN Working Paper* (Vol. No 2464097). Ahmedabad, India. https://doi.org/10.2139/ssrn.2464097

Amel-Zadeh, A. (2011). The return of the size anomaly: evidence from the German stock market. *European Financial Management*, *17*(1), 145–182.

Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2009). High idiosyncratic volatility and low returns: International and further US evidence. *Journal of Financial Economics*, *91*(1), 1–23.

Asness, C. S., Frazzini, A., & Pedersen, L. H. (2012). Leverage Aversion and Risk Parity. *Financial Analysts Journal*, *68*(1), 47–59. https://doi.org/10.2469/faj.v68.n1.1

Asness, C. S., Frazzini, A., & Pedersen, L. H. (2014). Low-Risk Investing without Industry Bets. *Financial Analysts Journal*, *70*(4), 24–41. https://doi.org/10.2469/faj.v70.n4.1

Baek, S., & Bilson, J. F. O. (2015). Size and value risk in financial firms. *Journal of Banking & Finance*, *55*, 295–326.

Baker, M., Bradley, B., & Taliaferro, R. (2014). The Low-Risk Anomaly: A Decomposition into Micro and Macro Effects. *Financial Analysts Journal*, *70*(2), 43–58. https://doi.org/10.2469/faj.v70.n2.2

Baker, M., Bradley, B., & Wurgler, J. (2011). Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly. *Financial Analysts Journal*, *67*(1), 40–54. https://doi.org/10.2469/faj.v67.n1.4

Baker, N. L., & Haugen, R. A. (2012). Low risk stocks outperform within all observable markets of the world.

Ball, R. (1978). Anomalies in relationships between securities' yields and yield-surrogates. *Journal of Financial Economics*, *6*(2–3), 103–126.

Banz. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics*, *9*(1), 3–18. https://doi.org/10.1016/0304-405X(81)90018-0

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. https://doi.org/10.1111/j.1540-6261.1977.tb01979.x

Berk, J. B. (1995). A critique of size-related anomalies. *The Review of Financial Studies*,

8(2), 275–286.

Bhandari, L. C. (1988). Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence. *THE JOURNAL OF FINANCE*, *XLIII*(2).

Black, F. (1972). Capital Market Equilibrium with Restricted Borrowing. *The Journal of Business*, *45*(3), 444. https://doi.org/10.1086/295472

Black, F. (1974). International capital market equilibrium with investment barriers. *Journal of Financial Economics*, *1*(4), 337–352. https://doi.org/10.1016/0304-405X(74)90013-0

Black, F. (1993). Beta and Return. *The Journal of Portfolio Management*, *20*(1), 8–18. https://doi.org/10.3905/jpm.1993.409462

Black, F., Jensen, M. C., & Scholes., M. (1972). The Capital Asset Pricing Model: Some Empirical Tests. *Studies in the Theory of Capital Markets. Michael C. Jensen, Ed. New York:Praeger*, 79–121. https://doi.org/10.2139/ssrn.908569

Blitz, D., Pang, J., & van Vliet, P. (2013). The volatility effect in emerging markets. *Emerging Markets Review*, *16*(1), 31–45. https://doi.org/10.1016/j.ememar.2013.02.004

Blitz, & Van Vliet, P. (2007). The volatility effect. *The Journal of Portfolio Management*, *34*(1), 102–113.

Bradley, B., Taliaferro, R., Low, T., Link, C., & Taliaferro, R. (2013). The Low Beta Anomaly : A Decomposition into Micro and Macro Effects. *Financial Analysts Journal*. Retrieved from http://nrs.harvard.edu/urn-3:HUL.InstRepos:11130436%0AThis

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance*, *52*(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Chaibi, A., Alioui, S., & Xiao, B. (2015). On the impact of firm size on risk and return: Fresh evidence from the American stock market over the recent years. *Journal of Applied Business Research*, *31*(1), 29.

Choueifaty, Y., & Coignard, Y. (2008). Toward maximum diversification. *The Journal of Portfolio Management*, *35*(1), 40–51.

