Multifactor Asset Pricing Model for Pakistani Equity Market. Can it Predict Industry Returns?

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DEPARTMENT OF MANAGEMENT SCIENCES
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ISLAMABAD

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CERTIFICATE OF APPROVAL

This is to certify that the research work presented in the thesis, entitled "**Multifactor Asset Pricing Model for Pakistani Equity Market**" was conducted under the supervision of **Dr. Syed Muhammad Amir Shah**. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the **Department of Management Sciences** in partial fulfillment of the requirements for the degree of Doctor in Philosophy in the field of **Management Sciences**, **Department of Management Sciences**, **Capital University of Science and Technology**. The open defence of the thesis was conducted on **12 April, 2017.**

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I pray to Allah to bless them all with His favor who favored me during the completion of this task. Ameen

Dedication

This thesis is dedicated to my Mother, whose sincere prayers aided me throughout the hardships I encountered during my PhD. She motivated me to commence PhD at a very critical stage of my life when it was a turning and bold step.

Dedicated to Dr Arshad Hassan (Dean, Mgt Sciences, CUST) without whom selfless help I would have never completed this thesis. Despite of his busy schedule and professional engagements, he was always there whenever I needed his help.

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Abstract

This study explores the multifactor asset pricing models in Pakistani equity market for the period June 2004 - June2013. All the non-financial firms were the sample for this study. This study proposed a six factor model for pricing of financial assets. The proposed six factor model was first applied to the whole stock exchange and then to individual industries. CAPM's validity was first checked through Fama Macbeth (1973) methodology and was found invalid in Pakistani stock market, therefore there arises a need to add more risk indicators into the capital asset pricing model. We tested the role of market risk premium, size premium, value premium, asset growth premium, investor sentiment premium & media coverage premium in predicting the future returns of the securities and all except market risk premium were found priced. Asset growth premium, investor sentiment premium and media coverage premium all had negative signs indicating the negative relationship between these risk premiums and their respective rewards. The famous notion of "higher the risk higher will be the reward" does not stand valid for these risk factors. Safer stocks yield higher returns and riskier stocks yield lower returns, therefore, a negative relationship between risk and return was found. These results were consistent with the survey of managers of U.S based firms. According to this study the direction of returns premium for all the factors proved to be verifying the theories regarding their directions. For example, small firms earn higher returns than big firms. High BMR firms yields higher returns than low BMR firms. Low asset growth firms yield higher returns than high asset growth firms. Low sentiment firms earn more than the high sentiment firms and finally no media coverage firms earn more than the firms covered by media. Multicollinearity may exist if there are more than one risk premium in the asset pricing model. It may lead to misguided results, therefore, variance inflationary factor (VIF) was calculated for all these variables and the results lie within the acceptable range of tolerance limits. It implied that multicollinearity did not exist among these variables and that these six variables could be simultaneously used in one asset pricing model to predict the future returns of the financial assets.

One pass and two pass both were applied on the proposed six factor model. The explanatory power of the proposed six factor model according to one pass was almost 70% while it is 37% for the second pass which is considered as worth mentioning. It was great achievement

of this study to develop such a model which could help the investors through a successful investment decision and efficient allocation of resources. Investors can base their investment decision on these five factors and can minimize the uncertainty involved in estimating the future returns.

In this study we also applied Fama Macbeth methodology keeping portfolios of various characters like S, B, S/H, S/L, B/H, & B/L as dependant variables. Asset Growth was the only variable which was priced in every subset of portfolio. Therefore, asset growth premium can be used by investors for strategic investment decision without any hesitation.

After applying the proposed six factor model to the individual industries, it was revealed that this model does not predict the returns of industries. Results were inclined towards the notion that “multifactor asset pricing models does not predict industry returns”.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Investment decisions till 1950s were based on the level of returns only. Risk consideration was subjective, no method and model was applied to measure it. Later the discussion erupted to quantify risk. Some models were proposed in this regard and it was the developmental time of finance as a different field. It can be said that from the mid of 20th-century, valuation of assets and their pricing remained an interesting topic both for financial analysts as well as for practitioners and economists of developed as well as developing countries for investment decisions.

Until now researchers have worked on finding the priced variable in asset pricing models and a number of contemporary theories are available for financial asset pricing. However, the most noticeable and essential is the model of capital asset pricing models given by Sharpe (1964) which highlighted the start of asset pricing models. In addition Black Scholes model (Black, 1972; Lintner, 1965b), inter-temporal CAPM (Merton, 1973a) and arbitrage pricing theory (Ross, 1976) are also hallmark of assets pricing theories. CAPM is the highly used asset pricing model by the investors and analysts for forecasting the expected returns because of its simplicity. CAPM started losing its importance with the emergence of multifactor asset pricing models, but still it remains a fact that it provided the solid foundations for other researchers to explore new anomalies which can affect the expected returns of the securities.

Likewise, the milestone in the area of asset pricing model was set by Harry Markowitz (1952) when he presented the portfolio selection techniques. In this regard, investors, analysts/practitioners, and researchers found a way-out for finding the risk factors attached with assets. So, Harry Markowitz invented the wheel and a number of asset pricing models are available in the literature. A brief history of asset pricing models is discussed here.

1.2 Markowitz Model

Markowitz (1952) initially developed the model of risk return trade-off. He mentioned that the expected return and risk is calculated by weighted average of historical returns and the variance of these returns respectively. Similarly, Markowitz confirmed a linear relationship of expected risk and expected returns and hence, its efficient frontier showed the shape of a parabola. It indicated a diminishing relationship between risk and return. However, at some point, risk and return did not change in the same proportion but a larger increase in risk lead to a smaller increase in returns. Furthermore, Markowitz efficient portfolio theory did not incorporate the risk-free asset in calculating the expected returns of securities. With the passage of time, when these weaknesses of the theory were highlighted, researchers jumped into the search of another theory which can overcome these weaknesses. In response to these shortcomings, Sharpe (1964) presented the seminal theory of asset pricing model which did not have these shortcomings.

1.3 CAPM (Single factor model)

Capital asset pricing theory marks the birth of pricing of financial assets (Lintner, 1965b; Sharpe, 1964). According to CAPM, expected returns of the securities are the characteristic of one risk factor i.e. market risk premium only and beta (β) is calculated as a co-variance among security returns 'i' and that of market returns divided by the variance of the portfolio of market returns. Similarly, under CAPM, portfolios are sorted on the basis of risk (beta) and stocks are put into various deciles according to their risk profile. CAPM has certain assumptions as other theories of finance have. Hence, these assumptions provided an environment for the theory to exist.

CAPM has some strong assumptions like risk aversion of investors, risk-free borrowing and lending, diversification of investors, assets divisibility, and market perfection etc. These hard assumptions make CAPM as an inappropriate model for the pricing of financial assets.

There arises the need of an asset pricing model which has relatively compatible assumptions and incorporates more than one factor as explanatory variables. The reason of the emergence of multifactor asset pricing model is that a single risk factor is not enough to determine the expected returns of an asset. Numerous studies have considerable importance in this regard like Fama & French (1992) that established value and size factors, Carhart (1997) four feature model that established momentum effect to FF Model and likewise, Tsai, Lin, Yen, & Chen, (2011) six feature model that established illiquidity premium and leverage premium to Carhart (1997) four features model.

Further, researches like Fraser, Hamelink, Hoesli, & Macgregor (2004); Groenewold Fraser (1997); Hansson & Hordahl (1998); Javid & Ahmed (2008); Michailidis, Tsopoglou, & Papanastasiou (2006); Qu & Perron (2007); Raei & Mohammadi (2008); Roll (1977) & Scheicher (2001) discarded capital asset pricing model in different stock markets. Hence, the above non satisfactory results give rise to the need of a multifactor model of financial asset pricing such as Arbitrage Pricing Theory (APT).

1.4 Arbitrage Pricing Theory

APT is considered as a more reliable measure of expected return introduced by Ross (1976). It can be measured in two dimensions: through macroeconomic variables and through fundamental variables. In other words, expected returns are a function of fundamental factors (firm specific factors) and macroeconomic factors.

Factors that are included in Arbitrage Pricing Theory may be economic factors (inflation, interest rates, and Gross domestic production), financial factors (exchange rates, yield curves, and market indices), fundamental factors like (dividend yields, price/earnings ratios, liquidity), and statistical factors (factor analysis, principal component analysis). Therefore, the beta coefficient such as sensitivities can be calculated by cross-sectional regression. Similarly, there are a few changes in the multifactor models hence it is stated to be an asset's expected return that is associated to changes in the economy; as a result one may judge a beta time series of change in the economical state Ferson & Harvey (1993).

1.5 Background to problem

The failure of capital asset pricing model has instigated more research towards testing of multi-factor models of asset pricing. Arbitrage pricing theory has been empirically studied in several markets and proved a better predictor of returns than the single factor CAPM. In pursuit of this,MacKinlay (1995) estimated multifactor asset pricing model on New York

Stock Exchange and Berry (1988) examined S&P 500 by using arbitrage pricing theory. Similarly, Antoniou, Holmes, & Priestley (1998) used the arbitrage pricing theory to detect the factors that have influence on asset prices and returns in London Stock Exchange. Whereas Dhankar & Esq (2005) applied arbitrage pricing theory on Indian stock market. Nonetheless, Russian stock markets and Japanese stock market were studied by Azeez & Yonezawa (2006) and Anatolyev (2008) respectively through APT. Similarly, Javid (2009) examined a higher moment capital asset pricing model on Pakistani equity market. Therefore there is a need to examine a new multifactor asset pricing model in the context of Pakistan which can better predict the future returns of assets.

1.6 Justification of variables

Lipson et al.(2011) identified premium present in low asset growth firms as a significant predictor of future returns. Similarly, H. W. Chan & Faff (2005); Javid & Ahmed (2008) documented a statistically reliable association between illiquidity premium and expected returns. Likewise, L. Fang & Peress (2009) & Liu, Sherman, & Zhang (2014) discovered a strong relationship between media coverage premium and future returns. Hence, these results motivated us to examine an improved model of the three feature model of Fama & French (1992) that adds investor's sentiment premium, asset growth premium, media coverage premium to market, size, and value premiums of the FF model. As all of the above researchers have used the variables in various countries of the world, it is justifiable to apply them on Pakistani stock market. In this pursuit, the current study examines the performance of the six-factor model and its different versions.

1.7 Importance of study

The main purpose of the current study is to examine how precisely the proposed six factors of the expected returns are predicted by asset pricing model. Equity markets are becoming increasingly important for investors because of the essential role of markets in investigating relationship between asset pricing and resource allocation. Similarly, a competent pricing mechanism leads to beneficial decision of investment and therefore, it helps in efficient allocation of resources. As a result, price has been considered as an important phenomenon and has remained a topic under consideration for researchers. As a whole, Karachi stock exchange is not a stable market and prices fluctuate after every major event. Due to this, Karachi stock exchange has numerous trade-off of return and risk. Consequently stock markets have bullish and bearish effects in a few trading sessions.

According to newspaper Business Recorder, in December 2008, 100 index was down to 3300 points in 13 trading sessions and as a result of the two months, the 100 index goes up by 2638 points in 19 trading sessions. Hence, the crucial problem for portfolio managers and investors is to calculate the risk attached with securities of expected return of KSE. Secondly, emerging markets are highly compliant towards the estimation of expected security returns because there are various irregularities to be detected. It is therefore necessary to apply this widely accepted multifactor approach to Pakistani equity market for estimating future returns.

1.8 Rationale of Variables

There are numerous variables that should be examined however; current study adds three new elements to the customary FF three component model. Investor's sentiment premium, asset growth premium, and media coverage premium are the new components that will be tried besides conventional FF three variables to implement another multifaceted model of assets pricing in Pakistan. Earlier we selected a variety of variables but after scrutinizing them in respect of data availability in Pakistani perspective the above three are chosen as feasible.

1.8.1 Asset Growth

The importance of asset growth is evident from the fact that Fama & French (2015) in their research, worked on investment and profitability in addition to their famous FF three factors. The concept of investment is the same as asset growth. Asset growth and investment refers to increase in the asset base of the firm. They recognized the importance of asset growth as a predictor of future returns; therefore, we also included this variable in our asset pricing model.

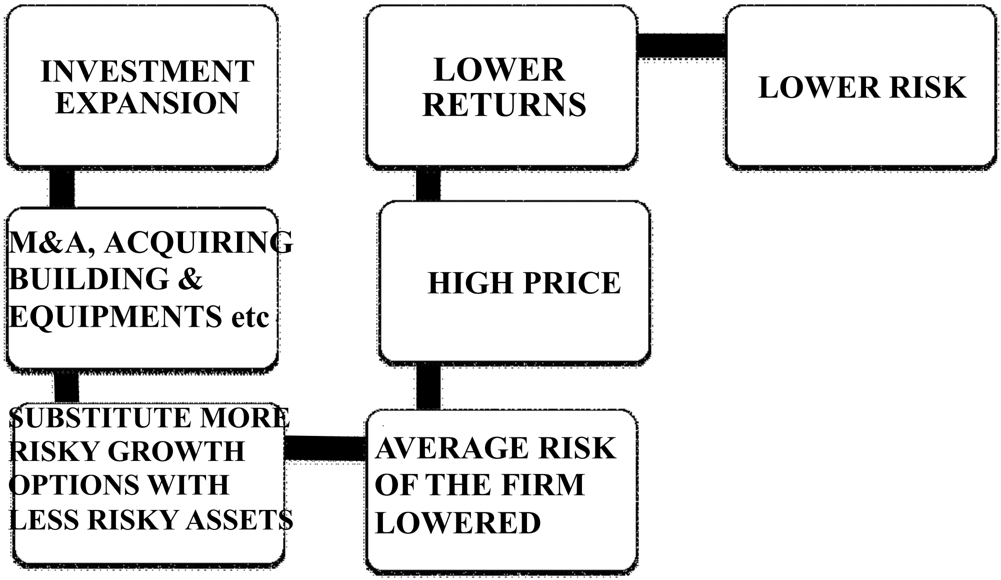
Asset Growth is development in resources. Asset growth refers to changes in total assets. The impact of asset growth on future returns remained under discussion for long time. However, the empirical evidence proved its significant negative impact on the returns

Titman, Wei, & Xie (2004). Asset Growth has proved to be the strongest predictor of future negative returns as compared to other factors including firm capitalization, book-to-market ratio, accruals, lagged returns, and growth measures. Furthermore, high asset growth firms yield lower returns. Literature reveals two explanations for the above discussed association of asset growth and future returns.

First, when a firm makes capital investments such as starting a new venture, acquiring large building and equipment, merger and acquisition, issuing equity, loan initiations, and issuing bonds give rise to abnormal low stock returns. The total value of assets is increased that provides substitute to risky growth options with less risky growth assets. The average risk of the firm will be lowered and ultimately it will decrease the returns. On other hand, firm's returns after trimming down its assets (share repurchases, spinoffs, dividend initiations, and debt repayments) tends to follow the abnormal high attitude in returns, thus it induces a reverse relation between investment and expected stock returns Eckbo & Thorburn (2008).

Another explanation is based on mispricing in which Eckbo & Thorburn (2008) & Titman, et al., (2004) tried to explore the relationship between asset growth and future returns. This explanation is based on mispricing. Hence, they concluded that investor's react adversely to the investment expansion activity of managers. Other researchers like L. K. Chan, Karceski, Lakonishok, & Sougiannis (2008) found this irregularity is more prominent in firms having low profitability and poor corporate governance and therefore, it is inferred from this fact that the irregularities are because investors' under react to the empire-building activities of managers. Empire-building activity is a process to enhance the organizational scope and expanding the business unit. However, this is seen as an unhealthy activity in the corporate world when executives and managers are more interested in increasing their staffing levels than with maximizing the shareholder's wealth. Moreover, the effect of growth in assets comes under the heading of second explanation. The above discussed relationships is shown in figure 1.1

Figure 1.1: Relationship between Asset Growth and Future Returns



1.8.2 Investor Sentiment

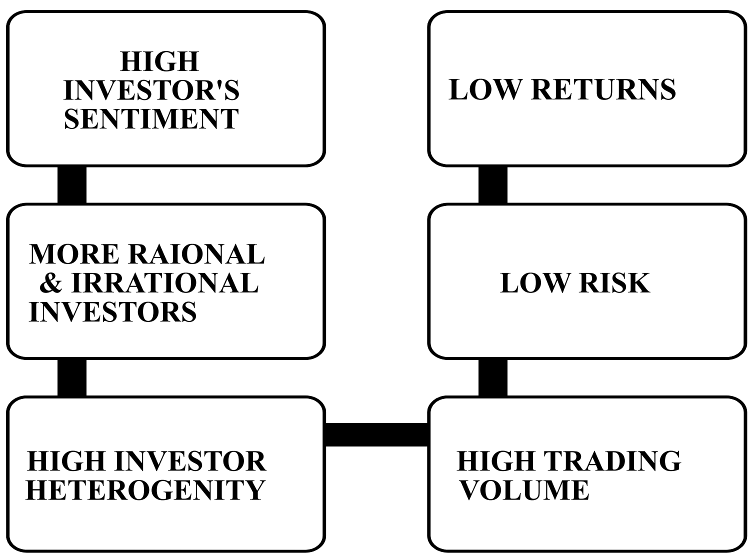
The theories of classical finance in general and asset pricing in specific asserts that investors are rational and takes into account the information available to them while making investment decision Daniel & Titman (1999). Furthermore, the efficient market hypothesis believes in the rapid adjustment of information into the prices of securities Fama & French (1992), it may not be the case in reality. All investors may not get the information at the same time because sources of information are different for different investors and the processing of information and price adjustment will occur only when they receive the information. Every investor will react differently to same news, therefore, this clash of timing and reaction among different investors humiliate the theoretical concept of efficient market hypothesis. Wang, Li, & Lin (2012) affirmed the existence of an abnormal phenomenon in the market which has nothing to do with the rational financial theory. Efficient market hypothesis exclude the idea of presence of irrational investors. However, in the real world, investors may not always be rational and their behavior deviates from what is termed as rational .Whenever an investor is influenced by emotions and moods, he acts irrationally. These emotions significantly affect their investment decisions and their expected returns will vary accordingly. The same is verified by De Long, Shleifer, Summers, & Waldmann (1990) who also reinforce the inclusion of noise traders as a factor in pricing of financial assets.

Human psychology has a great influence on stock prices De Bondt & Henriques (1995). Hence, the role of investor sentiment is quite visible over here. Stambaugh (2014) contended that investor sentiment is a short term phenomenon if arbitragers are allowed to eliminate the mispricing. However, arbitragers use the short-selling technique to eliminate the mispricing effect. If there are constraints on short-selling, then rational traders cannot fully exploit the profit opportunities and sentiment effect is likely to prevail in the stock returns. Moreover, it validates the standing of investor's sentiment as a risk factor in pricing of assets models.

Another justification is that behavioural finance is an emerging field. It deals with the behaviour of investors which can affect their investment decisions. Carhart (1994) added momentum to the famous FF three factors thereby emphasizing on the importance of behavioural factors like investor's sentiment in determining the prices of assets.

Famous six proxies of investor sentiment by M. Baker & Wurgler (2006) were decided to use in current study. As investor sentiment cannot be observed directly, they used share turnover, closed end fund discount, IPOs and their returns, share of equity in total, dividend payers and non-payers ratio as proxies for investor sentiment. When it comes to practical data collection phase, it was not possible to have all the proxies except share turnover because all the factors used in asset pricing model were collected on last trading day of June for the year t-1, while the above mentioned proxies except share turnover were not available on last trading day of June for the year t-1 as every proxy had its different date and time of occurrence. Finally, it was decided to use share turnover as the proxy for investor sentiment. M. Baker & Wurgler (2006); Bekaert, Harvey, & Lundblad (2003); Datar, Naik, & Radcliffe (1998); Joseph, Wintoki, & Zhang (2011) & Rouwenhorst (1999) used share turnover as proxy for investor sentiment. Brennan, Chordia, & Subrahmanyam (1998) used shares turnover as a substitute for liquidity. They observed a negative correlation between share turnover and expected returns. Hence in their study, they documented a negative strong relation between average returns and shares turnover. It means that the firms having low sentiment earn higher returns than the firms having high sentiment.M. Baker & Stein, (2004); Brown & Cliff, (2005) suggested that sentiment of investor is actually the valuation differences among rational and irrational investors. When there are plenty of investors in the market, there will be high sentiment. The number of investors denotes the investor heterogeneity. Other researchers such as Harris & Raviv (1993); Ofek (1993) suggested that investor heterogeneity denote high trading volume. It is therefore, possible that high sentiment leads to higher volume of trading. This relationship can best be explained with the help of figure 1.2.