Connor, G., & Sehgal, S. (2001). Tests of the Fama and French model in India.

Damodaran, A. (2012). *Investment valuation : tools and techniques for determining the value of any asset*. Wiley. Retrieved from https://books.google.com.pk/books?hl=en&lr=&id=5SRHAAAAQBAJ&oi=fnd&pg=PA250&dq=Damodarn,+2012&ots=Fch_jX42c0&sig=sZeqXtzvSSFWcT3Ej7K7IYT_Vnk#v=onepage&q=Damodarn%2C 2012&f=false

Drew, M. (2003). Beta, firm size, book-to-market equity and stock returns. *Journal of the Asia Pacific Economy*, *8*(3), 354–379.

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.

Faff, R. (2001). An examination of the Fama and French three-factor model using commercially available factors. *Australian Journal of Management*, *26*(1), 1–17.

Falkenstein, E. G. (1994). Mutual funds, idiosyncratic variance, and asset returns. Northwestern University.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383. https://doi.org/10.2307/2325486

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance*, *46*(5), 1575–1617.

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. (1998). Value versus growth: The international evidence. *The Journal of Finance*, *53*(6), 1975–1999.

Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics*, *105*(3), 457–472. https://doi.org/10.1016/j.jfineco.2012.05.011

FAMA, E. F., & FRENCH, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance*, *47*(2), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

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. https://doi.org/10.1111/j.1540-6261.1995.tb05169.x

FAMA, E. F., & FRENCH, K. R. (1996). The CAPM is Wanted, Dead or Alive. *The Journal of Finance*, *51*(5), 1947–1958. https://doi.org/10.1111/j.1540-6261.1996.tb05233.x

Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. *Journal of Financial Economics*, *111*(1), 1–25. https://doi.org/10.1016/j.jfineco.2013.10.005

Griffin, J. M. (2002). Are the Fama and French factors global or country specific? *The Review of Financial Studies*, *15*(3), 783–803.

Guan, L., Hansen, D. R., Leikam, S. L., & Shaw, J. (2007). Stable betas, size, earnings-to-price, book-to-market and the validity of the capital asset pricing model. *Managerial Finance*, *33*(8), 595–614.

Halliwell, J., Heaney, R., & Sawicki, J. (1999). Size and book to market effects in Australian share markets: a time series analysis.

Hassan, A., & Javed, M. T. (2011). Size and value premium in Pakistani equity market.

African Journal of Business Management, *5*(16), 6747–6755. https://doi.org/10.5897/AJBM10.817

Haugen, R. A., & Baker, N. L. (1991). The efficient market inefficiency of capitalization–weighted stock portfolios. *The Journal of Portfolio Management*, *17*(3), 35–40.

Haugen, R. A., & Baker, N. L. (1996). Commonality in the determinants of expected stock returns. *Journal of Financial Economics*, *41*(3), 401–439.

Haugen, R. A., & Heins, A. J. (1975). Risk and the rate of return on financial assets: Some old wine in new bottles. *Journal of Financial and Quantitative Analysis*, *10*(5), 775–784.

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.

Jensen, M. C. (1978). Some Anomalous Evidence Regarding Market Efficiency. https://doi.org/10.2139/SSRN.244159

Khan, F., Hassan, A., & Ali, S. (2012). SIZE , LEVERAGE AND STOCKS RETURNS : EVIDENCE FROM PAKISTAN. *INTERNATIONAL JOURNAL of ACADEMIC RESEARCH*, *4*(1), 24–32.

Kothari, S. P., & Shanken, J. (1997). Book-to-market, dividend yield, and expected market returns: A time-series analysis. *Journal of Financial Economics*, *44*(2), 169–203.

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *The Review of Economics and Statistics*, *47*(1), 13–37. Retrieved from http://www.jstor.org/stable/1924119

Lischewski, J., & Voronkova, S. (2012). Size, value and liquidity. do they really matter on an emerging stock market? *Emerging Markets Review*, *13*(1), 8–25.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, *7*(1), 77–91. https://doi.org/10.1111/j.1540-6261.1952.tb01525.x

Mazviona, B. W., & Nyangara, D. (2014). Does firm size affect stock returns? Evidence from the Zimbabwe Stock Exchange. *International Journal of Business and Economic Development (IJBED)*, *2*(3).

Miller, M. H., & Scholes, M. (1972). Rates of return in relation to risk: A reexamination of some recent findings. *Studies in the Theory of Capital Markets*, *23*.

Minović, J., & Živković, B. (2012). The impact of liquidity and size premium on equity price formation in Serbia. *Ekonomski Anali*, *57*(195), 43–78.

Mirza, N. (2008). Size and value premium in Karachi Stock Exchange.

O'Brien, M. A., Brailsford, T., & Gaunt, C. (2010). Interaction of size, book-to-market and momentum effects in Australia. *Accounting & Finance*, *50*(1), 197–219.

Pontiff, J., & Schall, L. D. (1998). Book-to-market ratios as predictors of market returns.

Journal of Financial Economics, *49*(2), 141–160. https://doi.org/10.1016/S0304-405X(98)00020-8

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. https://doi.org/10.1016/0022-0531(76)90046-6

Rostagno, L. M., Costa Soares, K. T., & Oliveira Soares, R. (2008). O Perfil Fundamentalista das Carteiras Vencedoras e Perdedoras na Bovespa no Período de 1995 a 2002. *BBR-Brazilian Business Review*, *5*(3).

Sehgal, S., & Tripathi, V. (2005). Size effect in Indian stock market: Some empirical evidence. *Vision*, *9*(4), 27–42.

Sharathchandra, G., & Thompson, R. (1994). The effect of early resolution of uncertainty on the valuation of assets: A dichotomy into market and non-market information. *Review of Quantitative Finance and Accounting*, *4*(2), 137–153.

Sharpe, W. F. (1964). Capital Asset Prices: A Theory Of Market Equilibrium Under Conditions Of Risk. *The Journal of Finance*, *19*(3), 425–442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x

Shleifer, A. (2000). *Inefficient Markets: An Introduction to Behavioural Finance*. Retrieved from https://philpapers.org/rec/SHLIMA-2

Stattman, D. (1980). Book values and stock returns. *The Chicago MBA: A Journal of Selected Papers*, *4*(1), 25–45.

Treynor, J. L. (1961). Toward a theory of market value of risky assets. *Unpublished Manuscript*, *6*.

Van Dijk, M. A. (2011). Is size dead? A review of the size effect in equity returns. *Journal of Banking & Finance*, *35*(12), 3263–3274.

APPENDICES

Annexure I: List of China Companies

Sr.	Stock Code	Full Name
1	600005	Wuhan Iron And Steel Company Limited.
2	600006	Dongfeng Automobile Co Ltd
3	600007	China World Trade Center Company Ltd.
4	600009	Shanghai International Airport Co. Ltd.
5	600051	Ningbo United Group Co.,Ltd.
6	600052	Zhejiang Guangsha Co.,Ltd.
7	600054	Huangshan Tourism Development Co.,Ltd.
8	600055	China Resources Wandong Medical Equipment Co., Ltd.
9	600056	China Meheco Co., Ltd.
10	600057	Xiamen Xiangyu Co., Ltd.
11	600058	Minmetals Development Co., Ltd.
12	600059	Zhejiang Guyuelongshan Shaoxing Wine Co.Ltd
13	600060	Hisense Electric Co.,Ltd.
14	600062	China Resources Double£Crane Pharmaceutical Co.,Ltd.
15	600063	AWU High-Tech Material Industry Company Limited
16	600064	Nanjing Gaoke Company Limited
17	600066	Zhengzhou Yutong Bus Co.,Ltd.
18	600067	Citychamp Dartong Co.,Ltd.
19	600068	China Gezhouba Group Company Limited
20	600069	Yinge Investment_A
21	600070	Zhejiang Furun Co.Ltd
22	600071	Phenix Optical Company Limited
23	600072	Cssc Steel Structure Engineering Co.Ltd.
24	600073	Shanghai Maling Aquarius Co.Ltd
25	600074	Jiangsu Protruly Vision Technology Group Co.Ltd.
26	600075	Xinjiang Tianye Co.Ltd.
27	600076	Weifang Beida Jadebird Huaguang Technology Co.Ltd
28	600077	Sundy Land Investment Co.Ltd.
29	600078	Jiangsu Chengxing Phosph-Chemical Co.Ltd
30	600079	Humanwell Healthcare (Group) Co.Ltd.
31	600080	Ginwa Enterprise(Grpup) Inc.
32	600081	Dong Feng Electronic Technology Co.Litd.
33	600082	Tianjin Hi-Tech Development Co.Ltd.
34	600083	Guangdong Boxin Investing & Holdings Co.Ltd
35	600084	Citic Guoan Wine Co.Ltd
36	600085	Beijing Tongrentang Co.Ltd
37	600086	Eastern Gold Jade Company Ltd.