Figure 1.2: Relationship between Investor’s Sentiment and Future Returns



1.8.3 Media Coverage

Media is playing a pivotal role in our everyday life and is affecting our decisions. Same is the case in financial markets. Considering media coverage as a return predictor became indispensible in this age of information and awareness as our financial market is integrally based on information.

Investor's reaction to the inflow of new information depends upon the time the investor receive that information. Therefore, in today's high-tech world, media coverage plays a prominent role in disseminating information to the general public. Individual investors receive company information through media coverage and investors incorporate this information in their investment decision. Likewise, market efficiency is achieved when investors adjust prices rapidly to the release of new information. Therefore, the coverage of firms through any media source acts as the fundamental source of market efficiency. Additionally, Tetlock (2007) realized the importance of media coverage and measured the association among the media coverage and performance of stock market. He found a significant impact of media coverage on expected returns of stock.

Sentiments are based on the availability of news. The response of the investor and market deviation from the efficient market and it's under and over reaction all are based on the news available to the market. The source that gives coverage to the news and information played a vital role in the asset pricing. For example, Business recorder Pakistan, a daily newspaper, plays a vital part in disseminating data to a wide crowd, particularly to individuals and financial specialists. Online and printed memberships of the press are much bigger, and undeniably far more extensive than different corporate data sources, for example, Business Recorder Pakistan. Given its wide achievement on the basis of readability, one may anticipate that it will influence the individuals present in security markets L. H. Fang, Peress & Zheng (2009).

The concept of market efficiency contradicts the effect of media coverage. Market efficiency does not allow media coverage to affect stock prices but as the markets are not fully efficient, relationship among cross-sectional returns and media coverage exist Tetlock (2007). L. Fang & Peress (2009) conducted a research on the effect of mass media coverage on stock returns. According to them, the stock's portfolio that have no coverage of media earns more returns than that stocks that are provided coverage of media even after having a control of renowned factors of risk. Therefore, the return premium for stocks not covered by media is economically significant. In other words, such firms earn higher returns that have no media coverage.

Meidyawati (2012) argued that the more coverage a stock gets, the lower the returns will be and the less coverage, or even no coverage a stock gets, the higher the return will be. In other words, those firms which have got considerable media coverage should have low returns because of the information dissemination, hence prices are adjusted. In addition, there can be various reasons for this relationship and one is that when a firm has considerable media coverage, it leads to temporary over valuation of firms. More retail trading occurs which means more buying than selling due to short sale impediments. Miller (1977) stated that during the period of retail trading, prices tend to increase which leads to lower future returns. Another explanation for the above relationship is media coverage of a firm point to the information dissemination and it reduces the chance of information asymmetry. This timely information is reflected into the prices of the stocks; hence investors cannot earn abnormal profits thus reducing the returns and thereby risks. Figure 1.3a & 1.3b can best explain these relationships.

Figure 1.3a: Relationship between Media Coverage and Future Returns

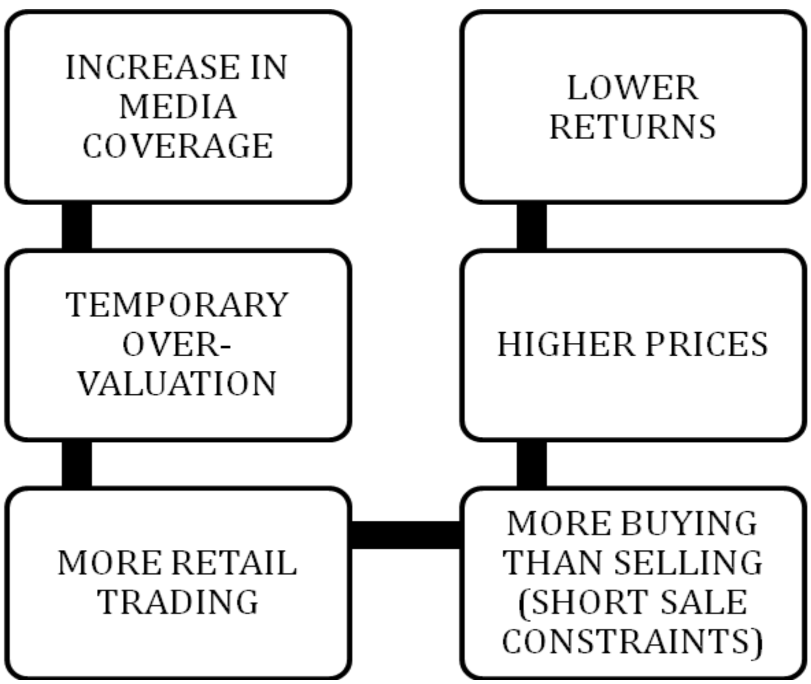
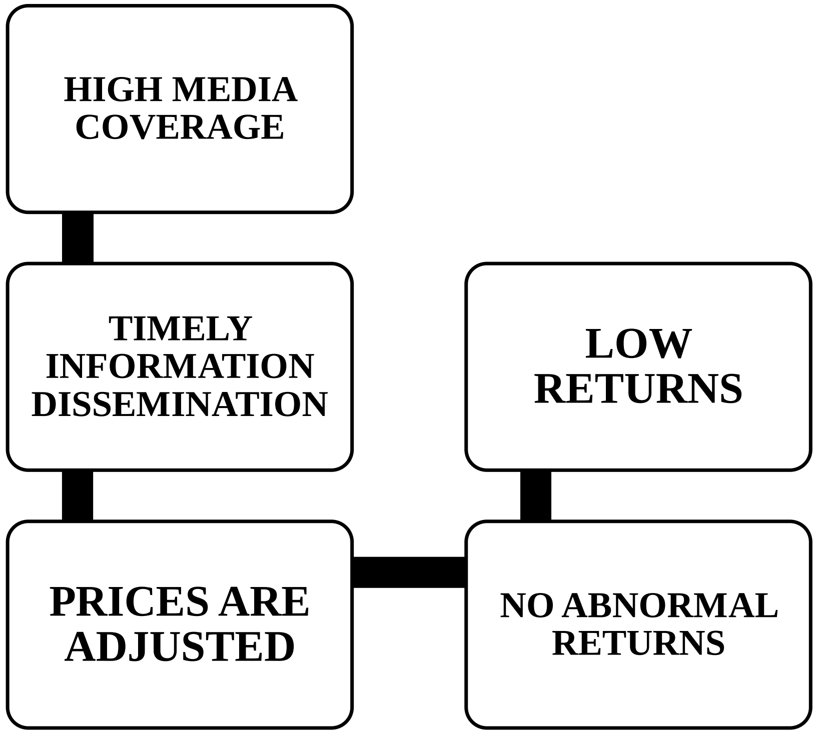


Figure 1.3b: Relationship between Media Coverage and Future Returns



In best of my knowledge, the above discussed factors have neither been tested simultaneously nor independently in Pakistani stock market.

1.9 Research Questions

There are six questions fabricated after critically evaluating the previous literature.

i) Is Asset Growth helpful in determining the prices of financial assets in Pakistan?

ii) Is Investor Sentiment a priced factor in asset pricing model?

iii) Is Media Coverage contributing towards the determination of prices?

iv) Which of the proposed six factors will contribute more to the stock returns of market?

v) Whether the proposed multifactor model will predict the future returns of a specific industry or market in general?

vi) Which industry will be benefited more from the proposed model.

1.10 Problem Statement

Number of studies proved CAPM as invalid in Pakistani equity market Bhatti & Hanif (2010), Hassan & Javed (2011) & Shaikh (2013) therefore, other factors are tested to formulate a comprehensive multifactor asset pricing model. Following size and value effects in the United States of America stock market Fama & French (1992), size and value effects have proved to be significant in the Pakistani equity market Bhatti & Hanif (2010); Hassan & Javed (2011). Some additional risk factors to augment the model have been tested by researchers like accruals, shareholding patterns, P/E ratio, new equity issuance, IPOs etc but still some important factors have been found missing from empirically testing in Pakistani equity market, which could potentially add an equity premium in FF model. The current study adds three possible fundamental and noise factors to the FF three factor model. A comprehensive asset pricing model for Pakistani equity markets is not yet been proposed which can qualify the assumptions of asset pricing models. The multifactor model has never been tested on any industry in Pakistan. This study explores the effect of multiple variables in predicting the expected returns of the industries.

Following objectives are designed considering the above problem statement.

1.11 Objectives of Study

The current study has a few objectives such as

i) To check the role of asset growth premium in determining the future returns of securities.

ii) To test the role of investor's sentiment in determining the future returns of assets.

iii) To check whether media coverage can forecast the expected returns of portfolios.

iv) To frame a mechanism of asset prices for stocks listed on Pakistani equity markets that capture the behavioural and the firm specific aspects of returns.

v) To capture the effect of proposed six variables on various portfolios like P (portfolio of mixed firms), S (small firms), B (big firms), S/H (small firms having high book to market ratio), B/H (big firms having high book to market ratio), B/L (big firms having low book to market ratio) & S/L (small firms having low book to market ratio).

vi) To investigate whether the nature of asset pricing model is industry specific or country specific?

This model will help to determine the untested irregularities like investor sentiment, asset growth, and media coverage.

1.12 Limitations of Study

There are various limitations of this study discussed below:

i) Literature favours the construction of portfolios to discover irregularities, and more generally to test asset pricing models. Researchers who favoured portfolio construction faced alot of opposition because it considers average returns of the firms that are pooled into one portfolio. The averaging out of returns wastes and potentially distorts valuable information about cross sectional patterns in abnormal returns. Andrew, Liu, & Schwarz (2010) & Litzenberger & Ramaswamy (1979) also found the portfolio construction as less efficient and recommend to consider individual firms in asset pricing models.

ii) Firm characteristics may offer little unique information about abnormal returns. Asset pricing models that consider each firm characteristic in isolation are probable to undergo from a misplaced variable bias that will result the importance of an anomaly being overstated. Traditional portfolio approach is unable to address the omitted variable problem hence, current study have relied on multi-dimensional sorts to isolate the effects of a particular characteristic, but testing two or more than two variables simultaneously is infeasible.

1.13 Contribution of Study

This study contributes to the available literature of multifactor asset pricing models and it identifies the irregularities presented in Pakistani equity market. This study explores almost a perfect asset pricing model with 67% explanatory power assuming all the variables as significantly affecting future returns. Furthermore, relationship between future portfolio returns and novel factors like Asset Growth, Investor Sentiment, and Media Coverage have been investigated for the first time in Pakistani equity market. These variables were neither tested alone nor simultaneously to find out prices of financial assets in Pakistani equity market. This proposed model is very useful for investors in investment decision as they can base their investment decision on these six variables proposed by us to get maximum returns and to allocate their resources efficiently.

Another contribution of this study is that Fama & MacBeth (1973) methodology has been applied for the first time on various portfolios like P (overall portfolio), S(small cap), B(big cap), S/H(small capitalization and high b/m firms), B/H(big capitalization and high b/m firms), S/L(small capitalization and low b/m firms), B/L(big capitalization and low b/m firms). All such studies apply Fama Macbeth methodology on models which has only P portfolio as the dependant variable. The results of this test are useful for investor to focus their investment decision. They can set their portfolio as high and low on the basis of industry average and then can verify from our study which variables are more significant for their respective portfolio.

The important contribution of this study is that the proposed model is applied on all the non-financial industries to check whether the multifactor models are either country specific or industry specific.

1.14 Organization of Study

This study is organized as follows.

Chapter 1 aims to introduce various asset pricing models and finally our proposed asset pricing models. It explains the background of asset pricing, objectives of study, contributions and significance of the study, limitations, the problem statement and purpose of the study.

Chapter 2 describes the theoretical framework of the models. It aims to explain related theories regarding the function of current study. Similarly, the purpose of this chapter is to provide a picture of the selected theories.

Chapter 3 describes the review of previous relevant papers. The review starts from the validity of CAPM followed by FF three factor models and then the novel factors added by us have been reviewed. Moreover, past studies on asset pricing models in context of Pakistan are also discussed.

Chapter 4 explains the methodology used in this study and all the variables and their formulas are discussed one by one. It explains the methodology for portfolio construction and Fama & MacBeth (1973) procedure. All the asset pricing models tested are shown and discussed in detail.

Chapter 5 describes the detail data analysis. Descriptive statistics, results of ordinary least square test and Fama & MacBeth (1973) two pass regression are shown and discussed one by one for all the ten models.

Chapter 6 concludes the results on the basis of analysis, what more or else that could have been done. Recommendations and further research that have emerged during the study are also discussed.

CHAPTER 2

THEORETICAL FRAMEWORK

2.1 Theoretical Framework for Asset Pricing

According to the scope of current study, asset pricing theories can be expanded into two broad groups:

i) Neo-Classical asset pricing theories

ii) Behavioral asset pricing theories

Neoclassical and behavioral finance have considerable implications on asset pricing models. We will shed light on both of the theories in this research but all of them are not the focus of this study. The bold areas in figure 2.1 are the focus of the current study.

2.2 Neoclassical Asset Pricing Theories

Neoclassical finance is developed amid of 1960s and it is built on previous developments. Asset pricing have remained the center point of attention for the field of neoclassical finance and in this pursuit, several asset pricing theories have been established. However, these theories vary in their types and characteristics. Earlier, when there was no formal theory of estimating the prices of assets, the general sense was that asset would like to have a reasonable price margin if its returns are riskless rate.

$$\boldsymbol{E_i = E[X_i] = r} \qquad\qquad (\boldsymbol{2.1})$$

Where:

x_i express the expected rate of return of asset i

If things happen like this the asset will neither reward nor punish the asset holder. This equation did not proved to be an adequate representation of expected returns. Therefore, it evolved into the modern financial theory. It has following three main postulations

i) Markets efficiency exists

ii) Investors use to take advantage of potential arbitrage opportunities

iii) Investors have rational behavior

Figure 2.1: Theoretical Framework of Neo-Classical Based Asset Pricing Models

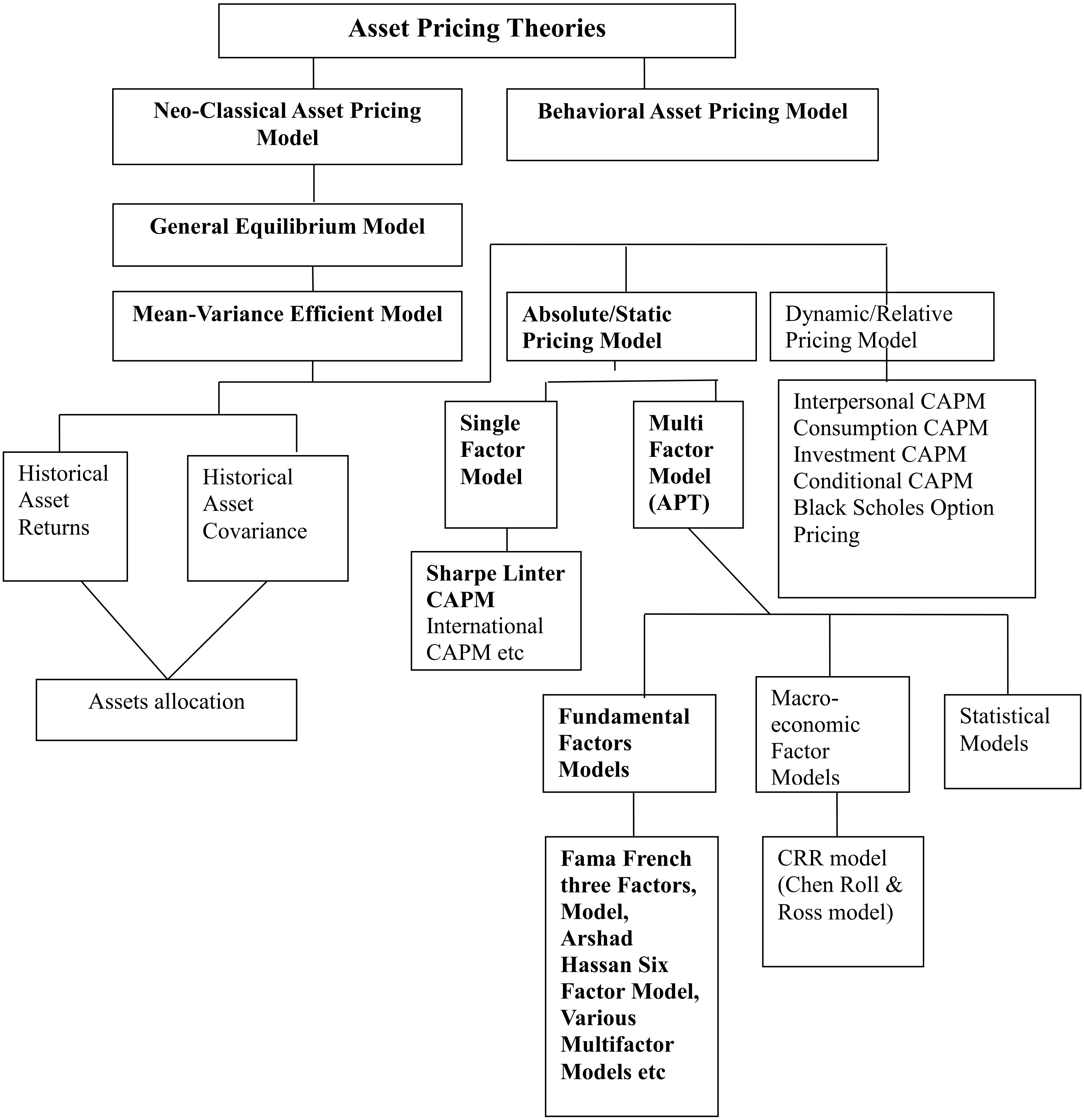
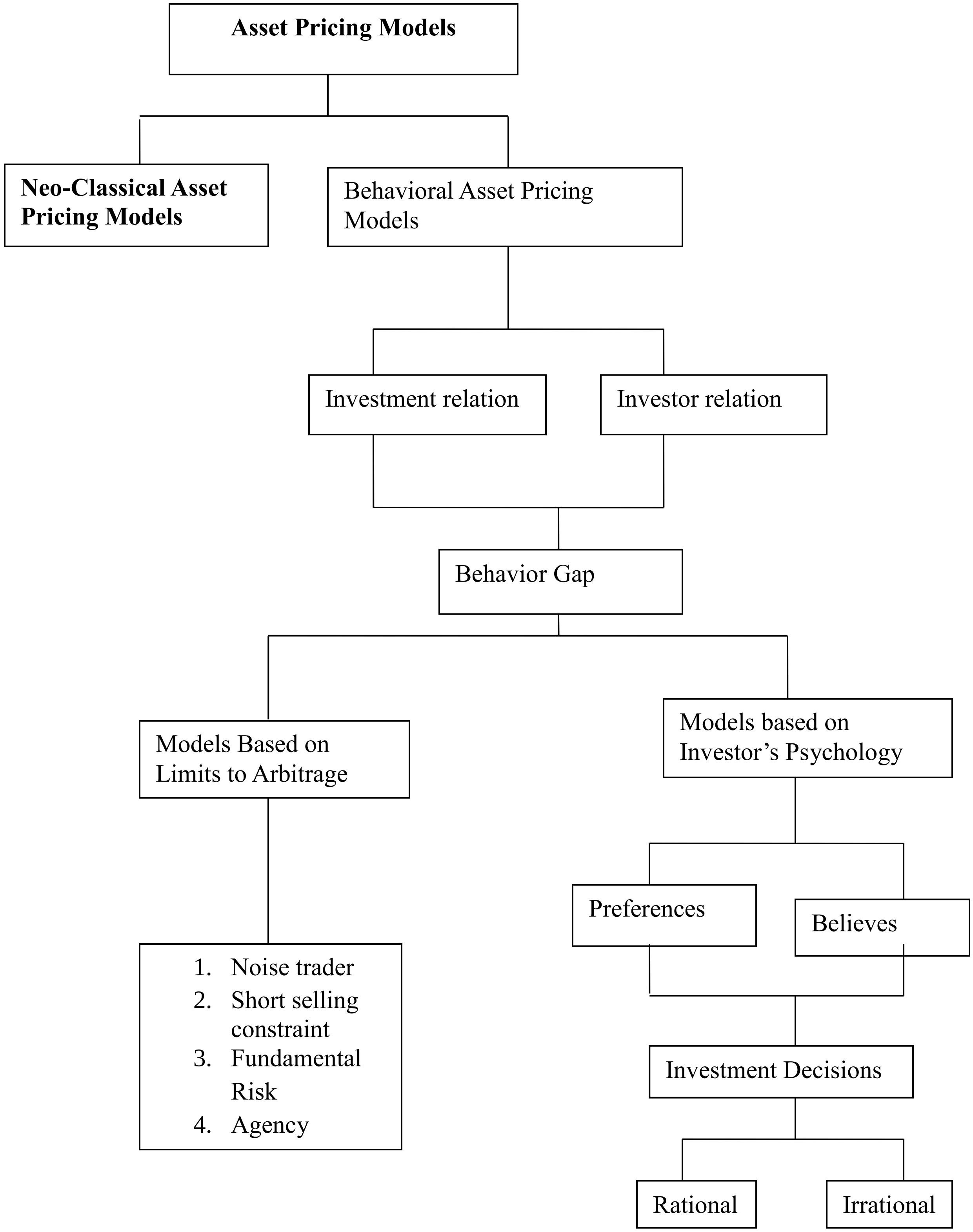


Figure 2.2: Behavioural Asset Pricing Models



All investors are commonly presumed as with the attitude of risk aversion and hence those assets whose returns are much risky must yield a higher level of return as compared to riskless assets. A return premium r_{prem} was then added for the risky assets in equation 2.1 to get the expected returns of risky assets.

$$\boldsymbol{E_i = r + r_{prem}} \qquad \textbf{(2.2)}$$

Where:

$r_{prem}>0$ to inculcate additional return needed for risk compensation.