38	600088	China Television Media Co.Ltd.
39	600089	Tbea Co.Ltd.
40	600090	Xin Jiang Hops Co.Ltd
41	600091	Baotou Tomorrow Technology Co.Ltd
42	600093	Sichuan Hejia Co.Ltd.
43	600095	Harbin High-Tech(Group)C0.Ltd.
44	600096	Yunnan Yuntianhua Co.Ltd
45	600097	Shanghai Kaichuang Marine International Co.Ltd.
46	600098	Guangzhou Development Group Incorporated
47	600099	Linhai Co.Ltd.
48	600100	Tsinghua Tongfang Co. Ltd
49	600101	Sichuan Mingxing Electric Power Co.,Ltd
50	600103	Fujian Qingshan Paper Industry Co.,Ltd.
51	600104	Saic Motor Corporation Limited
52	600105	Jiangsu Etern Co., Ltd.
53	600106	Chongqing Road & Bridge Co.,Ltd
54	600107	Hubei Mailyard Share Co.£.Ltd
55	600108	Gansu Yasheng Industrial Group Co.Ltd
56	600109	Sinolink Securities Co.Ltd.
57	600111	China Northern Rare Earth (Group) High-Tech Co.Ltd
58	600113	Zhe Jiang Dong Ri Co.Ltd
59	600115	China Eastern Airlines Corporation Limited
60	600116	CTG Water Conservancy And Electric Power Co.Ltd.
61	600117	Xining Special Steel Co.Ltd
62	600118	China Spacesat Co.Ltd.
63	600119	Y.U.D Yangtze River Investment Industry Co.Ltd.
64	600121	Zhengzhou Coal Industry & Electric Power Co.Ltd.
65	600122	Jiangsu Hongtu High Technology Co.Ltd.
66	600123	Shanxi Lanhua Sci-Tech Venture Co.Ltd
67	600125	China Railway Tielong Container Logistics Co.Ltd
68	600126	Hangzhou Iron And Steel Co.Ltd.
69	600127	Jinjian Cereals Industry Co.Ltd.
70	600128	Jiangsu Holly Corporation
71	600129	Chongqing Taiji Industry(Group) Co.Ltd
72	600131	Sichuan Minjiang Hydropower Co.Ltd.
73	600132	Chong Qing Brewery Co.Ltd
74	600133	Wuhan East Lake High Technology Groupe Co.Ltd.
75	600135	Lucky Film Company Limited
76	600136	Wuhan Ddmc Culture Co.Ltd.
77	600138	China Cyts Tours Holding Co.Ltd.
78	600141	Hubei Xingfa Chemicals Group Co.Ltd.
79	600145	Xinjiang Yilu Wanyuan Industrial Investment Holding Co.Ltd.
80	600146	Shangying Global Co.,Ltd.
81	600148	Changchun Yidong Clutch Co.Ltd.
82	600149	Langfang Development Co.Ltd.

83	600151	Shanghai Aerospace Automobile Electromechanical Co.Ltd
84	600152	Ningbo Veken Elite Group Co.Ltd.
85	600153	Xiamen C&D Inc.
86	600155	Hebei Baoshuo Co.Ltd.
87	600156	Hunan Huasheng Co.Ltd
88	600157	Wintime Energy Co.Ltd.
89	600158	China Sports Industry Group Co.£¬Ltd.
90	600159	Beijing Dalong Weiye Real Estate Development Co.Ltd
91	600160	Zhejiang Juhua Co.Ltd.
92	600161	Beijing Tiantan Biological Products Corporation Limited
93	600162	Shenzhen Heungkong Holding Co.Ltd
94	600163	Zhongmin Energy Co.Ltd.
95	600165	Ningxia Xinri Hengli Steel Wire Rope Co.Ltd
96	600166	Beiqi Foton Motor Co.Ltd.
97	600167	Luenmei Quantum Co.Ltd
98	600168	Wuhan Sanzhen Industry Holding Co.Ltd
99	600169	Taiyuan Heavy Industry Co.Ltd.
100	600170	Shanghai Construction Group Co.Ltd
101	600171	Shanghai Belling Co.Ltd.
102	600172	Henan Huanghe Whirlwind Co.Ltd.
103	600173	Wolong Real Estate Group Co.Ltd.
104	600175	Meidu Energy Corporation
105	600176	China Jushi Co.Ltd.
106	600177	Youngor Group Co.Ltd.
107	600178	Harbin Dongan Auto Engine Co.Ltd.
108	600179	Heilongjiang Heihua Co.Ltd.
109	600180	Ccs Supply Chain Management Co.Ltd.
110	600182	Giti Tire Corporation
111	600183	Shengyi Technology Co.Ltd.
112	600185	Gree Real Estate Co.Ltd
113	600186	Lotus Health Group Company
114	600187	Heilongjiang Interchina Water Treatment Co.Ltd.
115	600188	Yanzhou Coal Mining Company Limited
116	600189	Jilin Forest Industry Co.Ltd.
117	600190	Jinzhou Port Co.Ltd.
118	600191	Baotou Huazi Industry Co.Ltd.
119	600192	Lanzhou Greatwall Electrical Co.Ltd.
120	600193	Shanghai Prosolar Resource Co.Ltd
121	600195	China Animal Husbandry Industry Co.Ltd.
122	600196	Shanghai Fosun Pharmaceutical (Group) Co.Ltd.
123	600197	Xinjiang Yilite Industry Co.Ltd

Annexure II: List of India Companies

Sr.	Stock Code	Company Name
1	500008	Amara Raja Batteries Ltd.
2	500010	Housing Development Finance Corp Ltd.
3	500040	Century Textiles & Industries Ltd.
4	500043	Bata India Ltd.
5	500049	Bharat Electronics Ltd.
6	500086	Exide Industries Ltd.
7	500087	Cipla Ltd.
8	500096	Dabur India Ltd.
9	500101	Arvind Ltd.
10	500103	Bharat Heavy Electricals Ltd.
11	500104	Hindustan Petroleum Corporation Ltd.
12	500113	Steel Authority Of India Ltd.
13	500114	Titan Company Limited
14	500124	Dr.Reddy'S Laboratories Ltd.
15	500164	Godrej Industries Ltd.
16	500165	Kansai Nerolac Paints Ltd.
17	500182	Hero Motocorp Ltd.
18	500188	Hindustan Zinc Ltd.
19	500209	Infosys Ltd.
20	500219	Jain Irrigation Systems Ltd.
21	500228	Jsw Steel Ltd.
22	500253	Lic Housing Finance Ltd.
23	500257	Lupin Ltd.
24	500290	MRF Ltd.
25	500294	NCC Ltd.
26	500295	Vedanta Limited
27	500300	Grasim Industries Ltd.
28	500302	Piramal Enterprises Ltd.
29	500303	Aditya Birla Nuvo Ltd.
30	500312	Oil And Natural Gas Corporation Ltd.
31	500325	Reliance Industries Ltd.
32	500331	Pidilite Industries Ltd.
33	500387	Shree Cement Ltd.
34	500390	Reliance Infrastructure Ltd.
35	500400	Tata Power Company Ltd.
36	500408	Tata Elxsi Ltd.
37	500410	Acc Ltd.
38	500411	Thermax Ltd.
39	500420	Torrent Pharmaceuticals Ltd.
40	500425	Ambuja Cements Ltd.
41	500440	Hindalco Industries Ltd.
42	500459	Procter & Gamble Hygiene & Health Care Ltd.