Determinants of risk premium have been the focus theoretically and empirically. We can better define the risk premium by two angles. One is of higher risk premium accounts for the higher risk inherent in the stocks and the other definition is based on the risk preference of the investor. The investors who have much risk aversive attitude will ultimately get more premium as their reward for bearing the risk. Researchers changed their idea regarding the risk premium with more in-depth research into the topic. In the process of evolution of asset pricing, the above mentioned rough idea of risk premium transforms into the famous mean-variance portfolio theory. The contribution of modern neo-classical theory to the definition of risk premium is that risk premium of a security can be determined by the relationship of the security with other assets and is not measured by its volatility only. This idea leads to the inclusion of general equilibrium model to Neo-classical based asset pricing models.

2.2.1 General Equilibrium Model

According to general equilibrium model, assets are priced according to their systematic risk. It assumes the notion of “higher the risk, higher the return”. General equilibrium models presented different theories ranging from single factor model to multifactor models based on macroeconomic and fundamental variables.

2.2.2 Mean Variance Theory

Markowitz was the first who presented the mean variance efficient model and subject of finance was made more unique with Markowitz (1952) work on portfolio selection. From the beginning, it was much clear that investors would always like to enhance his/her wealth, and they also reduce the risk that is associated with potential gain. According to Harry

Markowitz, these two criteria can never be combined. He clarified that, there is always a trade-off between risk and returns. Either you can gain the expected returns by taking on variance, or reduce variance by giving up expected returns. This practice turned to be inefficient for asset allocation.

Markowitz (1952) observed that the standard deviation of two risky asset's portfolio is less than the sum of standard deviation of these risky assets. Hence, it is less than the sum of standard deviation of its constituents. The main assumptions of Markowitz model is that investors are risk averse and rational people. Similarly, investors consider mean (return) and variance (risk) of their investment and as a result investor chooses "Mean–Variance Efficient Portfolios". Thus, the Markowitz approach is often called a "mean-variance model". The total portfolio risk can be reduced because of negative correlation among constituent assets of the portfolio. Likewise, the negative correlation among asset classes is a powerful tool for reducing the total portfolio risk through diversification. This tool pointed to the idea of increasing expected returns and decreasing variance by adding more uncorrelated assets to the existing portfolio. Among all possible portfolios, the rational investor must consider only those portfolios that enhance expected return for a given variance, or on the other hand, which minimizes the level of variance for an expected return. Moreover, these types of portfolios shape the mean and variance efficient to be set on the efficient frontier. Investors have to choose the portfolio from the efficient frontier which matches his risk tolerance level.

A major limitation of Markowitz mean variance theory is that it only deals with the risky assets. Consequently, two fund separations is the result of limitations in Markowitz portfolio theory. According to Roll & Ross (1980) expected return and their standard deviation have no linear relationship while on contrary; a binomial relationship exists between the two. Therefore, alternative models were devised and alternative mean variance efficient theories can be formed into static and dynamic asset pricing models.

2.2.3 Absolute/Static Asset Pricing Models

Absolute or static pricing mean pricing of assets in one point of time, hence, according to static models, the assets are priced with exposure of basic risk sources. We can further group the static models into single factor asset pricing models and multi-factor asset pricing models. We can illustrate this with a look at the three main asset-pricing theories.

i) Single factor model
ii) Arbitrage Pricing Theory (Fundamental factors)
iii) Arbitrage Pricing Theory (Macroeconomic factors)

2.2.3.1 Single Factor Models (Capital Asset Pricing Model)

Lintner (1965a) formulated CAPM to be a pioneering single factor model of asset pricing and hence, CAPM marks the birth of the asset pricing models. According to it, the expected returns of the securities can be determined through the market risk premium only. CAPM is econometrically stated as follows:

$$\boldsymbol{E(R_i) = R_f + \beta\left(R_m - R_f\right) + \varepsilon} \qquad \mathbf{(2.3)}$$

Where:

R_f is the risk free rate
β is the sensitivity of individual security's return
$\beta = Cov_{i,m}/\theta^2_m$
R_m is market return
ε is random error

As every theory has some underlying assumptions behind it, CAPM also have some. The main assumptions are that all investors:

i) are rational and risk averse
ii) are price takers
iii) may borrow and lend at risk free rate
iv) all information are available at the same time to all investors without any cost

Assumptions provide the environment for any theory to exist. The assumptions listed above are impractical and unrealistic. In reality, investors are not necessarily rational. Their portfolio may contain borrowing or lending or both. The information is not necessarily available to all investors at the same time. Every investor has different source of getting that information, hence react differently to the same information. Receiving any information without any cost is totally impractical. In today's economic world, it is unrealistic to get information without any cost.

Despite all the criticism, CAPM is still widely used in countries to estimate future returns. CAPM is the most debated and criticized topic of finance since the beginning, but after all its criticism, it provides a base to the researchers for the estimation of future returns. CAPM is not valid for Pakistani equity market according to our research. In other words it fails to explain the future returns. The main problem of CAPM is that expected returns are determined though a single factor only while there can be other variables also which can predict the future returns well.

The first extension of CAPM was presented by Basu (1977) on P/E sorted portfolios and he documented that high P/E firms earn higher returns than low P/E firms. Similarly, Statman (1980) investigated about the book to market ratio of firms and confirmed it as a priced variable. Due to the limitations of CAPM, there is variety of asset pricing models that bring changes. Numerous models are variations of the basic capital asset pricing model. We will discuss here some of them.

2.2.3.2 Black Zero Beta CAPM

After the work of Sharpe, other researchers started working on relaxing the strong assumptions of CAPM. Likewise, Black (1972) also worked on the relaxation of one of the assumptions. He expressed how the model is modified when riskless borrowing and lending is not available and introduced famous Black Zero Beta CAPM.

By dropping the above mentioned assumption of CAPM, the model would be changed substantially. Black version of the CAPM is stated as follows:

$$E(R_i) = ER_z + \beta(R_m - R_z) + \varepsilon \qquad (2.4)$$

Where:

ER_z is the return of the zero beta portfolios

Portfolio z returns are uncorrelated with the market returns, its beta is zero. When the covariance of the returns of portfolio z with the return of other assets is counterbalancing, the variance of the asset's returns occur. Such type of assets are riskless in a sense that they are totally uncorrelated with the risky asset's returns i.e. market returns. These assets contribute nothing to the variance of the market returns. Contrary to the Lintner (1965b) & Sharpe (1964) capital asset pricing model with the difference of risk free rate that is replaced by returns of portfolio z that is unattached with market portfolio. Likewise, portfolio z can be theoretically termed as companion portfolio for market since it is not correlated. Jensen, Black, & Scholes (1972) showed that model using risk free rate (eq 2.3) does not hold well in empirical findings but rather the two factor model (eq 2.4) holds well.

In Sharpe and Lintner model of CAPM, the security market slope line must be equivalent to the risk of market premium and therefore, the intercept point must be equal to the market risk free rate. Additionally, for zero-beta CAPM, the slope line must be less than the risk premium of market; while on the other hand, the intercept line should be greater than the risk free rate.

2.2.3.3International CAPM

A conventional approach of CAPM is the result of certain unrealistic assumptions of CAPM and it estimates the expected returns in one currency only. International CAPM (ICAPM) takes other variables into discussion which effect the assets return at global basis. Consequently, ICAPM is more beneficent than CAPM in theory and practice. ICAPM is stated as follows:

$$E(R_i) = RFR_i + \beta_i(ER_{WM} - RFR_W) + \varepsilon \qquad (2.5)$$

Where:

$\beta_i = Cov_{i,wm}/\theta^2_{wm}$ expresses the international systematic risk of security i,

RFR_i denotes the domestic risk free rate

RFR_W denotes the average worldwide risk-free rate

R_{WM} denote the return on the worldwide market portfolio.

CAPM compensates the investors for the money time value, inflation adjustment and the value of premium for having market risk, while ICAPM compensate investors for exposure to risks attached with foreign currency exchange rate. Likewise, ICAPM permits investors in adding effects of currency to CAPM to count for the foreign currency changes sensitivity once investors will hold an asset. For instance, if an organization that originates in the USA and buys its parts from China then, after increase in the value of U.S. dollar with respect to Chinese Yuan, the cost of these imports will be reduced. Hence, these currency exposures affect the profitability of a company and the returns that is produced by the investment.

There are various versions of original CAPM such as Mayers (1972) added human capital as a determinant of the expected returns, calling it as CAPM with non-marketable human capital. Another assumption of CAPM about the homogeneity of information was challenged by Lintner (1969). He argued that it is hard to believe that all investors share the same set of information and he introduced investor's heterogeneity in beliefs to the CAPM and found that heterogeneous beliefs of investors regarding mean, variance, and covariance of securities/portfolios can affect aggregate market returns. In addition, Levy, Levy, & Benita (2006) also supported the challenge of Lintner (1969).

2.2.3.4 Arbitrage Pricing Theory (Multi Factor Models)

CAPM considers a single factor of market portfolio responsible for the determination of expected returns; however, there are a number of other variables that can affect the expected returns of securities. Ross (1976) therefore, challenged the validity of CAPM and consequently developed an alternative asset pricing model known as arbitrage pricing theory (APT). APT is in use by the researchers because it has fewer assumptions than CAPM. Generally, a multifactor model states that the different asset returns are explained by common factors in a linear process model. For return on assets and portfolio we have multifactor model

$$ER_i = \alpha + \beta_1 K_1 + \beta_2 K_2 + \cdots\cdots\cdots \beta_N K_N + \varepsilon_i \qquad (2.6)$$

Where:

K is a set of factors affecting the expected returns of the securities. All other variables formerly described.

However, number of variables is the main difference between CAPM and APT. The inclusion of several risk factors enhances the predicting power of APT and it allows for a more expansive systematic risk. Multifactor models are often referred to as Arbitrage Pricing Theory (APT) models. Additionally, multi-factor models may be categorized into three types depending on the type of variables it use.

i) Macroeconomic model
ii) Fundamental models
iii) Statistical models

Similarly, macroeconomic models are in contrast with security's return to factors like inflation, employment, and interest. In the same way, fundamental model investigates the causal relationship among security's return and financials (such as size, B/M, leverage, accruals, earnings, liquidity) and statistical models are used to make a comparison of returns of various securities that is based on performance of each security itself. Principal Component Analysis (PCA) is an advanced statistical technique that extracts the common factors from a cross-section of stock returns.

Through PCA the most relevant or systematic information from the data is extracted and the remainder (ε) is classified as "noise" or un-systematic information. Similarly, factor analysis is another related method, which yields similar results. In practice, it is job of empirical researchers to make up their own personalized APT model to test according to what is referred to as their "intuition". We have tailored a six factor asset pricing model in this research. A number of multifactor models are empirically tested. The APT of Ross (1976) is a general model of multiple factors which can affect the security returns but Ross left the detection of these variables to other researchers. During the last twenty five years, a number of studies have empirically tested various factors.

2.2.3.5 Fundamental Factors

A successful approach to determine the risk exposure of a specific variable in a multifactor asset pricing model is to focus on the fundamental uniqueness of the assets themselves. Consequently, last three decades have proved to be the search time for alternative risk factors and during that period, Fama & French (1992) presented the famous three factor asset pricing model. They argued that small cap firms earn more returns than big cap firms and value stocks outperforms growth stocks. Their model became the most famous of the multifactor asset pricing models as size and value effects are the most common effects prevalent in almost every stock market of the world. In the same way Carhart (1997) added momentum to the three factor model of Fama & French (1992). Fixed-income models are combinations of 70 fundamental and macroeconomic factors.

Hasan & Javed (2009) proposed a multifactor asset pricing model for Pakistani equity market based on fundamental (market, size, value, momentum, liquidity and P/E) as well as macroeconomic (100 index, industrial growth, oil prices, narrow money growth rate, consumer price index, T-bill rates, foreign portfolio investment, & decrease in value of currency) factors. Hence, it was an integrated asset pricing model proposed for the first time in Pakistan. Fama & French (2013) four factor model added expected profitability to the traditional FF three factor model. Fama & French (2015) recently worked on the five factors asset pricing model and it captured the value, size, investment patterns, and profitability in average returns.

2.2.3.6 Macroeconomic variables

Chen, Roll, & Ross (1986) introduced the macroeconomic based asset pricing model by hypothesizing that security returns are a function of a set of macroeconomic variables. Money supply, consumer confidence index, interest rate, GDP, inflation risk, credit spread, industrial production, unemployment rate, business cycle risk, foreign direct investment, unanticipated shifts in the yield curve etc are the mostly used variables in empirically testing the effect of macroeconomic variables on expected returns.

Similarly, Issahaku, Ustarz, & Domanban (2013) presented macroeconomic variables based asset pricing model for Ghana. Alam (2013) investigated the role of macroeconomic variables and fundamental variables in explaining stock returns of big four Southeast Asian countries. Likewise, Nishat, Shaheen, & Hijazi, (2004) investigated various macroeconomic factors and found a causal relationship between them. Researcher have their own preferences of macroeconomic variables and could not agree on a set of k variables Chen, et al. (1986) therefore, APT has been inconclusive because of this reason. Finding arguments for adding a variety of macroeconomic and fundamental factors remains a parable.

2.2.3.7 Statistical models

In a macroeconomic based model, the projected returns are the functions of a set of K factors while in characteristic based asset pricing model, the expected returns are a function of factor betas of the fundamental factors. In a statistical model, neither betas nor factors are linked to sources of external data and hence statistical model is recognized from the co-variances of asset's returns. In statistical factor model, the factors are unobservable and extracted from asset return through the process of principal component analysis or factor analysis. A common component is extracted from the co-variances of the assets returns and these principal components have linear relationship with returns. The principal component is constructed in such a way that the first principal component is the largest portion of the co-variances of returns and second principal component is the next largest portion and other parts are so on and so forth. Hence, observed factors have factor loadings that can be estimated using model of multiple regressions.

2.2.4 Dynamic/Relative Pricing Model

Dynamic models refer to imposing a change or condition on the existing static models. The main purpose of the dynamic asset pricing models is to incorporate the potential serial autocorrelation in the volatility and time variation in the distribution of return innovations so that the results and tests can be meaningful with a degree of confidence. For example, in static CAPM we find the static (one time) betas while in dynamic CAPM/conditional CAPM we find the time varying betas of the stocks. Jagannathan & Wang (1996) showed that unconditional tests of asset pricing models fails concurrently when their conditional counterpart is valid. The conditional asset pricing model produces more efficient estimates of asset factor loadings and pricing error is reduced. Discussed below are some of the dynamic asset pricing models.

2.2.4.1 Conditional CAPM

As the static CAPM have some serious problems of estimation. There is a need of dynamic asset pricing model which has the provision to impose various conditions on CAPM. The conditional CAPM can be expressed as follows:

$$\boldsymbol{E_{t-1}(r_{it}\ |Z_{t-1}) = \lambda_{0t-1} + \beta_{it}E_{t-1}(\lambda_{1t}\ |Z_{t-1}} \qquad \textbf{(2.7)}$$

Where:

$$\boldsymbol{\beta_{it}} = \frac{\textbf{cov}\ (r_{it},\textbf{rmt}\ |Z_{t-1})}{\textbf{var}\ (r_{mt}\ |Z_{t-1})} \qquad \textbf{(2.8)}$$

The unconditional counterpart of CAPM can be written as changes in equation (2.7) in the following manner:

$$\boldsymbol{E(r_{it}) = \lambda_0 + \beta_i E(\lambda_1)} \qquad \textbf{(2.9)}$$

Comparing equations 2.9 and 2.7, we get:

$$\boldsymbol{\lambda_0 = \lambda_{0t-1}}$$

$$\boldsymbol{\lambda_1 = (\lambda_{1t}\ |Z_{t-1})}$$

$$\boldsymbol{\beta_i = E\beta_{it-1}}$$

One of the assumptions of static CAPM is that the expected returns are anticipated for one time period. This is a reason that makes it necessary for making a certain assumption that the asset betas should change with the passage of time. Jagannathan & Wang (1996) included the time varying quality of returns because the relative risk of cash flow of firms vary over the business cycle and are not stagnant.

2.2.4.2 The Inter-temporal CAPM

Inter-temporal CAPM is also a conditional CAPM as the condition of time variation is imposed upon the static CAPM. Merton (1973b) introduced ICAPM, according to which investors can trade continuously in time. More explicitly, the trading can occur across different periods of time. In static CAPM, the amount invested in assets was set for a given time and could not be changed or withdrawn. In real world, it may not be the case; investors continue to trade frequently, therefore, ICAPM permit the individuals to adjust the invested amount in every asset and also to remove an investment part for instant utilization.

Breeden (1979) introduced single beta consumption CAPM with market portfolio replaced with consumption growth per capita and Lucas Jr. (1978) worked on production based CAPM. According to it the returns of an asset are perfectly associated with cumulative production or with aggregate production growth rate itself.

2.3 Behavioral Asset Pricing Theories

Rational financial theories assume that investors are rational and their decisions maximize their wealth. However, there are many instances of the existence of irrational/noise traders. These traders act in an unpredictable way while market efficiency says that all the public information can be totally observed through security prices. According to market, efficiency prices cannot be projected on information basis while behavioral asset pricing theories contends that prices can be predicted by investor’s behavior and mood. An investor is not a robot and he has a personal life, a social circle of family and friends, work place pressures etc. All of these traits are responsible for establishing his mood and behavior and hence, investors behave in a biased and sometimes unpredictable manner due to these emotions and beliefs.

Gleason & Lee (2003) introduced the concept of fusion investing. According to him investments can be valued on the basis of two elements: fundamental value and investor sentiment. Likewise, behavioral models of asset pricing theories deal with the impact of investor’s psychology and beliefs on financial decision making. Shiller, Fischer, & Friedman (1984) contended that market prices of the securities are expected to dividend which is discounted to infinity plus the demand from noise traders (investor’s sentiment). When noise traders are bullish, it will have a positive impact on the prices (higher than normal) while when noise traders are bearish, the equity prices go down. Fusion investing considers both the fundamental as well as the sentiment factors in pricing of assets.

The gap between the investment returns and investor returns is due to the investor's behavior. Behavioral asset pricing theories are about tracing the implication of psychological phenomena on financial behavior. Certain theories exist behind this behavior gap. Hassan, A. (2011) grouped these theories into following broad groups:

i) Theories of limits to arbitrage

ii) Theories of investor's psychology

2.3.1 Limits to arbitrage

Arbitrage activity is the basic concepts of finance and it is the instantaneous sale and purchase of the similar security in various markets or on other hand, it is instantaneous sale and purchase in same market but at different prices. Arbitrage is not the domain of little traders in the market and it is specifically conducted by high professionals and specialized investors. These arbitragers do not use their own resources while on contrary, they use the resources provided by banks, investment funds, pension funds, endowments, and wealthy individuals who have little knowledge of market behaviors. The agency problem arises when these arbitragers starts losing money. Hence, the resource contributors may refuse to provide the arbitrager with more capital and even withdraw some of the capital invested.

Arbitragers often face fundamental risk when some bad news enters into the market about the security they have recently bought and this risk could be eliminated by having a closely related security in your portfolio. As substitute securities are less often present, hence, it is very difficult to eradicate the fundamental risk attached with it. Even if an arbitrager finds out substitute security, he/she will still be vulnerable to the bad news that is specific to his original security.

Noise traders generate mispricing in the market due to their noisy and irrational behavior (De Long, et al 1990). Therefore, noise traders are very important because of its links to the agency problem. When mispricing occurs due to noise traders, the arbitragers could not avoid that loss. Due to this reason, it can compel workforce like hedge fund managers and institutional investors in order to liquidate their positions too early, hence bearing sudden losses. Barberis & Thaler (2003) argued that arbitragers are less interested in eliminating such mispricing. Therefore, the only way to remove this mispricing is to buy a substitute security. On the other hand, transaction costs such as commission and bid ask spread go anti-clockwise with exploiting a mispricing. Since short selling is indispensable for arbitrage process but there are certain constraints in the implementation of short selling. It may be sometimes very costly (fee for borrowing) to borrow a stock or even finding a mispriced stock.

2.3.2 Investor's Psychology

The theory of limited arbitrage contends that when noise traders cause mispricing of securities in the market, rational investors are helpless to eliminate it. To discuss these deviations, economists turn to the field of investor's psychology. Models of investor's psychology are further grouped into models based on preferences and beliefs. As investor sentiment is a non observable phenomenon, these models use indirect proxies for the measurement of various versions of sentiment (Hoffmann, Post, & Pennings, 2013). As recent work in the area of behavioral finance has contradicted the notion of market efficiency, the idea of using psychological biases as the determinant of investor behavior and thus asset prices has eminent place in the debate among modern researchers. Paudal & Laux (2010) investigated the influence of investor's psychology on stock prices of 35 firms belonging to three different industries for a period of 56 years but their results were not supporting any causal effect of investor's psychology on stock prices. Thus, there are mix results of the effect of investor's psychology and mood on stock prices of assets.

CHAPTER 3
LITERATURE REVIEW

This chapter gives the detailed review of available literature regarding single factor and multifactor asset pricing models. A brief history of asset pricing also makes a part of this chapter. The discussion of asset pricing starts from the Harry Markowitz portfolio selection theory developed in 1952.

3.1 Markowitz Model

Markowitz (1952) portfolio theory was developed and transformed into capital asset pricing model. Earlier than Markowitz, portfolios were evaluated on the basis of returns only and investors ranked their portfolios as good or bad based on the performance of peer groups. In that era, investors invested in a portfolio which earns the highest expected returns without taking into account the risk associated with it. Harry Markowitz was the first one to challenge this concept by incorporating mean-variance trade off to portfolio selection techniques. Likewise, Markowitz puts all the portfolios on an efficient frontier and the investors selected their portfolio based on their level of risk aversion and utility level. Markowitz model highlighted the fact that assets might not be chosen only on features that were distinctive to the security itself. Instead the investors had to consider how each security goes in parallel with all other securities. Taking these co-movements into consideration resulted in a type of portfolio that had the same expected return with less risk than a type of portfolio created by overlooking these co-movements among securities. The Markowitz portfolio selection model gave the base for modern theory of portfolio but that is not practically used by researchers. The prime cause for this was the huge data requirements. This model also relied on variance as a risk measure for portfolio's returns while variance of a portfolio does not measures the complete risk of the portfolio.

3.2 Tobin's Separation Theorem

On one hand, Markowitz model established a relationship between risk and return of risky assets while Tobin (1958) added risk free asset or zero-variance asset to the Markowitz efficient frontier to get a new frontier named as capital market line (CML). Adding risk free asset to the portfolio greatly simplified the Markowitz model. The portfolio returns were calculated as follows:

$$R_P = XR_f + (1 - X)R_g \qquad (3.1)$$

Where:

X is the proportion of assets invested in risk free assets and the remaining (1-x) into risky asset g.

Tobin actually discussed the liquidity preferences of the investor in addition to the mean-variance concept of the Markowitz. He allowed investors to choose between investing their assets into a combination of risk free assets and risky assets. Hence, Markowitz (1952) and Tobin (1958) separation theorem provided the theoretical background for CAPM.

3.3 Capital Asset Pricing Model and its Various Versions

Lintner, (1965a) recognized the prices of assets under the conditions of risk. As opposed to Markowitz (1952), Sharpe, (1964) tried not only to evaluate the relationship between higher risk and expected return but also to separate the part of the risk that was being influenced by the market. Therefore, Sharpe observed that some of it but not all the risk could be eliminated through diversification. CAPM extended the assumptions of Markowitz model. Econometrically, capital asset pricing model can be expressed as follows:

$$R_{it} = \alpha_i + \beta_i\left(R_{mt} - R_f\right) + \varepsilon_{it} \qquad (3.2)$$

Where:

$$\beta = COV_{i,m} \,/\, VAR_m$$

Jensen & Ruback (1983) explained that covariance of a security's returns with the market return is the appropriate measure of the risk and not its own variance. Many researchers tested the validity of CAPM in numerous world stock markets and explored diverse results. A few researchers accepted capital asset pricing model and considered it as a perfect asset pricing model. Whereas, Fraser, et al. (2004); Groenewold Fraser (1997); Hansson & Hordahl (1998); Michailidis, et al. (2006); Qu & Perron (2007); Raei & Mohammadi (2008); Roll (1977) & Scheicher (2001) rejected CAPM in various stock markets of the world.

Despite the limitations attached with static CAPM, it is still the most popular asset pricing models. As capital asset pricing model had some strong assumptions, many researchers tried to relax these assumptions with the passage of time. The various versions of CAPM are developed by relaxing these hard assumptions of the basic CAPM and Black's zero beta version of CAPM was one of such versions. Similarly, the heterogeneous expectation version of CAPM was presented by Lintner (1969) and International CAPM of Solnik (1974) added the foreign currency effect to the original CAPM. In addition, Mayers (1972) talked about the human capital variation of CAPM and the behavioral version of CAPM was presented by Shefrin & Statman (1994). They introduced the beliefs of the noise traders to the original CAPM.

CAPM is empirically tested using two methodologies.

i) Fama & MacBeth (1973)

ii) Pettengil approach (1995)

3.3.1 Fama Macbeth Procedure

Literature revealed that Fama & MacBeth (1973) methodology of portfolio construction was preferred because it reduces the idiosyncratic volatility of assets. Fama & MacBeth (1973) employed a three step approach and they divided the data into a portfolio formation period, beta estimation period, and testing period. Monthly returns were calculated for portfolios, then betas were estimated for each portfolio and beta sorted portfolios were then formed.

3.3.2 Pettengil Conditional Approach

Pettengill, Sundaram, & Mathur (1995) incorporate business cycle effects to the original CAPM. Hence, they studied the effect of market risk premium in bull and bear market and the research strength of this test later termed it as a modification to the Fama Macbeth methodology. The first two steps are the same as Fama & MacBeth (1973) test but the third step is modified by Pettengill, et al. (1995) and according to it a regression is estimated keeping returns of beta sorted portfolios as explained variable while betas for up markets and down markets separately as explanatory variable. They concluded that significant positive relationship exists between the beta and expected returns in an up market and significant negative relationship exists between the beta and expected returns in a down market. Incorporating the business cycle effect, the traditional CAPM equation was transformed into a new equation shown below.

$$\boldsymbol{R_{it} = \lambda_{0t} + \lambda_{1t}\beta_{1t}D + \lambda_{2t}\beta_{it}(1 - D) + \varepsilon_{it}} \qquad \textbf{(3.3)}$$

Where:

D = 1 if (R_{mt} - R_{ft}) is positive

D = 0 if (R_{mt} - R_{ft}) is negative

Fletcher (2000) tested conditional CAPM in four stock markets of the world. All the markets proved the ability of time varying conditional betas to predict stock returns. In addition, Lewellen, Nagel, & Shanken (2010) tested both conditional and unconditional CAPM and their results suggested that variation in beta and equity premium would have to be large enough in explaining important asset pricing irregularities like momentum and the value premium. Hence, they used direct estimates of conditional alphas and betas from monthly regressions and concluded that conditional CAPM does not give any differential results as compared to the unconditional counterpart of it. Likewise, Ki (2011) tested the conditional CAPM in asset pricing performance in equity market of Turkey and argued the conditional and unconditional CAPM performs in similar way in portfolio's pricing. Other researchers like Buss & Vilkov (2012) also tested the validity of an inter-temporal CAPM, under the dynamic asset pricing models framework. They imposed two conditions simultaneously on the original CAPM hence; they introduced business cycle to the time varying conditional CAPM. Additionally, they found the conditional model sufficient to explain the expected returns, especially in an up market situation. However, in a down market the conditional model did not fit well and it needed some additional factors to explain the expected returns more accurately.

Javed (2009) tested the validity of CAPM in Karachi stock exchange. Their findings were not in favor of CAPM as a mode of finding prices of financial assets in Pakistani equity market. Similarly, Bekaert, Harvey, & Lundblad (2007) tested CAPM in Indonesian stock market and suggested that CAPM fails to predict the expected returns.

3.4 Arbitrage Pricing Theory

Many researchers have worked on irregularities other than market risk premium which proved to be helpful in explaining the expected returns of the securities. An anomaly is usually a disorder or a deviation from the standard. Hence, there is a bulk of literature available on the empirical testing and confirmation of the existence of certain anomalies making towards the determination of future returns. Likewise, earning/price ratio is examined by Basu (1977) and the results revealed that high E/P ratio firms have higher returns than low E/P ratio stocks. Other researchers like Banz (1981) tried size as the mean of sorting the portfolios. Size is determined through market capitalization of the firms. The results undoubtedly suggested the surprising relationship between expected returns and size.

Bhandari (1988) found significant leverage effect in determining future returns and finally, Rosenberg, Reid, & Lanstein, (1985) & Statman (1980) documented that stocks with high B/M ratios have high average returns than those having low B/M ratio. In addition, Shefrin (2008) worked on the behavioral approach of multi factor asset pricing model and M. Baker & Wurgler (2007) added investor's sentiment to multi factor asset pricing model. Moreover, Fama & French (1993) added size and value effect to the capital asset pricing model and they investigated the role of size and value in determining the expected returns of the securities and their results confirmed a significant positive relationship of size and value premium with expected returns of the securities.

3.4.1 Size Premium, Value Premium and Equity Returns

Size refers to the market capitalization of a firm and value refers to the book-to-market ratio of a firm. When market capitalization is high, the stocks are referred to as "big stocks" while when market capitalization is low, the stocks are referred to as "small stocks". Firms bearing high B/M ratios are termed as "value stocks" while firms bearing low B/M ratios are termed as "growth stocks". Banz (1981) for the first time tested size anomaly in asset pricing model and found fitting results. He used the common stock of NYSE to empirically estimate the relationship between return and total market value of the securities. Results showed that smaller firms earn higher returns than larger firms. Likewise, Fama & French, (1993 & 1996) investigated the size and value effect using U.S data as well as international data. Both are considered as priced anomalies in the framework of risk return relationship. They applied asset pricing model to different countries and different time periods using Fama & MacBeth (1973) methodology and results confirmed the role of size and value of the firm to be predictor of securities future returns. Fama & French (1996) suggested that size and value are proxies for distress and distress firms are more exposed to business cycle risk like changes in credit ratings. The explanation given by Fama & French (1993) for this relationship is that the high returns are actually compensation for high risk inherent in distress firms (firms having small capitalization and high book-to-market ratio).

Lakonishok, Shleifer, & Vishny (1994) explored that growth stocks are as glamorous stocks than value stocks; therefore, naive investors may be attracted towards glamorous stocks which drive the prices up and lower the expected returns. Avramov & Chordia (2006) tested whether conditional asset pricing models, applied to single securities, can explain the size and value effects along with other fundamental factors. The static/unconditional form of asset pricing model did not explain the role of any of the anomalies in predicting the future returns. Only the varying beta explains the effect of size and value in determining the future returns. Fama & French (2015) presented a five-factor model which captured the value, size, investment patterns, and profitability in an average stock returns. Low returns are observed on small stocks and HML is considered to be a redundant factor which cannot explain its effect in determining future returns. Likewise, Damodaran (2015) tested market size premium, risk premium, momentum, and value premium in an emerging stock market of India. They used the panel data estimation technique to drive the risk adjusted returns of individual securities.

They tested both the unconditional and conditional form of (Fama & French, 1993) three factors and Carhart (1997) four factor models. They confirmed the existence of value anomaly in the framework of alternative unconditional and conditional form of the asset pricing models. The results are consistent with Lambert & Hübner (2013) and empirically proved that different portfolio classification methods leads to different results. They conducted a study on the stock market of Australia and found significant support regarding value premium that is only present in the biggest stocks, as compared with the results from U.S stock markets. In the same way, Mirza & Alexandre (2009) investigated the unique business and financial dynamics of the banking sector that are priced by the market and they sorted portfolios on the basis of size and value and observed maximum variation in returns.

Aldaarmi, Abbodb, & Salameh (2015) tested both the CAPM and three factor model using the generalized methods of moments in a country like Kingdom of Saudi Arabia which has some unique features as compared to other stock exchanges all over the world due to Islamic Sharia. Islamic Sharia does not allow interest and debt and even there are no taxes in Kingdom of Saudi Arabia as it is a rich country, nonetheless, there is an Islamic shara of Zakat that is 2.5% tax on net assets but not on profit. Hence, it makes very hard to apply well known models for an emerging and developing market like Saudi Arabia. Their results illustrated that Fama & French (1993) and CAPM model both explains the variation in expected returns of the securities but three factor model's explanatory power is more than the CAPM.

3.4.2 Asset Growth Premium and Equity Returns

Asset growth is defined as the percentage change in assets on a yearly basis. One explanation of the relationship between asset growth and future returns is that when a firm is involved in large investment such as acquiring building and equipments, investment in new projects, merger and acquisition, public equity and bond issuance, loan initiations, spinoffs, repurchase of shares, debt repayments & dividend payments. These activities increase the total assets of the firm, and the risky growth options are replaced by the less risky assets. This mix of assets reduces the average risk of the firm which reduces the expected returns of the firm (Cooper, 2008).

This anomaly has occupied a strong position in recent research and is empirically checked by many researchers. Berk, Green, & Naik (1999) & Kogan & Papanikolaou (2014) suggested that low growth firms yield higher expected returns. Hence, this high return is the compensation for risk borne by the investors. The justification of this argument is that organizations always maintain a blend of assets in place and growth options and likewise, growth options are relatively more risky than the prevailing assets. Every time a firm chooses to exercise growth options, the importance of growth options relative to existing assets reduce, the average risk of the asset mix is reduced because existing assets replace growth options. The overall risk is reduced after exercising the growth options. The outcome of this activity results in a negative relationship between asset growth and returns. Tobin (1969) and Yoshikawa (1980) also confirmed the negative relationship of required returns and asset growth.

Cooper, Gulen, & Schill (2008) accomplished that the phenomenon of asset growth is a strong predictor of future abnormal returns. The direction of the relationship is determined to be negative having t value of - 6.52. These results were consistent with Anderson & Garcia-Feijóo (2006); Berk, et al. (1999) & Kogan & Papanikolaou (2012). Cooper, et al.. (2008) also checked the prediction power of asset growth to predict future abnormal returns. they found a negative strong relationship between asset growth and returns. Likewise, Chui & Wei (1998) tested the same relationship in nine equity markets and found a strong negative association between the two variables. However, they further explored the relationship by scrutinizing the factors which affects the relationship between asset growth and stock return. Dominance of the banking system and dependency on debt were found to be the major causes for decline in the negative correlation between asset growth and future returns. They decomposed the total asset growth effect into corporate investment and disinvestment. On the asset side of corporate balance sheet, growth in cash and non-cash current assets, building and equipment and other fixed assets is termed as asset growth. All the non-cash components of the asset side of balance sheet predict future stock returns. On the liability side, growth in retained earnings, equity financing, debt financing, and other liabilities is attributed to asset growth. Equity and debt financing strongly predict future returns. The roe of leverage (debt and equity)in predicting future returns has been confirmed by Boguth & Simutin (2015).

The findings of asset growth anomaly have generated much research interest. Consequently, Anderson & Garcia-Feijoo (2006) found strong negative relationship between investment growth and subsequent returns. This result is consistent with the findings of Cooper, Gulen, & Schill (2006). In addition, Cooper, et al. (2008) argued that the asset growth anomaly is most consistent with investor over extrapolation of past gains to growth.

Guan & Ma (2003) also looked into the relationship. They included a firm's innovative capacity (ability of a firm to create multiple growth options from new projects) as mediator between asset growth ratio and future returns. They concluded that the negative relationship of asset growth and expected returns is not necessary in firms with high innovative capacity, because investment can generate new growth options. The negative correlation between asset growth and expected return exist only in firms with low innovative capacity. Alfaro, Chanda, Kalemli-Ozcan, & Sayek (2004) took asset growth in two dimensions: the asset growth in local markets and the asset growth in international equity markets. Both the dimensions of asset growth confirmed the negative correlation between future stock returns and growth but asset growth is followed by lower stock return in companies with higher growth in assets in international equity markets.

Levine (2001) showed the existence of asset growth effect in Australian equity market. They concluded that asset growth effect is present in largest stocks. An equally weighted portfolio of low-growth big stocks outperforms a portfolio of high-growth big stocks by an average of 13% per annum. At an individual stock level analysis, asset growth effect persists even after controlling for other fundamental factors which have significant effect on the cross section of returns. By employing Fama & MacBeth (1973) methodology, they found asset growth as a priced factor and found no evidence to support the risk based explanation for asset growth, thereby favors the existence of mispricing.

The above literature strongly favors the inclusion of asset growth premium in determining the future returns of the securities. Analyzing the results of the current study, asset growth premium has found to be the significant factor in every model tested for finding the price of financial assets. Hence the inclusion of asset growth in our proposed six factor model proved to be a wise decision.

3.4.3 Investor Sentiment and equity returns

The variables discussed above are based on the assumption of rationality where investment decision depends on all the information available to the investors. Investors may not only base their comprehensive asset allocation decision on the information available but also on their past experiences and their emotions. Sentiment cannot be overlooked while efficient allocation of resources. Likewise M. Baker & Wurgler (2006); Lee, Shleifer, & Thaler (1991); Zweig (1973) considered investor mood and psychology as their biased expectations on estimating the value of assets. Difference between the actual and perceived value of assets is considered as investor sentiment. As investor's feeling is an unobservable phenomenon therefore, researchers used proxies for its measurement. Hence, the most frequently used proxies are shares turnover, closed end fund discount (CEFD), consumer confidence index and analyst's forecasts.

Estimating investor's sentiment has remained an unsolved puzzle since 1990s. The reason is that researchers of neo-classical finance hypothesized that effect of sentiment on equity prices can be easily arbitraged away by rational investors. However De Long, et al. (1990) concluded that the effect of sentiment could persist in some stocks. They identified two types of investors: rational investors who act on the basis of information available and irrational (noise) traders who believe in their emotions and sentiments at the time of asset allocation decision. According to Brown & Cliff (2004) investors can be divided into two broad categories: individual investor and institutional investor. They further categorized investors on the basis of their size as small, medium and large investors. Individual investors are trading irrationally most of the time because they are unaware of the fundamentals of stock market. In the same way, institutional investors invest for their survival and also on behalf of other investors therefore, it is their job requirement to be well informed and they use this information in their trading behavior.