43	500470	Tata Steel Ltd.
44	500477	Ashok Leyland Ltd.
45	500480	Cummins India Ltd.
46	500483	Tata Communications Ltd.
47	500493	Bharat Forge Ltd.
48	500510	Larsen & Toubro Ltd.
49	500520	Mahindra & Mahindra Ltd.
50	500530	Bosch Ltd.
51	500547	Bharat Petroleum Corporation Ltd.
52	500570	Tata Motors Ltd.
53	500575	Voltas Ltd.
54	500660	Glaxosmithkline Pharmaceuticals Ltd.
55	500676	Glaxosmithkline Consumer Healthcare Ltd.
56	500696	Hindustan Unilever Ltd.
57	500770	Tata Chemicals Ltd.
58	500790	Nestle India Ltd.
59	500820	Asian Paints Ltd.
60	500825	Britannia Industries Ltd.
61	500830	Colgate-Palmolive (India) Ltd.
62	500875	Itc Ltd.
63	500877	Apollo Tyres Ltd.
64	503806	SRF Ltd.
65	505200	Eicher Motors Ltd.
66	505537	Zee Entertainment Enterprises Ltd.
67	506285	Bayer CropScience Ltd.
68	507685	Wipro Ltd.
69	507815	Gillette India Ltd.
70	508869	Apollo Hospitals Enterprise Ltd.
71	509480	Berger Paints India Ltd.
72	512070	Upl Limited
73	512599	Adani Enterprises Ltd.
74	514162	Welspun India Ltd.
75	517334	Motherson Sumi Systems Ltd.
76	517354	Havells India Ltd.
77	522275	GE T&D India Ltd.
78	524494	Ipca Laboratories Ltd.
79	524715	Sun Pharma Advanced Research Company Ltd.
80	524804	Aurobindo Pharma Ltd.
81	524816	Natco Pharma Ltd.
82	526299	Mphasis Ltd.
83	526371	Nmdc Ltd.
84	530019	Jubilant Life Sciences Ltd.
85	530965	Indian Oil Corporation Ltd.
86	531162	Emami Ltd.
87	531344	Container Corporation Of India Ltd.

88	531642	Marico Ltd.
89	532155	Gail (India) Ltd.
90	532178	Engineers India Ltd.
91	532234	National Aluminium Company Ltd.
92	532281	Hcl Technologies Ltd.
93	532286	Jindal Steel & Power Ltd.
94	532296	Glenmark Pharmaceuticals Ltd.
95	532321	Cadila Healthcare Ltd.
96	532424	Godrej Consumer Products Ltd.
97	532432	United Spirits Ltd.
98	532454	Bharti Airtel Ltd.
99	532466	Oracle Financial Services Software Ltd.
100	532478	United Breweries Ltd.-$
101	532488	Divi'S Laboratories Ltd.
102	532500	Maruti Suzuki India Ltd.
103	532522	Petronet Lng Ltd.
104	532538	Ultratech Cement Ltd.
105	532540	Tata Consultancy Services Ltd.
106	532555	Ntpc Ltd.

Annexure III: List of Pakistan Companies

Sr.	Code	Company
1	AABS	AL- Abbas Sugar Mills Limited.
2	ABOT	Abbot Laboratories (Pakistan) Ltd.
3	ADAMS	Adam Sugar Mills Ltd.
4	ADMM	Artistic Denim Mills Limited
5	AGIL	Agriautos Industries Limited.
6	AGTL	AL-Ghazi Tractors Ltd.
7	AHTM	Ahmed Hassan Textile Mills Ltd.
8	ALNRS	Al-Noor Sugar Mills Ltd.
9	ALTN	Altern Energy Ltd.
10	APOT	Apollo Textile Mills Ltd.
11	ATBA	Atlas Battery Limited
12	ATLH	Atlas Honda Ltd.
13	ATRL	Attock Refinery Ltd.
14	BAFS	Baba Farid Sugar Mills Limited
15	BATA	Bata Pakistan Ltd.
16	BAWS	Bawany Sugar Mills Ltd.
17	BERG	Berger Paints Pakistan Ltd.
18	BIFO	Biafo Industries Limited
19	BILF	Bilal Fibres Limited
20	BNWM	Bannu Woollen Mills Limited
21	BPL	Burshane LPG (Pakistan) Limited
22	BUXL	Buxly Paints Ltd.

23	BWCL	Bestway Cement Ltd
24	CHAS	Chashma Sugar Mills Limited.
25	CHCC	Cherat Cement Company Limited
26	CJPL	Crescent Jute Proudcts Ltd.
27	CLOV	Clover Pakistan Limited.
28	COLG	Colgate Palmolive (Pakistan) Ltd.
29	CRTM	Crescent Textile Mills Ltd.
30	CSAP	Crescent Steel & Allied
31	CWSM	Chakwal Spinning Mills Ltd.
32	DADX	Dedex Eternit Limited.
33	DBCI	Dadabhoy Cement Industries Limited
34	DINT	Din Textile Mills Limited
35	DNCC	Dandot Cement Company Ltd.
36	DREL	Dreamworld Ltd
37	DSFL	Dewan Salman Fibre Limited.
38	ELSM	Ellcot Spinning Mills Ltd.
39	ENGRO	Engro Corporation Ltd.
40	FEROZ	Ferozsons Laboratories Ltd
41	FRSM	Faran Sugar Mills Ltd.
42	FZCM	Fazal Cloth Mills Ltd.
43	GADT	Gadoon Textile Mills Ltd.
44	GAMON	Gammon Pakistan Ltd.
45	GATM	Gul Ahmed Textile Mills Ltd.
46	GENP	Genertech Pakistan Limited
47	GHGL	Ghani Glass Mills Limited
48	GHNL	Ghandara Nissan Limited
49	GLAXO	GlaxoSmithKline (Pak) Ltd.
50	GLPL	Gillette Pakistan Limited
51	GTYR	General Tyre and Rubber Co. of Pak. Ltd.
52	GUTM	Gulistan Textile Mills Ltd.
53	GWLC	Gharibwal Cemant Ltd.
54	HABSM	Habib Sugar Mills Ltd.
55	HAJT	Hajra Textile Mills Ltd.
56	HINOON	Highnoon Laboratories Limited
57	HUBC	Hub Power Company Limited
58	HWQS	Haseeb Waqas Sugar Mills Limited
59	ICI	I.C.I Pakistan Ltd.
60	IDRT	Idrees Textile Mills Limited
61	IDYM	Indus Dyeing Manufacturing Co. Ltd.
62	INDU	Indus Motor Company Limited
63	INIL	International Industries Ltd.
64	ISIL	Ismail Industries Ltd.
65	JDMT	Janana-de-Malucho Textile Mills Ltd.
66	JDWS	J. D. W. Sugar Mills Ltd.
67	JPGL	Japan Power Generation Limited
68	KESC	Karachi Electric Supply Company Ltd.
69	KHTC	Khyber Tobacco Co. Ltd.
70	KOHC	Kohat Cement Limited
71	KOHE	Kohinoor Energy Limited
72	KOHP	Kohinoor Power Company Limited.