Noise traders are irrational investors in financial markets and their trading is not based on fundamental information Shiller, et al. (1984) that is affected by their sentiments. Investor's sentiment is a belief about future asset values that is not justified by the facts M. Baker & Wurgler (2007). According to noise trader theory (De Long, 1990), some assets are more heavily traded by individual investors which increases the transaction cost so that the stock prices move far away from their fundamental values. These deviations from fundamentals are not easily arbitraged away.

Fisher & Statman (2000) investigated the impact of investor's sentiment on stock returns and they suggested that investors have different behaviors. They took three types of investors: large (Wall Street strategists), medium (writers of investment newsletters) and small (individual investors). So, they gathered the data for large, medium and small investors from Merrill Lynch, Chart craft (an investment services company that publishes Investors Intelligence) and American Association of Individual Investors (AAII) respectively. They used percentage of bullish and bearish investors to measure sentiment effects and result indicates that individual investor and newsletter writers are highly correlated and they show bullish trend. The researchers found a statistically significant negative relationship of these three sentiment groups and future returns as the theory says. De Long, et al. (1990) presented a model of equity market in which there are irrational/noise and sophisticated traders. The noise traders have erroneous beliefs which affect stock prices and earn higher expected returns than sophisticated traders. The unpredictability of noise trader's beliefs creates a risk in the prices of the assets. As a result prices diverge significantly from their fundamental values.

Similarly, Guadalupe, Kuzmina, & Thomas (2010) suggested that market is composed of three types of traders such as rational traders: whose decisions are mainly based on the fundamental knowledge, irrational traders: whose decisions are based on emotions, self-perceptions and their moods, and noise traders: who decide randomly without any logical basis. Noise traders are almost present in every equity market but their impact is more highlighted in emerging markets than in stable markets. If the market is mature enough, it can absorb the disruptions caused by noise traders and their impact will be balanced but in the case of emerging market noise trader's effect does not cancel out in aggregate.Kane, Fichman, Gallaugher, & Glaser (2009) added that in the presence of these noise traders, the risk for arbitragers increase. These noise traders have a major role in creating the disorder for rational investors. Moreover, Berger & Turtle (2012) suggested that information which is required in valuing risky securities should be authentic.

Investors require additional reward according to the level of authenticity of information. They require more compensation for holding assets with less transparent information and such types of securities are prone to sentiment. The researchers have examined the extent to which investor sentiment is priced in an asset pricing model. Using the model of conditional asset pricing, the researchers found negative relationship between investor sentiment and the marginal performance of solid stocks.Nazir, Nawaz, Anwar, & Ahmed (2010) studied the association of investor sentiment with stock market volatility in Karachi stock exchange. They concluded that stock prices are influenced by investor sentiment and that investors should consider investor sentiment along with other fundamental variables to estimate stock prices. Mendel & Shleifer (2012) presented a model in which rational but uniformed traders choose noise as if there is any piece of real information present in noise. Hence, these uninformed traders increase the effect of sentiment shocks, thus moving the prices far away from their fundamental values. Noise traders can affect the market prices more than their proportion in the market. W. Baker & Dumont (2014) argued that individual investors are less informed than institutional/sophisticated investors. Individual investor takes less time to take decision about investment activities as compared to institutional investors because of the small size of information with individual investors. Thus, confirming the effect of noise traders on the expected returns of the securities.

M. Baker & Wurgler (2006) argued that during high sentiment period, investors are willing to pay more prices for the securities than their expected price. This high sentiment motivates the issuers of the equity to issue new equity shares to get higher prices. Their study revealed that there is a strong association between the equity shares in new issues and expected returns. They also considered mispricing as the reason of variation in stock returns. Moreover, Yacob (2010) used investor's intelligence sentiment index as proxy for investor sentiment. In the same way, they employed GARCH model to test the impact of noise traders risk on both the volatility and expected returns.

Lowry (2003) examined the determinants of IPO (initial public offering) volume and there are various reasons behind the fluctuations in IPO volume. Hence, sentiment is considered as the main reason behind the level of IPO volume. During high sentiment regime, investors are optimistic which motivate IPOs and SEOs (secondary equity offerings). Heavy costs are required for conducting an IPO or SEO. Firm's decision regarding the volume of IPO or SEO will therefore be based upon the cost of conducting these offerings. Sometimes investors are excessively enthusiastic and confident that they pay unnecessary attention to the firms than they worth. The cost of conducting an IPO is very low during such high sentiment times. Subsequently more firms find this time suitable for going public. In contrast, during low sentiment period, investors pay less attention to firms than they are worth which leads to a very few number of IPOs. Their results indicated that firm's demand for capital and investor sentiments are the most significant determinants of IPO volume.

Brown & Cliff (2005) also used multiple proxies to measure sentiment. They used the ratio of number of firms that are issuing more equities to number of firms that are reducing their equity share, ratio of short sales to total sales, ratio of new highs to new lows, change in the net position in SPX futures by trader type, expected option volatility to current volatility ratio, ratio of odd-lot sales to purchases, closed-end fund discounts, proportion of fund assets held in cash, first day returns on IPOs, and number of IPOs. W. Baker & Dumont (2014) created a sentiment index based on widely used six proxies rather than using a single measurement for investor sentiment. The six proxies they use are: closed-end fund discounts, turnover of NYSE shares, number of IPOs, first day returns on IPOs, equity shares in new issues, and the dividend premium. These proxies are regressed on macroeconomic variables to remove the effect of fundamental macroeconomic news. Principal component analysis is used to determine the common component into an average index.

Ding, Wang, Lee, Hung, & Lin (2014)investigated that how stock market is affected by investor sentiment over time. In current study, noise trading is discussed in which investors have no fundamental knowledge about stocks and they are investing as irrational investors. They use market indicators which include the turnover rates of trading shares, trading value and transaction as proxies of investor sentiment. It is observed that most of the investments are done by short selling instead of cash selling. When noise traders are optimistic they participate aggressively and bet on rising stock and vice versa. The ratio of market to book value and the short selling turnover ratio are considered to be inappropriate proxies for measuring investor sentiment. Moreover Oprea & Brad (2014)investigated the relationship between investor sentiment and stock returns in Romania stock exchange. In the same way, they used consumer confidence index as proxy for investor sentiment and find positive correlation between changes in consumer confidence index and stock market returns but the effect of mispricing is removed by arbitragers within a month.

Edmans, Garcia, & Norli (2007) investigated the impact of individual investor sentiment on Istanbul Stock Exchange and they further investigated whether investor sentiment, stock returns and volatility are related. They used the Turkish consumer confidence index as a proxy for individual investor sentiment. First the macroeconomic variables are regressed against investor sentiment and then the effect of unanticipated movements in investor sentiment is examined on both stock returns and volatility. Hence, the findings showed that unexpected changes in rational and irrational sentiments have a positive significant impact on ISE returns. The study also documented that investors are optimistic about the overall economy of Turkey. This optimism leads to reduction in risk and in turn reduces the volatility. Furthermore, (Yiwei Zhao, 2015) investigated the same relationship in Chinese stock market that has a bulk of individual investors trading on the floor of the market. They played a more central role in stock trading than in Western countries. Therefore, results indicated that individual investor behavior exhibits a short term effect and small cap stocks exhibit short term gain inertia.

Coakley, Dotsis, Liu, & Zhai (2014) examined the relationship between both individual and institutional investor sentiment measures and the risk-neutral skewness of seven stock index options comprising of either growth or value stocks. Hence, results depicted that growth options are significantly positively related to investor sentiment while a negative relationship exist between sentiment measures and value index options. Applying these results yield high abnormal returns and zero exposure to systematic risk. Therefore, an investor sentiment anomaly exists in the index options market.

In current study, turnover intention is used as a proxy for investment sentiment. Many researchers have proved the validity of turnover ratio as a measure for sentiment like M. Baker & Stein (2004) used trading volume as a proxy for investor sentiment and they developed a model which explains why increase in trading volume predict lower future returns in both firm-level and aggregate data. They also divided the investors into two classes: rational and irrational. According to Baker and Stein, in the presence of short-sale impediments, high liquidity is a symptom of presence of these irrational/noise traders. They found high correlation in aggregate equity issuance and share turnover and both have predictive power for estimating future returns. Moreover Lee & Swaminathan (2000) & Shiller, et al. (1984) also suggested to use turnover in place of investor sentiment. With the entry of any positive news regarding a specific firm in the market, investors during high sentiment period will take a long position on that firm and share prices will move upward. Therefore, returns will move downward. Thus, it is evident that trading volume reflects investor's expectations, beliefs and moods.

Chuang, Ouyang, & Lo (2010) studied the effect of irrational investors on the returns of stocks listed in Taiwan Stock exchange. They used change in trading volume as proxy for investor sentiment and found a significant impact of irrational sentiment on stock returns. While, Sun & Tong (2000) examined the effect of net individual trading on stock returns in Taiwan Stock Exchange and found a negative relationship between individual trading and future stock returns. They further found that these individual traders are considered as noise traders. Uygur & Tas (2012) used the daily and weekly trading volumes as proxy of investor sentiment and found contradictory results and suggested a positive relationship between investor sentiment and conditional volatility of stock returns during high sentiment period. Investor sentiment has negative effect on volatility of returns during low sentiment period and high volatility leads to higher returns. Thus, we can deduce from the above two findings that high sentiment leads to higher returns unlike the theoretical relationship between sentiment and expected returns.

Stocks should be made available to institutional investors through additional IPOs and SEOs, so that the number of noise traders participating in the trading activity is reduced. It will reduce the pressure of noise traders and investor sentiment on the prices and their volatility. Joseph, et al. (2011)argued that online ticker search is a valid proxy for investor sentiment in Istanbul stock exchange. They examined the ability of online ticker search to forecast abnormal returns and trading volumes.

MacKinlay (1995) argued that when investor sentiment is high, they become overconfident which is reflected in high trading volume and liquidity. High liquidity thus reflects the high participation of these overconfident investors in the trading process which ultimately is a reason of high investor sentiment. It can be inferred from the above argument that during the period of high sentiment, a large number of overconfident investors will participate in the trading process which leads to higher investor heterogeneity Harris & Raviv (1993) & Karpoff (1986). Furthermore, Bekaert, et al. (2003) suggested that investor heterogeneity contributes to trading volume. It is thus conceivable that when investor sentiment is high, trading volume is likely to increase and expected returns are likely to decrease.

3.4.4 Media Coverage and Equity Returns

Media coverage of firms play important role in publicizing information to the investors in general and individual investors specifically. Individual investors get informed about the companies and stock market through this news. Efficient market hypothesis shows that this news information should not affect security prices. However, in recent years a significant relationship between media coverage and security returns has been found. Signaling hypothesis also postulates that the announcement or news have an effect on the investors and give signals about certain decisions. Keeping in view the above argument, this study examines the role of media coverage premium in predicting future returns of the securities.

The relationship of media coverage and stock returns has been established by the work of L. Fang & Peress (2009). They suggested that no-media coverage firms earn higher returns than high-media coverage firms in order to compensate investors for bearing information risk. An inverse relationship of media coverage and expected returns has been found. If media coverage is proved as a priced variable then the company's cost of capital will be reduced. Therefore, investors' and company executives' should recognize the importance of media coverage as it plays an important role in disseminating information and firm's public relations. Stocks with little coverage have a narrow investor base and the idiosyncratic risk is not diversified away. Similarly, diversified/well informed investors earn a higher premium by investing into stocks with no or low media coverage. Vega (2006) found a positive correlation between media coverage and analyst forecast dispersion. Whereas, Diether, Malloy, & Scherbina (2002) suggested that stock with higher analyst forecast dispersion yield lower future returns. Thus, it can be inferred from the above two researches that media coverage premium has a negative impact on future returns of the securities.

Theory provides two main reasons for the no-media premium in the cross-sectional returns of firms having no media coverage. One is the famous risk return trade-off for imperfect information base of investors. If investors are not well informed (irrational traders) then as a consequence, investors will require higher expected returns for their holders for being poorly diversified. This is also called as the "investor recognition hypothesis" advanced by Merton, (1973b). Another explanation is based on the mispricing: the no-media coverage premium can be arbitraged away by arbitragers because they are meant to spot profits out of mispricing. A mispricing can persist only if the arbitragers are not allowed to exploit such conditions and eliminate the mispricing. This phenomenon is called as "impediments to trade" or "short sale constraint" hypothesis.

Ferguson, Philip, Lam, & Guo (2015) examined whether tone (positive and negative) and volume of firm specific media content are priced variables in determining the future returns of securities, using UK news media data from 1981-2010. They found significant impact of both tone and volume of news media content on future returns of securities with volume of media content being more powerful predictor of returns than tone. Attention is when there is any news information about stocks then investors should have paid attention to it. Likewise, Google search frequency is used as proxy for investor attention because when you are searching for a stock in Google, you are undoubtedly paying attention. Their results suggest that there is a short run effect of an increase in investor attention (frequency in Google search) on stock prices but in the long run price patterns follow a reversal. Overall, the firm specific Google search frequency depicts valuable information that predicts future returns of the assets.

Similarly, Anderson & Garcia-Feijóo, (2006) revisited the ideas of Arrow et al. (2008) by studying the effect of sentiment on asset prices of the 20th century i.e. 1900-2005. The long data set contains all the variations of business cycle and they use positive and negative words of financial news as proxy for high and low sentiments respectively. They believe that investor react more to news information when they are going through hard times because a distressed person is waiting for some miracle happens in his life. Therefore, they employed a conditional asset pricing model and found that asset prices can best be predicted during recession. Peress (2014) improved his earlier work on media coverage effect on cross sectional returns. He first identified the no-media coverage firms from the overall portfolio, then the rest of the firms are divided into low-media coverage and high-media coverage firms according to the median set. The average monthly returns for stocks having no, low and high-media coverage are 1.35%, 1.11% & 0.96% and these results supported the theoretical results, where no-media coverage firms earn higher returns than media-coverage firms.

Solomon, Russell-Bennett, & Previte (2012) examined the impact of media coverage of good and bad news on stock returns of investor relation (IR) firms. Investor relation firms are a subset of public relation industry that deals specifically with a company's communication with investors, shareholders, and media. Solomon examined whether IR firms manipulate their client's news by showing a rosy picture. Manipulation is done by giving more coverage to the positive news as compared to negative news. Therefore, the results suggested that this manipulation of news increases the investor optimism which in turn increases the stock returns. Heston & Sinha, (2014) used over 900,000 news stories to test whether news can predict stock returns. In this way, they used textual information processing methodology to test the hypotheses. Hence, their results confirmed that a higher level of visibility or recognition of a firm leads to lower expected returns, since the average investor of such a firm is more broadly diversified and thus requires a lower return premium.

3.5 Order of the variables

The order of variables to be tested in multifactor asset pricing model is of utmost importance. The order of the variables is important from the view point that if we first sort the firms on the basis of size then all the size sorted portfolios will be balanced for the next sorting because every firm has market capitalization (size). If the size sorted portfolios are again sorted on the basis of media coverage then the second decile would shrink because all the firms do not have media coverage. If the sorting is done the other way round, for example, when the overall portfolio is first sort on the basis of media coverage followed by size, then the number of firms will shrink in the first deciles and fewer firms will remain for the size sort, thereby changing the average returns of the portfolios in every decile. Keeping in view the above argument, the order of variables in asset pricing equation has an important impact on the results. Changing the order of sorting will change the entire scenario of results. Hence, in current study, we have sorted the securities in the following order.

i) Market excess returns
ii) Market capitalization
iii) Book-to-market ratio
iv) Asset growth
v) Investor sentiment
vi) Media coverage

The above order is adopted because of the availability of data for maximum number of firms in each sort. First the firm specific factors are taken and then behavioral factors are listed.

3.6 Multifactor Asset Pricing Models and Pakistani Equity market

Since 1960s researchers are trying to construct a model that can be called as perfect and can be used universally to predict future returns but it is impossible because different markets have different maturity levels. A developed market can absorb various financial disorders without any major disruptions as compared to an emerging market where the fundamentals are not so mature to adapt to the changes. No model can be constructed which can predict the future returns of multiple equity markets. Similar model, if applied to multiple countries does not yield similar results. Therefore, an asset pricing models differs in predictability when applied to different equity markets. Multifactor asset pricing models are tested by many researchers in Pakistani equity market. Fama & French (1993) three factor model: a famous asset pricing model has been tested by many researchers on Pakistani equity market in different time periods.

Javid (2009) explored a set of macroeconomic variables along with market return which can affect the expected returns of the securities listed in Karachi stock exchange. They employed a conditional multifactor asset pricing model and found very little incremental result as compared to static capital asset pricing model in Karachi stock exchange. Moreover, they divided the set of variables into two categories: macroeconomic variables and information variables. The macroeconomic variables that supported the risk-return relationship in this multifactor asset pricing model are consumption growth, inflation, call money rate and term structure. However, market returns, foreign exchange risk and oil price risk have limited impact on the asset prices. They found that expected returns are high in recession because investors are not as much inclined towards risky stocks in bad times as they are in boom.

Sarwar, Hussan, & Malhi (2013)worked on ten irregularities of asset pricing model in Pakistani context. Results of market premium, size premium, investor sentiment premium and uncertainty premium confirmed significant positive impact on future returns while book to market has significant negative relationship with expected returns which confirmed the returns of overvalued stock to be higher. Likewise, earnings to price ratio and discretionary accruals and leverage proved to be non-priced in determining the cross-sectional returns and uncertainty has negative impact on expected returns of securities which confirmed the presence of noise trading in Pakistani equity returns. Khalid (2010) investigated Fama French three factor model as well as a new seven factor model to predict the cross-sections of returns of the securities listed on Karachi stock exchange. They worked on the daily returns of securities and then the excess returns are regressed on the seven explanatory variables. Both the models proved to be valid and applicable in Pakistani equity market. Addition of more explanatory variables to the single factor CAPM increases the coefficient of determination of the model, therefore, a seven factor model predict the returns more accurately than a three factor model. The risk return relationship proved to be linear for all the seven factors i.e. MKT, SMB, HML, MOM, LMH (low liquidity minus high liquidity), GBI (Govt: Bond Index) and CI (Commodity Index) and expected returns of the securities.

Hwang & Pedersen (2004) investigated the effect of value-at-risk (downside risk) on the expected returns in an emerging market, i.e., Pakistan and they found evidence of portfolios with higher value-at-risk explains higher returns. Moreover, they investigated the relationship of market, size, book to market and value-at-risk with the expected returns using a time series approach on 25 size and book-to-market portfolios. Hence, result suggested that value at risk has greater explanatory power than the market, size and book to market factors. Okeke (2015) examined the performance of the CAPM, the three-factor model, the four-factor model and their liquidity adjusted variants in explaining the expected returns in South African stock market. He also investigated the higher moments of these models. Market premium consistently remains significant for all the models along with size, momentum and liquidity. Another interesting finding is that large size firms yield more returns than small size firms which is inconsistent with the popular findings in the developed market. Okeke (2015) also worked on the conditional approach of these models by adding a dummy variable for the business cycle effect. Conditional approach enhances the model stability in up market conditions.

Gleason, Bruce Johnson, & Li (2013)examined the performance of sell side analysts based on their one year forward target price and observed that whether the actual returns can meet the target set by analysts forecast. They found unexpected results with an absolute forecast error of 65 percent and only 5 percent of the target prices were met. The analysts forecast are considered to be optimistic with target price more than the actual price. Moreover, they linked the forecast error to capital asset pricing model and report that the CAPM misprice the cost of equity resulting in optimistic target price. When CAPM was replaced with multifactor asset pricing model their target prices improved by 40%. Thus, they supported the use of multifactor asset pricing models for estimating expected returns in Pakistan where the stock market is relatively volatile.

3.7 Prediction of Industry Based Portfolio Returns

Shank (2012) worked on the industry sorted portfolios and overall portfolio simultaneously. He applied the six risk factors model on a selection of twenty industry specific portfolios. He used momentum, and short and long-term price reversals in addition to the Fama French three factor model and found it valid in predicting the returns of overall portfolio while the same model was unable to predict the industry average returns. Margin de Vries (2012) followed the same line and suggested the same results. He found both CAPM and multifactor model as better predictor of returns while these results changed when he used the average industry returns as the dependent variable. Both the CAPM and multifactor models showed a reduction in R^2 as well as a n increase in α (management's alpha) when they were applied to industry based portfolio returns. it makes the estimation of cost of equity as imprecise leading to a false selection of projects.

CHAPTER 4
DATA DESCRIPTION, SOURCE AND METHODOLOGY

4.1 Data Description and Sources

Below are explained the eight types of data points which are used in the current study.

i) End of day prices of all the financial stocks for the period June 2004 to June 2013 on monthly basis:-

Price on the last trading day of the month is taken as closing price for a month. Website of business recorder Pakistan is used to collect monthly closing prices. This is an authentic source of information. Returns on monthly basis are calculated from these prices as under:

$$\boldsymbol{R_{pt}} = \textbf{ln}\ (\boldsymbol{P_t}\ /\boldsymbol{P_{t-1}}) \qquad \text{(Eq 4.1)}$$

Where:

R_p is portfolio's monthly returns, P_t is price at month t while P_{t-1} is price at previous month. We have used the natural log returns instead of raw returns to fulfill the assumption of continuous compounding of returns.

ii) Monthly points for KSE 100 index for the period June 2004 to June 2013:

The 100 index points on the last trading day of the month are taken. Website of business recorder Pakistan is used to collect monthly index values. The formula for calculating market returns is as under:

$$\boldsymbol{R_{mt}} = \textbf{ln}\ (\boldsymbol{I_t}\ /\boldsymbol{I_{t-1}}) \qquad \text{(Eq 4.2)}$$

Where:

R_{mt} is market returns for month t, I_t is 100 index points at month t while I_{t-1} is 100 index points for the previous month.

iii) T-bill rate (risk free rate) for the period June 2004 to June 2013:-

A 3 month, 6 month and 12 month T-bill rates are available in Pakistan. They are annualized rates of returns on investing in a risk-free asset. The researchers can be indifferent towards the selection of anyone of them. Current study considers the 6 month T-bill rate and divided it by 1200 to get the monthly absolute T-bill figure so as to come at par to the other variables. Rate of return on treasury bills is considered as risk free rate. Selecting the 6 monthly T-bill rate does not discriminates the results if we would have used 3 month or 12 month T-bill rates as all the rates are annual and we have converted them to monthly rates by dividing them with 1200. As the stock returns are in monthly frequency, we converted the annual T-bill rate to monthly rate as well. When we converted all the three T-bill annual rates to monthly rates, there was a negligible difference between the three of them and could hardly bring any change in the results. As 6 monthly T-bill rates were frequently available throughout our data period, therefore, the reason of data availability pushed us to use the 6 monthly T-bill rates in the current study.

iv) Market capitalization of all the firms for the period June 2004 – June 2013:-

Market capitalization is a proxy for the size of the firms and is calculated through the following formula:

Market capitalization = No of outstanding shares * market value per share

Business recorder is used as a source.

v) Book to market ratio of all the firms for the period June 2004 – June 2013:-

Book value of equity is collected from the analysis report available on annual basis on KSE website.

vi) Total assets of a firm for the financial year ending June of all the non-financial companies for June 2004 to June 2013:-

Growth in total assets is calculated as under:

$$\boldsymbol{AGt} = \frac{\boldsymbol{TA_t - TA_{t-1}}}{\boldsymbol{TA_{t-1}}} \qquad \text{(Eq 4.3)}$$

Where:

AG_t is growth in assets for the year t

TA_t is Total Assets for the year t

TA_{t-1} is Total Assets for the preceding year

KSE publishes analysis reports on yearly basis. Total assets are picked up from them. They are easily available on KSE(Karachi stock exchange) website, now named as PSE(Pakistan stock exchange).

vii) Investor sentiment:-It is a non-observable phenomenon. We used turnover as a proxy, which best depicts the investor sentiment. Zweig (1973), Lee, Shleifer, Thaler (1991), Baker and Stein (2004) and Brown and Cliff (2005) suggests that investor sentiment can be measured as the valuation differences between one group of rational investors and one group of irrational investors. Therefore when investor sentiment becomes high, investor heterogeneity would become high as well. Karpoff (1986) and Harris and Raviv (1993) suggests that investor heterogeneity contributes to trading volume. It is thus conceivable that when investor sentiment becomes high (low), trading volume is likely to increase (decrease). Website of Noormaier was used for collecting annual turnover for the period June 2007 – June 2013.

viii) Media coverage:- Business recorder contains a link for the company news, where all the news for all the companies listed on KSE is available. Media coverage is covered through the link "company news".

All the above data is collected for nine years starting 2004 to 2013.

4.1.1 Inclusion and Exclusion Criteria

i) The stocks which are traded for at least eight months during a year are included.

ii) Non-financial companies are included.

iii) Negative equity firms are excluded.

Initially 418 non-financial firms are selected but after applying the above exclusion/inclusion criteria, the number of firms shrinks for every year. Initially the data is collected for the period 2000 to 2013 but media coverage is available since 2004 only, therefore, overall data set contracts to 9 years i.e. July 2004- July 2013. The table below shows the detail of sample size for every year after applying the above exclusion/inclusion criteria.

Table 4.1: Sample Details

Year	No. of stocks
2004-2005	225
2005-2006	232
2006-2007	247
2007-2008	238
2008-2009	227
2009-2010	217
2010-2011	216
2011-2012	213
2012-2013	200

4.1.2 Why exclude non-financial firms?

It is a usual practice to exclude financial firms from the study sample while conducting asset pricing tests. Foerster and Sapp (2005) identified the valuation difference between financial and non-financial firms. They compared the results using data both including and excluding financial firms. The main reason of excluding the non-financial firms from the sample is that these firms usually have a greater leverage and higher sensitivity towards financial risk. They conducted the asset pricing tests on countries having large size of financial sector i.e. G7 countries, Netherlands & Switzerland. They concluded that excluding financial firms from the sample changed the results of the asset pricing model when both the financial and non-financial sectors were added to the sample for testing. Excluding financial firms from the sample changed the impact and significance of the variable which was earlier believed to be insignificant when both the financial and non-financial firms were included in the sample. They concluded that the estimated betas of some of the variables were significantly negative for the financial firms while they were significantly positive for many of the non-financial firms. They accepted some models according to Fama Macbeth (1973) methodology when financial firms are included in the sample but the same models were rejected when they excluded financial firms from overall sample of the study. Therefore, they suggested the researchers to avoid using financial and non-financial firms simultaneously when constructing portfolios for asset pricing models.

4.2 Methodology

Fama MacBeth (1973) methodology is the most common methodology for testing multifactor asset pricing models. It is also known as two pass regression. In this research, we will test ten asset pricing models and will see their significance. The Fama MacBeth methodology is applied first on single factor model, then on two factor models (adding all the factors one by one with CAPM), then on Fama French three factor model and finally on proposed six factor model. A total of 10 models will be tested through Fama Macbeth methodology. Below is the detail of the models.

4.2.1 Single Factor Model (CAPM)

The model is shown econometrically as:

$$\boldsymbol{R_{pt} - RFR = \alpha_t + \beta_1(R_{mt} - RFR_t) + \mu_t} \qquad \text{(Eq 4.4)}$$

Where:

R_{pt}-RFR = asset returns i for the period t in excess of Rfr

$R_{mt} - RFR_t$= market returns for the period t in excess of Rfr

μ_t= error term

Fama Macbeth (1973) bifurcate the data set into two periods: the beta estimation period and returns testing period. The data bifurcation is as shown in the following table.

Table 4.2: Estimation and Testing period

Description	Time periods
Period for estimating beta	July 2004-June 2007
Period for calculating premium	July 2007- June 2013

Three years i.e. 36 months are considered to estimate beta. Beta can be obtained by implying two different methods. It can be estimated by regressing realized returns (R_{it}-RFR) of an asset with the corresponding market return (R_m-RFR). The second method is to apply the following:

$$\boldsymbol{\beta = Cov(R_{i,m})/Var\ (R_m)} \qquad \text{(Eq 4.5)}$$

Beta for each month, by applying this formula is calculated. Previous overlapping 36 month returns are used. As both the formulas give the same results, second method being simpler and appropriate has been implied by this study for beta estimation. The resulting beta is regressed against R_{it}-RFR. Generally this regression takes the following form:

$$\boldsymbol{R_{pt} - RFR = \lambda_{ot} + \lambda_{1t}\beta_{it} + \mu_{it}} \qquad \text{(Eq 4.6)}$$

Where:

$R_{pt} - RFR$ are returns of portfolio for the period t in excess of risk free rate

β_{it} is the beta estimated through equation 4.5.

λ_{0t} and λ_{1t} denotes the management's alpha and market premium respectively.

μ_{it} is the error term

Equation 4.6 depicts that the intercept is zero. CAPM's applicability is conditional upon a significant positive value of λ_{1t}. Results can be determined by a cross sectional regression.

Current study encompasses 108 months i.e. from July 2004 – June 2013, the first β_i will be available in the 37^{th} month i.e. July 2007 because 36 months (three years) are taken as the estimation period. According to Fama Macbeth, the second pass is run on the remaining months (72 months from July 2007 – June 2013).

4.2.2Two Factor Model (CAPM & size premium)

Two factor model explores the impact of market premium and size premium on the future returns of the securities. Theoretically, small market capitalization stocks earn higher returns than big market capitalization stocks. The econometric model for our two factor model is as follows:

$$\boldsymbol{R_{pt} - RFR = \alpha \quad + \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \mu_t} \qquad \text{(eq 4.7)}$$

Where:

R_{pt}-RFR = returns of portfolio i for the period t in excess of risk free rate

$R_{mt} - RFR_t$= market returns for the period t in excess of risk free rate

SMB_t = returns of small stocks minus returns of big stocks

μ_t= error term

According to Fama MacBeth (1973) procedure the data is bifurcated into two periods: the period in which beta is submitted and the period in which it is testing. The data is organized in three columns i.e. $(R_{pt} - RFR)$, $(R_{mt} - RFR_t)$& (SMB_t).

The first and second columns are self explanatory. Third column contains the market capitalization of 285 stocks at the end of June for the previous year and then stocks are arranged in descending order to get two size sorted portfolios. The portfolio on the top i.e. having high market capitalization is named as big firms and the portfolio beneath the top portfolio is named as small firm. This process is repeated each year. Now for the portfolios created at the end of previous year, monthly portfolio returns are calculated for year "t". Size premium is calculated as under:

$$SMB = R_{small\ stocks} - R_{big\ stocks} \qquad \text{(eq 4.8)}$$

Where:

SMB= Returns of small portfolio minus the returns of big portfolio.

Every year size premium is calculated in the same way.

4.2.3 Two Factor Model (CAPM & value premium)

This model explores the impact of market premium and value premium on the future returns of the securities. Theoretically, high book to market stocks earn higher returns than low book to market stocks. The econometric model for the second two factor model is as follows:

$$R_{pt} - RFR = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(HML_t) + \mu_t \quad \text{(eq 4.9)}$$

Where:

R_{pt}-RFR = returns of portfolio i for the period t in excess of risk free rate

$R_{mt} - RFR_t$= market returns for the period t in excess of risk free rate

HML_t= returns of high B/M stocks returns of low B/M stocks

μ_t= error term

The data is again bifurcated into two periods: the period in which beta is estimated and the period in which it is tested. For this model the data set is organized in the following three columns i.e. $(R_{pt} - RFR_t)$, $(R_{mt} - RFR_t)$& (HML_t).

First and second columns are self explanatory. Third column contains the book to market ratio of 285 stocks at the end of June for the previous year and then stocks are arranged in descending order to get two value sorted portfolios. The portfolio on the top i.e. having high book to market ratio is named as high firms and the portfolio beneath the top portfolio is named as low portfolio. This process is repeated each year. Now for the portfolios created at the end of previous year, monthly portfolio returns are calculated for year "t". Value premium is calculated as under:

$$HML_t = R_{high\frac{b}{m}stocks,t} - R_{low\frac{b}{m}stocks,t} \quad \text{(eq 4.10)}$$

Where:

HML = returns of high B/M firms minus returns of low B/M firms

4.2.4Two Factor Model (CAPM & asset growth premium)

This model examines the association between expected portfolio returns and asset growth premium along with the market premium. Theoretically, stocks having low asset growth ratio earn higher returns than stocks having high asset growth. The econometric model for the third two factor model is as follows:

$$R_{pt} - RFR = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(AG_t) + \mu_t \quad \text{(eq 4.11)}$$

Where:

R_{pt}-RFR = returns of portfolio p for the period t in excess of risk free rate

R_{mt} – RFR_t= market returns for the period t in excess of risk free rate

AG_t= returns of stocks with low asset growth minus returns of stocks with high asset growth

μ_t= error term

Fama MacBeth (1973) procedure says to divide the data into two periods: the period in which the beta is estimated and the period in which it is tested. For this model the data set is organized in three columns i.e. $(R_{pt} - RFR_t)$, $(R_m - RFR_t)$& (AG_t).

The first and second columns are self explanatory. Third column contains the market asset growth ratio of 285 stocks at the end of June for the previous year and then stocks are arranged in descending order to get two asset growth sorted portfolios. The portfolio on the top i.e. having high asset growth ratio is named as high asset growth firms and the portfolio beneath the top portfolio is named as low asset growth portfolio. This process is repeated each year. Now for the portfolios created at the end of previous year, monthly portfolio returns are calculated for year "t". Asset growth premium is calculated as under:

$$AG_t = R_{low\ AG,t} - R_{high\ AG,t} \qquad \text{(eq 4.12)}$$

Asset growth ratio is calculated through the following formula

$$AGt = \frac{TA_t - TA_{t-1}}{TA_{t-1}} \qquad \text{(eq 4.13)}$$

Where:

TA_t is total assets for the year t (current year)

TA_{t-1} is total assets for the year t-1 (previous year)

4.2.5Two Factor Model (CAPM & investor sentiment premium)

This model explores the relationship between investor sentiment premium and expected portfolio returns along with the market premium. Theoretically, low sentiment stocks earn higher returns than high sentiment stocks. The econometric model for the fourth two factor model is as follows:

$$R_{pt} - RFR = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(IS_t) + \mu_{it} \quad \text{(eq 4.14)}$$

Where:

R_{pt}-RFR = returns of portfolio i for the period t in excess of risk free rate

R_{mt} – RFR_t= market returns for the period t in excess of risk free rate

IS_t= returns of low sentiment stocks minus returns of high sentiment stocks

μ_t = error term

Fama MacBeth (1973) procedure says to divide the data into two periods: the period in which the beta is estimated and the period in which it is tested. For this model the data set is organized in three columns i.e. $(R_{pt} - RFR_t)$, $(R_{mt} - RFR_t)$& (IS_t).

The first and second columns are self-explanatory. Earlier, we decided to use the six proxies of sentiment used by Baker & Wurgler (2006). They used closed end fund discount, share turnover, number of IPOs, IPOs first day returns, share of equity issues in total issues and dividend payers and non-payers ratio as proxies for investor sentiment because it cannot be observed directly. When it comes to practical data collection phase, it was not possible to have all the proxies except share turnover because all the factors used in asset pricing model are collected on last trading day of June for the year t-1, while the above mentioned proxies except share turnover were not available on 30th June for the year t-1. Every proxy has its different date and time of occurrence. Finally, it was decided to use share turnover as the proxy for investor sentiment. Datar, Naik, and Radcliffe (1998), Rouwenhorst (1999), Bekaert, Harvey, and Lundblad (2003) and Joseph, Wintoki, and Zhang (2011) used turnover as proxy for investor sentiment.

Investor sentiment is calculated by sorting the individual stocks according to share turnover ratio. Following formula provides the calculation of turnover ratio of each stock

Turnover ratio = total turnover during last twelve months/total outstanding shares (eq 4.15)

Stocks are organized in ascending order. Median is calculated and these stocks are separated into two portfolios. The upper portfolio is called "low sentiment" that have turnover ratio lower than the median. The lower portfolio is termed as "high sentiment" that have turnover ratio higher than the median. This process is repeated each year. Now the monthly average returns are calculated for all stocks in the portfolio. Then returns of "high sentiment" portfolios are subtracted from the returns of "low sentiment" portfolio to get IS premium as shown below:

$$\boldsymbol{IS_t = R_{low\ sentiment\ stocks} - R_{high\ sentiment\ stocks}} \qquad \text{(eq 4.16)}$$

4.2.6 Two Factor Model (CAPM & media coverage premium)

This model explores the impact of market premium and media coverage premium on the future returns of the securities. Theoretically, stocks which have no media coverage earn higher returns than stocks which have media coverage. The econometric model for the fifth two factor model is as follows:

$$\boldsymbol{R_{pt} - RFR = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(MC_t) + \mu_t} \qquad \text{(eq 4.17)}$$

Where:

R_{pt}-RFR = returns of portfolio p for the period t in excess of risk free rate

$R_{mt} - RFR_t$= market returns for the period t in excess of risk free rate

MC_t= returns of stocks having no media coverage minus returns of stocks having media coverage

μ_t = error term

Fama MacBeth (1973) procedure says to divide the data into two periods: the period in which the beta is estimated and the period in which it is tested. For this model the data set is organized in three columns i.e. $(R_{pt} - RFR)$, $(R_{mt} - RFR_t)$ & (MC_t).

The first and second columns are self-explanatory. Media coverage is calculated by sorting the individual stocks according to news. Data regarding number of news for each stock is collected at the end of June for year t-1 from business recorder through a link known as "company news". Stocks are then custom sort according to two criteria: firms having no news and firms having news (avoid the number of news). The earlier portfolio is called "NMC": are the firms which have no media coverage. The later portfolio is termed as "MC": are the firms which are being covered by media. This process is repeated each year. Now the monthly average returns are calculated for all stocks in the portfolio. Media coverage premium is calculated through the following formula:

$$\boldsymbol{MC_t = R_{NMC\ stocks,t} - R_{MC\ stocks,t}} \qquad \text{(eq 4.18)}$$

4.2.7 Fama French Three Factor Model

Fama & French criticized CAPM for its single factor explaining the equity returns. Fama & French added two more factors i.e. size premium and value premium to the single factor asset pricing model to predict the expected returns of the portfolio. For size sorted portfolios, market capitalization of each stock is calculated at the end of June for the year t-1 and then stocks are arranged in ascending order. Now median is calculated and sample is divided into two portfolios. First portfolio comprises of the stocks that have market capitalization less than the median and is named as "small" and the other portfolio which have market capitalization greater than the median is named as "big".

These size sorted portfolios are further sort in descending order into two parts on the basis of B/M ratio. The small is further subdivided into two parts and new portfolios will be formed. These new portfolios will have two characteristics in it: they are "S/H & S/L". Similarly, the "Big" portfolio is further subdivided into two portfolios. These new portfolios will again have two characteristics in it: they are "B/H & B/L".

To isolate the factor premiums from each other, the three factors are constructed as follows:

MKT = R_{mt}- R_{fr}

SMB= ½* [(S/H – B/H) + (S/L – B/L)]

HML= ½* [(S/H – S/L) + (B/H – B/L)]

The algebraic relationship of Fama French three factors is given below:

$$\boldsymbol{R_{pt} - R_{ft} = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(\mathbf{SMB}) + \beta_3(\mathbf{HML}) + \mu_t} \quad \text{(eq 4.19)}$$

Where:

$R_{pt} =$ returns of portfolio p for period t

R_{ft}= risk free rate. Monthly T. bill rate has been used as proxy for risk free rate.

α_t= Management's alpha

R_{mt}= ln (I_t/I_{t-1})

I_t and I_{t-1} are closing values of KSE-100 index for the month "t" and "t-1" respectively.