73	KOIL	Kohinoor Industries Ltd.
74	KOSM	Kohinoor Spinning Mills Ltd.
75	KTML	Kohinoor Textile Mills Ltd.
76	LEUL	Leather Up Industries Ltd.
77	LUCK	Lucky Cement Limited
78	MARI	Mari Gas Company Limited
79	MERIT	Merit Packaging Ltd.
80	MFFL	Mitchell's Fruit Farms Limited
81	MIRKS	Mirpurkhas Sugar Mills Ltd.
82	MLCF	Maple Leaf Cement Factory Limited
83	MRNS	Mehran Sugar Mills Limited
84	MSOT	Masood Textile Mills Ltd.
85	MTL	Millat Tractors Ltd.
86	MUREB	Murree Brewery Company Ltd
87	MZSM	Mirza Sugar Mills Limited.
88	NAGC	Nagina Cotton Mills Ltd.
89	NESTLE	Nestle Pakistan Ltd.
90	NICL	Nimir Ind.Chemicals
91	NML	Nishat Mills Ltd.
92	NONS	Noon Sugar Mills Ltd.
93	NRL	National Refinery Ltd.
94	OTSU	Otsuka Pakistan Limited.
95	PAEL	Pak Elektron Ltd.
96	PAKD	Pak Datacom Limited
97	PAKT	Pakistan Tobacco Co. Ltd.
98	PGCL	Pakistan Gum and Chemiclas Ltd.
99	PIAA	Pakistan International Airlines Corp.
100	PIOC	Pioneer Cement Limited
101	PKGS	Packages Limited
102	PMPK	Philip Morris (Pakistan) Ltd. (Formerly Lakson Tobacco)
103	PNSC	Pakistan National Shipping Corporation
104	POL	Pakistan Oilfields Ltd.
105	PPP	Pakistan Paper Prouducts Ltd.
106	PRET	Premium Textile Mills Ltd.
107	PRL	Pakistan Refinery Ltd.
108	PRWM	Prosperity Weaving Mills Limited
109	PSEL	Pakistan Services Ltd
110	PSMC	Pak Suzuki Motor Co. Ltd.
111	PSO	Pakistan State Oil Co. Ltd.
112	PSYL	Pakistan Synthetic Ltd.
113	PTC	Pakistan Telecommunication
114	PTEC	Pakistan Telephone Cables Ltd.
115	RAVT	Ravi Textile Mills Ltd.
116	RCML	Reliance Cotton Spinning Mills Ltd.
117	REDT	Redco Textiles Ltd.
118	RMPL	Rafhan Maize Products Ltd.
119	RUPL	Rupali Polyester Ltd.
120	SAIF	Saif Textile Mills Limited
121	SARD	Sardar Chemical Industries Limited
122	SEPCO	Southern Electric Company Limited

123	SFL	Sapphire Fibers Ltd.
124	SHCM	Shadman Cotton Mills Ltd.
125	SHEL	Shell Pakistan Limited
126	SHEZ	Shezan International Ltd.
127	SHFA	Shifa International Hospitals Limited
128	SHSML	Shahmurad Sugar Mills Ltd.
129	SIEM	Siemens Pakistan Engineering Co. Ltd.
130	SING	Singer Pakistan Limited
131	SITC	Sitara Chemical Industries Ltd.
132	SNAI	Sana Industries Ltd.
133	SNGP	Sui Northern Gas Ltd.
134	SSGC	Sui Southern Gas Co. Ltd
135	SSML	Saritow Spinning Mills Ltd.
136	STCL	Shabbir Tiles and Ceramics Ltd.
137	STML	Shams Textile Mills Ltd.
138	SURC	Suraj Cotton Mills Ltd.
139	SUTM	Sunrays Tetile Mills Ltd.
140	TATM	Tata textile Mills Limited
141	TELE	Telecard Limited
142	TGL	Tariq Glass Limited
143	THALL	Thal Limited.
144	TREET	Treet Corporation Ltd.
145	TRIPF	Tri-Pack Films Limited
146	TSML	Tandlianwala Sugar Mills Limited
147	ULEVER	Unilever Pakistan
148	YOUW	Yousuf Weaving Mills Limited.