SMB_t= ½* [(S/H – B/H) + (S/L – B/L)]

HML_t= ½* [(S/H – S/L) + (B/H – B/L)]

4.2.8 Asset Growth based Four Factor Model

A new anomaly named "Asset Growth" is added to the Fama French three factors to test its ability to determine future prices. This risk factor is calculated by applying the following formula as described in section 4.1:

$$AGt = \frac{TA_t - TA_{t-1}}{TA_{t-1}}$$

Where:

AG_t is growth rate of assets for year t

TA_t is total assets for year t

TA_{t-1} is total assets for the preceding year

Cooper, Gulen, and Schill (2008) demonstrate that firms whose total assets are increased yield lower subsequent returns. In the last decade asset growth rate appears to be a priced variable in predicting future returns of the securities and exhibit that there is a negative relationship between asset growth premium and future returns. This relationship can be explained using systematic risk approach i.e. firms with relatively higher asset growth are associated with relatively lower risk. When a firm takes such steps which increase the total asset base of the firm, risky assets are replaced with less risky assets in place and average firm risk will be lower and, therefore, the returns will be lower. Another reason for this anomaly is related to mispricing. Investors over estimates the firms which are involved in investments, merger and other growth activities, therefore, the prices goes up lowering the returns, hence lowering the risk.

Keeping in view the above arguments, asset growth premium can be calculated as:

$$\mathbf{AG_t = R_{low\ AG\ stocks,\ t} - R_{high\ AG\ stocks,\ t}}$$

The asset growth premium is created by further dividing the portfolios created in section 4.2.7 on the basis of asset growth. The portfolios created in section 4.2.7 i.e. “S/H, S/L, B/H & B/L” are further sort in ascending order on the basis of “Asset Growth” to get new portfolios named: S/H/HAG, S/H/LAG, S/L/HAG, S/L/LAG, B/H/HAG, B/H/LAG, B/L/HAG & B/L/LAG.

S is for small stocks

B is for big stocks

H is for high B/M stocks

L is for low B/M stocks

HAG is for high asset growth stocks

LAG is for low asset growth stocks.

To isolate the factor premium from each other, market premium, size premium, value premium and asset growth premium are constructed as under:

$MKT_t = R_{mt} - R_{fr}$

SMB =¼*[(S/H/HAG – B/H/HAG) + (S/H/LAG – B/H/LAG) + (S/L/HAG – B/L/HAG) + (S/L/LAG – B/L/LAG)]

HML = ¼* [(S/H/HAG- S/L/HAG) + (S/H/LAG- S/L/LAG) + (B/H/HAG - B/L/HAG) + (B/H/LAG - B/L/LAG)]

AG = ¼* [(S/H/LAG- S/H/HAG) + (S/L/LAG - S/L/HAG) + (B/H/LAG - B/H/HAG) + (B/L/LAG- B/L/HAG)]

The new asset growth based model will be

$$\boldsymbol{R_{pt} - R_{ft} = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(\mathbf{SMB}) + \beta_3(\mathbf{HML}) + \beta_4(\mathbf{AG}) + \mu_t} \quad \text{(eq 4.20)}$$

Where:

R_{pt} = returns of portfolio p for period t

R_{ft}= rate of return on a riskless investment

α_t = management's effect

R_{mt}= ln (I_t/I_{t-1})

SMB = returns of small stocks – returns of big stocks

HML = returns of high BMR stocks – returns of low BMR stocks

AG = returns of low asset growth stocks – returns of high asset growth stocks

4.2.9 Investor Sentiment Based Five Factor Model:

The equation described in section 4.2.8 is expanded by adding another anomaly to it that captures the effect of investor's sentiment on expected returns. The sentiment is measured through share turnover.

Earlier, we decided to use the Wurgler & Baker (2006) six proxies of investor sentiment. We were stuck in the practical data collection phase because five of these proxies (Closed end fund discount, number of IPOs, IPO first day returns, dividend payers and non-payers ratio, new equity issuing) were not available on 30th June every year. All of these proxies have different dates of occurrence, while we have used 30thJune as the collection date of all the fundamental factors. Therefore, the only practical proxy left is volume. Share turnover can be used as an alternate to volume. Turnover ratios for the last year are calculated and portfolios are adjusted every year.

Now each portfolio created in section 4.2.8 is further sort into two portfolios in ascending order on the basis of turnover ratio. The upper portfolio is termed as "Low Sentiment" and the lower portfolio is termed as "High Sentiment". Sixteen new portfolios will be formed as follows:

S/H/HAG/LS, S/H/HAG/HS, S/H/LAG/LS, S/H/LAG/HS, S/L/HAG/LS, S/L/HAG/HS, S/L/LAG/LS, S/L/LAG/HS, B/H/HAG/LS, B/H/HAG/HS, B/H/LAG/LS, B/H/LAG/HS, B/L/HAG/LS, B/L/HAG/HS, B/L/LAG/LS, B/L/LAG/HS.

S is for small stocks
B is for big stocks
H is for high B/M stocks
L is for low B/M stocks
HAG is for high asset growth stocks
LAG is for low asset growth stocks.
LS is for low sentiment stocks
HS is for high sentiment stocks

To isolate the factor premium from each other, variables market premium, size premium, value premium, asset growth premium and sentiment premium are constructed as under:

$MKT = R_{mt} - R_{fr}$

SMB = 1/8* [(S/H/HAG/LS-B/H/HAG/LS) + (S/H/HAG/HS-B/H/HAG/HS) + (S/H/LAG/LS - B/H/LAG/LS) + (S/H/LAG/HS - B/H/LAG/HS) + (S/L/HAG/LS - B/L/HAG/LS) + (S/L/HAG/HS - B/L/HAG/HS) + (S/L/LAG/LS - B/L/LAG/LS) + (S/L/LAG/HS - B/L/LAG/HS)]

HML = 1/8* [(S/H/HAG/LS - S/L/HAG/LS) + (S/H/HAG/HS - S/L/HAG/HS) + (S/H/LAG/LS - S/L/LAG/LS) + (S/H/LAG/HS - S/L/LAG/HS) + (B/H/HAG/LS - B/L/HAG/LS) + (B/H/HAG/HS - B/L/HAG/HS) + (B/H/LAG/LS - B/L/LAG/LS) + (B/H/LAG/HS - B/L/LAG/HS)]

AG = 1/8* [(S/H/LAG/LS - S/H/HAG/LS) + (S/H/LAG/HS - S/H/HAG/HS) + (S/L/LAG/LS - S/L/HAG/LS) + (S/L/LAG/HS - S/L/HAG/HS) + (B/H/LAG/LS - B/H/HAG/LS) + (B/H/LAG/HS - B/H/HAG/HS) + (B/L/LAG/LS - B/L/HAG/LS) + (B/L/LAG/HS - B/L/HAG/HS)]

IS = 1/8*[(S/H/HAG/LS - S/H/HAG/HS) + (S/H/LAG/LS - S/H/LAG/HS) + (S/L/HAG/LS - S/L/HAG/HS) + (S/L/LAG/LS - S/L/LAG/HS) + (B/H/HAG/LS - B/H/HAG/HS) + (B/H/LAG/LS - B/H/LAG/HS) + (B/L/HAG/LS - B/L/HAG/HS) + (B/L/LAG/LS - B/L/LAG/HS)]

The new asset pricing model will be

$$R_{pt} - R_{ft} = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(\mathbf{SMB}) + \beta_3(\mathbf{HML}) + \beta_4(\mathbf{AG}) + \beta_5(\mathbf{IS}) + \mu_t$$

(eq 4.21)

Where:

$R_{t\,=}$ returns of portfolio p for period t

R_{ft}= risk free rate

α_t = management's effect

R_{mt}= ln (I_t/I_{t-1})

SMB_t = returns of small cap stocks – returns of big cap stocks

HML_t = returns of high BMR stocks – returns of low BMR stocks

AG_t =returns of low asset growth stocks – returns of high asset growth stocks

IS_t = returns of low sentiment stocks – returns of high sentiment stocks

4.2.10 Proposed Six Factor Model:

The equation described in section 4.2.9 is expanded by adding another anomaly to it that captures the effect of media coverage on expected returns. Media coverage is measured through company news. Business recorder's website has a link named company news. It contains all type of news regarding all the companies listed on Karachi Stock Exchange. Data regarding the number of news coverage of the firms is collected. Theoretically, those firms which have got considerable media coverage should have low returns because of the information dissemination, hence prices are adjusted.

Now each portfolio created in section 4.2.9 is further custom sort into two portfolios on the basis of media coverage. One is named as "Media Coverage" and the other portfolio is named as "No Media Coverage". Thirty two new portfolios will be formed as follows:

S/H/HAG/LS/MC, S/H/HAG/LS/NMC, S/H/HAG/HS/MC, S/H/HAG/HS/NMC,
S/H/LAG/LS/MC, S/H/LAG/LS/NMC, S/H/LAG/HS/MC, S/H/LAG/HS/NMC,
S/L/HAG/LS/MC, S/L/HAG/LS/NMC, S/L/HAG/HS/MC, S/L/HAG/HS/NMC,
S/L/LAG/LS/MC, S/L/LAG/LS/NMC, S/L/LAG/HS/MC, S/L/LAG/HS/NMC,
B/H/HAG/LS/MC, B/H/HAG/LS/NMC, B/H/HAG/HS/MC, B/H/HAG/HS/NMC,

B/H/LAG/LS/MC, B/H/LAG/LS/NMC, B/H/LAG/HS/MC, B/H/LAG/HS/NMC, B/L/HAG/LS/MC, B/L/HAG/LS/NMC, B/L/HAG/HS/MC, B/L/HAG/HS/NMC, B/L/LAG/LS/MC, B/L/LAG/LS/NMC, B/L/LAG/HS/MC, B/L/LAG/HS/NMC.

S is for small stocks
B is for big stocks
H is for high B/M stocks
L is for low B/M stocks
HAG is for high asset growth stocks
LAG is for low asset growth stocks.
LS is for low sentiment stocks
HS is for high sentiment stocks
MC is for media coverage
NMC is for no media coverage

To isolate the factor premium from each other, variables market premium, size premium, value premium, asset growth premium, sentiment premium and media coverage premium are constructed as under:

MKT = R_{mt}- R_{fr}

SMB = 1/16* [(S/H/HAG/LS/MC - B/H/HAG/LS/MC) + (S/H/HAG/LS/NMC - B/H/HAG/LS/NMC) + (S/H/HAG/HS/MC - B/H/HAG/HS/MC) + (S/H/HAG/HS/NMC - B/H/HAG/HS/NMC) + (S/H/LAG/LS/MC - B/H/LAG/LS/MC) + (S/H/LAG/LS/NMC - B/H/LAG/LS/NMC) + (S/H/LAG/HS/MC - B/H/LAG/HS/MC) + (S/H/LAG/HS/NMC - B/H/LAG/HS/NMC) + (S/L/HAG/LS/MC - B/L/HAG/LS/MC) + (S/L/HAG/LS/NMC - B/L/HAG/LS/NMC) + (S/L/HAG/HS/MC - B/L/HAG/HS/MC) + (S/L/HAG/HS/NMC - B/L/HAG/HS/NMC) + (S/L/LAG/LS/MC - B/L/LAG/LS/MC) + (S/L/LAG/LS/NMC - B/L/LAG/LS/NMC) + (S/L/LAG/HS/MC - B/L/LAG/HS/MC) + (S/L/LAG/HS/NMC - B/L/LAG/HS/NMC)]

HML = 1/16* [(S/H/HAG/LS/MC - S/L/HAG/LS/MC) + (S/H/HAG/LS/NMC - S/L/HAG/LS/NMC) + (S/H/HAG/HS/MC - S/L/HAG/HS/MC) + (S/H/HAG/HS/NMC - S/L/HAG/HS/NMC) + (S/H/LAG/LS/MC - S/L/LAG/LS/MC) + (S/H/LAG/LS/NMC - S/L/LAG/LS/NMC) + (S/H/LAG/HS/MC - S/L/LAG/HS/MC) + (S/H/LAG/HS/NMC - S/L/LAG/HS/NMC) + (B/H/HAG/LS/MC - B/L/HAG/LS/MC) + (B/H/HAG/LS/NMC - B/L/HAG/LS/NMC) + (B/H/HAG/HS/MC - B/L/HAG/HS/MC) + (B/H/HAG/HS/NMC - B/L/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/L/LAG/LS/MC) + (B/H/LAG/LS/NMC - B/L/LAG/LS/NMC) + (B/H/LAG/HS/MC - B/L/LAG/HS/MC) + (B/H/LAG/HS/NMC - B/L/LAG/HS/NMC)]

AG = 1/16* [(S/H/LAG/LS/MC - S/H/HAG/LS/MC) + (S/H/LAG/LS/NMC - S/H/HAG/LS/NMC) + (S/H/LAG/HS/MC - S/H/HAG/HS/MC) + (S/H/LAG/HS/NMC - S/H/HAG/HS/NMC) + (S/L/LAG/LS/MC - S/L/HAG/LS/MC) + (S/L/LAG/LS/NMC - S/L/HAG/LS/NMC) + (S/L/LAG/HS/MC - S/L/HAG/HS/MC) + (S/L/LAG/HS/NMC - S/L/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/H/HAG/LS/MC) + (B/H/LAG/LS/NMC - B/H/HAG/LS/NMC) + (B/H/LAG/HS/MC - B/H/HAG/HS/MC) + (B/H/LAG/HS/NMC - B/H/HAG/HS/NMC) + (B/L/LAG/LS/MC - B/L/HAG/LS/MC) + (B/L/LAG/LS/NMC - B/L/HAG/LS/NMC) + (B/L/LAG/HS/MC - B/L/HAG/HS/MC) + (B/L/LAG/HS/NMC - B/L/HAG/HS/NMC)]

IS = 1/16*[(S/H/HAG/LS/MC - S/H/HAG/HS/MC) + (S/H/HAG/LS/NMC - S/H/HAG/HS/NMC) + (S/H/LAG/LS/MC - S/H/LAG/HS/MC) + (S/H/LAG/LS/NMC - S/H/LAG/HS/NMC) + (S/L/HAG/LS/MC - S/L/HAG/HS/MC) + (S/L/HAG/LS/NMC - S/L/HAG/HS/NMC) + (S/L/LAG/LS/MC - S/L/LAG/HS/MC) + (S/L/LAG/LS/NMC - S/L/LAG/HS/NMC) + (B/H/HAG/LS/MC - B/H/HAG/HS/MC) + (B/H/HAG/LS/NMC - B/H/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/H/LAG/HS/MC) + (B/H/LAG/LS/NMC - B/H/LAG/HS/NMC) + (B/L/HAG/LS/MC - B/L/HAG/HS/MC) + (B/L/HAG/LS/NMC - B/L/HAG/HS/NMC) + (B/L/LAG/LS/MC - B/L/LAG/HS/MC) + (B/L/LAG/LS/NMC - B/L/LAG/HS/NMC)]

MC = 1/16*[(S/H/HAG/LS/NMC - S/H/HAG/LS/MC) + (S/H/HAG/HS/NMC - S/H/HAG/HS/MC) + (S/H/LAG/LS/NMC - S/H/LAG/LS/MC) + (S/H/LAG/HS/NMC -

S/H/LAG/HS/MC) + (S/L/HAG/LS/NMC - S/L/HAG/LS/MC) + (S/L/HAG/HS/NMC - S/L/HAG/HS/MC) + (S/L/LAG/LS/NMC - S/L/LAG/LS/MC) + (S/L/LAG/HS/NMC - S/L/LAG/HS/MC) + (B/H/HAG/LS/NMC - B/H/HAG/LS/MC) + (B/H/HAG/HS/NMC - B/H/HAG/HS/MC) + (B/H/LAG/LS/NMC - B/H/LAG/LS/MC) + (B/H/LAG/HS/NMC - B/H/LAG/HS/MC) + (B/L/HAG/LS/NMC - B/L/HAG/LS/MC) + (B/L/HAG/HS/NMC - B/L/HAG/HS/MC) + (B/L/LAG/LS/NMC - B/L/LAG/LS/MC) + (B/L/LAG/HS/NMC - B/L/LAG/HS/MC)]

The asset pricing model proposed by us is as follows:

$$\boldsymbol{R_{pt} - R_{ft} = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(\mathrm{SMB}) + \beta_3(\mathrm{HML}) + \beta_{i4}(\mathrm{AG}) + \beta_5(\mathrm{IS}) + \beta_6(MC) + \mu_t} \qquad \text{(eq 4.22)}$$

Where:

R_{pt} = returns of portfolio p for period t

R_{ft}= risk free rate

α_t = management's effect

R_{mt}= ln (I_t/I_{t-1})

SMB_t = returns of small stocks – returns of big stocks

HML_t = returns of high stocks – returns of low stocks

AG_t =returns of low asset growth stocks – returns of high asset growth stocks

IS_t = returns of low sentiment stocks – returns of high sentiment stocks

MC_t = returns of no media coverage firms – returns of firms having media coverage

4.2.11 Proposed Multifactor Model for Industries:

The proposed model discussed in the previous section is now applied to all the non-financial industries to check it applicability on industries rather than market. For analyzing industry effect, there is no need to construct new industry based portfolios sorted on the basis of size, value, asset growth, investor's sentiment and media coverage. The same portfolios as used in testing the proposed model will be used. The only difference is that industry average returns instead of overall portfolio returns will be used as dependant variable. Industry specific multifactor asset pricing model is as follows:

$$R_{pt} - R_{ft} = \alpha_t + \beta_1(R_{mt} - RFR_t) + \beta_2(\mathrm{SMB}) + \beta_3(\mathrm{HML}) + \beta_4(\mathrm{AG}) + \beta_5(\mathrm{IS}) + \beta_6(MC) + \mu_{it}$$

(eq 4.23)

Where:

R_{pt} = average returns of industry portfolio for period t

R_{ft}= risk free rate

α_t = management's effect

R_{mt}= ln (I_t/I_{t-1})

SMB_t = returns of small stocks – returns of big stocks

HML_t = returns of high stocks – returns of low stocks

AG_t =returns of low asset growth stocks – returns of high asset growth stocks

IS_t = returns of low sentiment stocks – returns of high sentiment stocks

MC_t = returns of no media coverage firms – returns of firms having media coverage

CHAPTER 5

DATA ANALYSIS AND EMPIRICAL RESULTS

This chapter is organized in the following manner:

Ten asset pricing models have been empirically tested one by one and their results are mentioned. Descriptive statistics, one pass regression and finally two pass regression tests are mentioned for each of the model listed below. Correlation matrix is also calculated for all the multi factor asset pricing models. The proposed model is then applied to all non-financial industries one by one to check whether this model is industry specific.

1. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \ \mu_t$
2. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \ \mu_t$
3. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(HML_t) + \ \mu_t$
4. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(AG_t) + \ \mu_t$
5. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(IS_t) + \ \mu_t$
6. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(MC_t) + \ \mu_t$
7. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \beta_3(HML_t) \ + \ \mu_t$
8. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) \ + \ \mu_t$
9. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \mu_t$
10. $R_{pt} - R_{ft} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t$

5.1 Single Factor Model (CAPM)

Econometric model for CAPM is as shown below:

$$\mathbf{R_{pt} - R_{frt} = \alpha + \beta_1(R_{mt} - R_{frt}) + \mu_t}$$

Following table explains the descriptive statistics of the above equation.

Table 5.1: Descriptive Statistics of R_{pt}-RFR_t & R_{mt}-RFR_t

	R_{pt}-RFR_t	R_{mt}-RFR_t
Mean	-0.01229551	0.00280978
Std Deviation	0.0637942	0.08144261
Kurtosis	0.37377529	10.0371191
Skewness	-0.20070313	-2.0796885
Count	108	108

Means of portfolio returns (R_{pt}-RFR_t= -0.0123) and market premium (R_{mt}-RFR_t=0.0028) indicate a negative relationship between them. Market premium is more volatile than portfolio returns and earn more returns than securities, it may be a result of outstanding performance of Pakistani equity market during 2004 to 2013. The negative skewness (R_{pt}-RFR_t= -0.2007, R_{mt}-RFR_t= -2.0797) shows that data is not normally distributed. Both are left skewed distributions because both are less than zero. Portfolio returns are normally skewed while market returns are substantially skewed and the distribution of market return is far from symmetrical which is demonstrated by the higher standard deviation (std deviation=0.080) of market returns. Kurtosis results shows that market premium is more peaked and high values are present in it, therefore, mean is inclined towards these high values. Following table shows OLS results of CAPM.

Table 5.2: OLS Regression results

	2004-2013
Intercept	-0.0138
	(-2.949)*
R_{mt} -R_f	0.5305
	(9.2039)*
R Square	0.4586

t-values in parenthesis

* at 5% level of significance

The above regression results shows an R square of 46% which indicates that market risk premium contributes 46% variation in portfolio returns. R_{mt}-R_{ft} is the only independent variable in this model which has significant positive impact on determining portfolio's current returns. The coefficient (0.53) of R_{mt}-R_{ft} shows substantial magnitude of the impact of market returns on portfolio's returns and its t-value (9.204) shows a significant positive relationship with portfolio's current returns. Thus proving that market risk premium alone can explain upto 45% of the current portfolio returns. Jensen's alpha has also a significant negative impact on portfolio returns [t(intercept) = -2.32342].

In table 5.3, we have mentioned the empirical results of two pass (Fama MacBeth procedure) regression results for CAPM.

Table 5.3: Fama Macbeth Test Results

	2007- 2013
λ_{0t}(Intercept)	-0.059
	(-1.8)
λ_{1t}(MKT)	0.079
	(1.3)
R^2	0.03

t-values in parenthesis

Fama Macbeth procedure tests the validity of capital asset pricing model. It is hypothesized that $\lambda_{0t} = 0$ and $\lambda_{1t} \neq 0$. The above results shows that λ_{0t} i.e. Jensen's alpha has weak negative impact on portfolio returns (-0.059) and has also weak significance (t (λ_{0t}) = -1.8). λ_{1t} denotes the average market risk premium and theoretically it should be positively related to portfolio returns. Fama Macbeth test shows that results are inconsistent with the theory and λ_{1t} has no significant impact on the future returns of the portfolio, thus, failed to prove the validity of capital asset pricing model in Pakistani stock market.

It can finally be concluded that market risk premium cannot provide insight into determining the future portfolio returns. We can also relate these results with the concept of market efficiency according to which current information cannot be used to predict future returns, hence, proving the Pakistani equity market to be efficient in its weak-form during 2004-

2013.

Fama Macbeth procedure (1973) does not provide any evidence of relationship between systematic risk and portfolio risk premium. Therefore, multifactor models may be tested which can better explain the portfolio returns.

5.2Two Factor Model (Market premium & Size premium)

As discussed in the previous section, market risk premium alone failed to predict the future returns. Therefore, another firm specific factor "Size Factor" has been added to CAPM to enhance the pricing ability of the model. Size is calculated through market capitalization of the firm. Addition of size effect to CAPM will take the following form:

$$\boldsymbol{R_{pt} - R_{frt} = \alpha \quad + \ \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_t) + \ \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

R_{mt} = $Ln(I_t/I_{t-1})$

SMB_t = R_{small} - R_{big}

μ_t= error term

The chance of multicollinearity is prevalent where there are multiple explanatory variables. To check for the multicollinearity between explanatory variables, the first step is to calculate the correlation matrix for them. If there exist strong correlation between any of the two variables, then VIF (variance inflationary factor) should be calculated to check for the multicollinearity. The following correlation matrix indicates a negative correlation of 50% between market premium and size premium. It points towards the need of calculating VIF between market premium and size premium.

Table 5.4: Correlation between Market premium & Size Premium

	MKT	SMB
MKT	1	
SMB	-0.50958	1

OLS is estimated keeping market return as dependent variable while size as independent variable. VIF is calculated for the above variables through the following formula:

VIF= 1/(1-Adj R^2)

The acceptable range for VIF is from 1 to 5. The above VIF gives the value of 1.33. It eliminates the existence of multicollinearity between market premium and size premium. Therefore, these two variables can be used simultaneously as explanatory variables.

The descriptive statistics of market premium and size premium are shown below in table 5.5.

Table 5.5: Descriptive Statistics- Portfolio returns, MKT,S, B &SMB

	R_{pt}-RFR_t	R_{mt}-RFR_t	Small	Big	SMB
Mean	-0.0123	0.0028	-0.00063	-0.00331	0.00268
Std:Dev	0.0638	0.0815	0.0624	0.0634	0.0423
Count	108	108	108	108	108

The above table confirms the theoretical relationship of the returns of size sorted portfolios. Small stocks earn higher returns than big stocks. This difference is yet to be statistically proved. The standard deviation of SMB is much lower, thereby fulfilling the purpose of constructing premiums because the sole purpose of portfolio construction is to reduce the idiosyncratic volatility.OLS regression of the above equation shows the following results.

Table 5.6: OLS regression results for the two factor model

	2004-2013
Intercept	-0.0159
	(-3.8145)*
R_{mt}-R_{ft}	0.6915
	(11.6489)*
SMB_t	0.6081
	(5.3232)*
R Square	0.58

t-values in parenthesis

* at 5% level of significance

R^2 has increased to 58% in this model as compared to the single factor model (45%). It shows that size premium has increased the explaining power of the model. Size premium has a significant positive impact on the security's current returns (SMB = 0.6081, t= 5.3232). In other words, small firms earn higher returns than big firms. To augment it further, Fama Macbeth methodology is applied on the two factor model i.e. market premium and size premium. The results are presented in table 5.7 below.

Table 5.7: Fama Macbeth Test for the two factor model

	2007- 2013
λ_{0t}(Intercept)	-0.1391
	(-2.7467)*
λ_{1t}(MKT)	0.13713
	(1.5551)
λ_{2t}(SMB)	0.0474
	(1.147)
R^2	0.14

t-values in parenthesis

* at 5% level of significance

R^2 has increased to 14% in this model as compared to the single factor model (3%). This increment may be due to the Jensen's alpha role in predicting future returns because the market premium and size premium have no significant impact on determining future returns and hence are not priced. The negative Jensen's alpha may not be the indicator of poor performance of the portfolio manager but it may indicate the omitted variable case. There may be a bias in Jensen's alpha (Ferson and Warther 1996).Theoretically $\lambda_{0t}= 0$ while λ_{1t}&λ_{2t} should have significant positive impact on future returns of the securities. The results shows opposite results hence two factor model is not valid in Pakistani equity market because of contradicting results.

Table 5.8 reports the statistical significance of the difference between returns of size sorted portfolios and market returns. Panel 1 exhibits difference between average returns of small and big size portfolios and its statistical significance. Panel 2 exhibits the difference between the average returns of small portfolio and market returns and its statistical significance. Panel 3 shows the difference between the average returns of big portfolio and market returns and its statistical significance.

No statistical difference was found in either of the panel which shows that both small and big size portfolios failed to outperform the market. Panel 1 result also indicates that small firm's returns are not statistically different from the returns of big firms.

Table 5.8: Comparison between returns of Size Sorted Portfolios & Market Returns

	R(Small)	***R(Big)***	$R_{mt}-R_{ft}$	***Difference***
Panel 1	-0.00063	-0.00331		0.00268 (0.64)
Panel 2	-0.00063		0.0028	-0.0034 (-0.4656)
Panel 3		-0.00331	0.0028	-0.00612 (-1.324)

t-values in parenthesis

5.3Two Factor Model (Market premium & Value Premium)

As size premium failed to predict the future returns, another firm specific factor "Value Factor" is tested this time along with market premium to check the pricing ability of the new asset pricing model. Value is calculated through B/M ratio of the firm. Addition of the value effect to CAPM will take the following form:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \quad + \beta_1(R_{mt} - RFR_t) + \beta_2(HML_t) + \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

$R_{mt} = Ln(I_t/I_{t-1})$

$HML_t = R_{high\ B/M}$ $-R_{low\ B/M}$

μ= error term

The chance of multicollinearity is prevalent where there are multiple explanatory variables. To check for the multicollinearity between explanatory variables, the first step is to calculate the correlation matrix for them. If there exist strong correlation between any of the two variables, then VIF (variance inflationary factor) should be calculated to check for the multicollinearity. The following correlation matrix indicates no strong relationship between any of the variables.

Table 5.9: Correlation Matrix-Market premium & Value Premium

	$\boldsymbol{R_{mt}\text{-}RFR_t}$	***HML***
$\boldsymbol{R_{mt}\text{-}RFR_t}$	1	
HML	-0.0049	1

It eliminates the existence of multicollinearity between market premium and value premium. Therefore, these two variables can be used simultaneously as explanatory variables. Descriptive statistics of Portfolio returns, MKT, High, Low & HML are shown below in table 5.10.

Table 5.10: Descriptive Statistics for Market Premium & Value Premium

	R_{it}-RFR_t	R_{mt}-RFR_t	*High*	*Low*	*HML*
Mean	-0.0123	0.0028	0.00215	-0.0062	0.008341
Std Dev:	0.0638	0.0815	0.0675	0.0558	0.0365
Count	108	108	108	108	108

The above table confirms the theoretical relationship of the returns of B/M sorted portfolios. High stocks earn higher returns than low stocks. This difference is yet to be statistically proved. The standard deviation of HML is much lower, thereby fulfilling the purpose of constructing premiums. OLS of the above equation shows the following results.

Table 5.11: OLS regression results for the two factor model

	2004-2013
Intercept	-0.0182
	(-4.123)*
R_{mt}-R_{ft}	0.5316
	(10.045)*
HML	0.524
	(4.4291)*
R Square	0.55

t-values in parenthesis

* at 5% level of significance

R^2 is 55% in this model as compared to the previous two factor model (58%). It shows that size premium has more contribution towards explaining the returns than value premium. But as evident, value premium has also got a significant positive impact on the security's current returns (HML = 0.524, t= 4.429), therefore, we cannot avoid the contribution of value premium towards current returns. In other words, firms having high B/M ratio outperforms the firms having low B/M ratio. To augment it further, Fama Macbeth methodology is applied on the two factor model. The results are presented in table 5.12 below.

Table 5.12: Fama Macbeth Test for the two factor model

	2007- 2013
λ_{0t}*(Intercept)*	-0.0946
	(-2.1949)*
λ_{1t}*(MKT)*	0.0745
	(0.9412)
λ_{2t}*(HML)*	0.0852
	(2.4576)*
R^2	0.111

t-values in parenthesis

* at 5% level of significance

Value premium has proved to be a priced variable because it has statistically significant positive impact on the portfolio's future returns. Investors can predict the future returns on the basis of B/M ratio of a firm. The risk returns relationship is proved to be positive.

Table 5.13 reports the statistical significance of the difference between returns of B/M sorted portfolios and market returns. Panel 1 exhibits difference between average returns of high and low portfolios and its statistical significance. Panel 2 exhibits the difference between the average returns of high portfolio and market returns and its statistical significance. Panel 3 shows the difference between the average returns of low portfolio and market returns and its statistical significance.

Panel 1 document substantial "Value Effect" in portfolio's returns over our sample period. Firms with high B/M ratio earn subsequent risk adjusted returns of 0.2% on average while firms with low B/M ratio earns -0.6% returns. The 0.8% spread is highly significant. In other words, the returns of high BMR stocks are statistically different from the returns of low BMR stocks. It is the confirmation of the above results based on mean values. No statistical difference was found in either of the panel 2 and 3 which shows that both high and low BMR portfolios failed to outperform the market. However, panel 3 results indicate that market outperforms the low BMR firms and the difference has weak significance.

Table 5.13: Comparison between returns of B/M Sorted Portfolios & Market Returns

	R(High)	*R(Low)*	*Rm-Rf*	*Difference*
Panel 1	0.00215	-0.0062		0.00834 (2.310)*
Panel 2	0.00215		0.00281	-0.0007 (-0.1)
Panel 3		-0.0062	0.00281	-0.009 (-1.7)

t-values in parenthesis

`* at 5% level of significance

5.4 Two Factor Model (Market premium & Asset Growth Premium)

Asset growth is now tested along with CAPM to check whether this new anomaly can predict the future returns. Asset growth has never been tested in Pakistani equity market as an anomaly in asset pricing model. Adding Asset Growth effect to CAPM will take the following form of equation:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \quad + \beta_1(R_m\mathrm{t} - RFR_t) + \beta_2(AG_t) + \mu_t}$$

Where:

R_{pt} = portfolio's return for the period't'

R_{ft}= Risk free rate

α= Management's alpha

$R_{mt} = Ln(I_t/I_{t-1})$

$AG_t = R_{LAG} - R_{HAG}$

μ_t= error term

The chance of multicollinearity is prevalent where there are multiple explanatory variables. To check for the multicollinearity between explanatory variables, the first step is to calculate the correlation matrix for them. If there exists strong correlation between any of the two variables, then VIF (variance inflationary factor) should be calculated to check for the multicollinearity. The following correlation matrix indicates no strong relationship between any of the variables.

Table 5.14: Correlation matrix - Market premium & Asset Growth Premium

	R_{mt}-RFR_t	*AG*
R_{mt}-RFR_t	1	
AG	0.036	1

It eliminates the existence of multicollinearity between market premium and asset growth premium. Therefore, these two variables can be used simultaneously as explanatory variables.

Descriptive statistics of Portfolio's returns, MKT, High Asset Growth firms, Low Asset Growth firms& AG are shown in the following table.

Table 5.15: Descriptive Statistics for the two factor model

	R_{it}-RFR_t	R_{mt}-RFR_t	*R (HAG)*	*R(LAG)*	*AG premium*
Mean	-0.0123	0.0028	-0.00422	-0.00052	0.0037
Std Dev	0.0638	0.0815	0.0584	0.0714	0.04
Count	108	108	108	108	108

The above table confirms the theoretical relationship of a firm's asset growth with its returns. Low asset growth firms earn higher returns than high asset growth firms. The available literature has agreed on two reasons for this relationship.

When a firm makes capital investments, the risky growth options are replaced with less risky assets in place and average firm risk will be lower, therefore, the returns will be lower (Cooper et al 2008).

Lipson, Mortal and Shill (2011) & Polk and Sapienza (2009) conclude that the asset growth effect is not fully explained by variations in risk. The other explanation has some behavioral aspects. Titman et al. (2004) argue that this effect is partially due to the systematic market mispricing of growing businesses. That source of mispricing could be due to the extrapolation of past gains to growth for high asset growth companies.

OLS regression result shows the contribution of asset growth in portfolio's current returns. Table 5.16 shows the results.

Table 5.16: OLS regression results for the two factor model

	2004-2013
Intercept	-0.0135
	(-3.138)*
$(R_m\text{-}R_{ft})$	0.522
	(9.837)*
AG_t	0.5994
	(4.372)*
R Square	0.55

t-values in parenthesis

* at 5% level of significance

The co-efficient of determination (R^2) has a value of 0.55 which indicate that asset growth premium and market risk premium contributes for about 55% variations in portfolio's current returns. Market premium and asset growth premium both have significant effect on the future returns. The risk return relationship will be checked through applying Fama Macbeth methodology on the two factor model. Fama Macbeth results are presented in table 5.17 below.

Table 5.17: Fama Macbeth Test for the two factor model

	2004- 2013
λ_{0t}*(Intercept)*	-0.1727
	(-3.3)*
λ_{1t}*(MKT)*	0.18
	(2.299)*
λ_{2t}*(AG)*	0.103
	(3.276)*
R^2	0.16

t-values in parenthesis

* at 5% level of significance

R^2 has increased to 16% in this model which is the highest as compared to the previously tested models. This increase in the coefficient of determination depicts that adding asset growth premium enhances the ability of this model to predict the future returns. The risk returns relationship is also confirmed as linear between the explanatory variables and future portfolio returns. Higher the risk borne by the investor due to investing in low asset growth firms, higher will be the reward given to him. Similarly, investor will also get higher reward for investing in assets where market risk is higher. In other words, asset growth premium and market risk premium both are priced variables which can be further proved by their statistical significance [t (λ_{1t}) = 2.299&t (λ_{2t}) = 3.276].

Table 5.18 reports the statistical significance of the difference between returns of asset growth sorted portfolios and market returns. Panel 1 exhibits difference between average returns of low and high asset growth portfolios and its statistical significance. Panel 2 exhibits the difference between the average returns of low asset growth portfolio and market returns and its statistical significance. Panel 3 shows the difference between the average returns of high asset growth portfolio and market returns and its statistical significance.

No statistical difference was found in either of the panel which shows that both high and low asset growth portfolios failed to outperform the market. Panel 1 result shows that the returns of low asset growth firms are not statistically different from the returns of high asset growth firms. Table 5.17 shows that asset growth is a priced factor while table 5.18 result does not second the Fama Macbeth results of table 5.17. This argument leads towards the existence of mispricing effect. Investors over estimate growth firms, which leads to higher prices and thereby lower returns earned from growth firms.

Table 5.18: Comparison between returns of AG Sorted Portfolios & Market Returns

	R(LAG)	*R(HAG)*	*Rm-Rf*	*Difference*
Panel 1	-0.00052	-0.0042		0.0037 (0.936)
Panel 2	-0.00052		0.00281	-0.0033 (-0.469)
Panel 3		-0.0042	0.00281	-0.007 (-1.34)

t-values in parenthesis

5.5 Two Factor Model (Market premium & Investor Sentiment Premium)

Four firm specific or fundamental factors have been so far tested to check for the determination of subsequent returns. According to Charles M. C. Lee (2003), fusion investing is the integration of two elements of investment valuation i.e. fundamental value and investor sentiment. In Robert Shiller's (1984) model of asset pricing, the market prices of the securities are its fundamental value plus investor sentiment. It is contended that when noise traders are optimistic, stock prices will be higher than normal and vice versa. Under the combination of fusion investing, investors will engage in fundamental analysis but should also consider investor sentiment. During some periods, investor sentiment is muted and noise traders are inactive, so that fundamental valuation dominates the portfolio' returns. In other periods, when investor sentiment is high, noise traders are very active and returns are more heavily impacted by investor sentiment. Keeping in view the concept of fusion investing, investor's sentiment is tested along with CAPM to check the prediction of subsequent returns.

Investor sentiment is measured through turnover ratio for the last year and portfolios are adjusted every year. Adding investor sentiment to CAPM will take the following form of equation:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \;\; + \; \beta_1(R_{mt} - RFR_t) + \beta_2(IS_t) + \; \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

$R_{mt} = Ln(I_t/I_{t-1})$

$IS_t = R_{\text{low sentiment stocks}} - R_{\text{high sentiment stocks}}$

μ_t= error term

The chance of multicollinearity is prevalent where there are multiple explanatory variables. To check for the multicollinearity between explanatory variables, the first step is to calculate the correlation matrix for them. If there exist strong correlation between any of the two variables, then VIF (variance inflationary factor) should be calculated to check for the multicollinearity. The following correlation matrix indicates negative relationship between market premium and sentiment premium. Keeping in view the negative 50% correlation, VIF should be calculated to check for the multicollinearity.

Table 5.19: Correlation matrix- Market premium & sentiment Premium

	MKT	**IS**
MKT	1	
IS	-0.505	1

VIF is calculated for the above variables through the following formula:

$$VIF= 1/(1\text{-Adj } R^2)$$

The acceptable range for VIF is from 1 to 5. The above VIF gives the value of 1.4. It eliminates the existence of multicollinearity between market premium and sentiment premium. Therefore, these two variables can be used simultaneously as explanatory variables in the asset pricing model.

Descriptive statistics for portfolio's returns, MKT, Low Sentiment firms, High Sentiment firms and Investor Sentiment premium are shown below in table 5.20.

Table 5.20: Descriptive Statistics for Market Premium & Sentiment Premium

	R_{it}-RFR_t	R_{mt}-RFR_t	*Low Sentiment*	*High sentiment*	*IS*
Mean	-0.0123	0.0028	0.0016	0.0008	0.0008
Std Dev	0.0638	0.0815	0.0029	0.009	0.0784
Count	108	108	108	108	108

The above table confirms the theoretical relationship of the returns of IS sorted portfolios. Low sentiment stocks earn higher returns than high sentiment stocks, but the risk associated with high sentiment portfolio is higher than the risk of low sentiment stock. It can be inferred that high sentiment portfolio is inefficient as it assumes higher risk but lower returns. These results are not in line with the theoretical base as well as results provided by Amihud and Mendels (1986) but are exactly in line with Hassan, A. & Javed, T. (2012). This difference is yet to be statistically proved. One pass regression estimates of the above equation shows the following results.

Table 5.21: OLS regression results for the two factor model

	2004-2013
Intercept	-0.014
	(-2.94)*
Rm-Rf	0.5363
	(7.989)*
IS	0.0119
	(0.171)
R Square	0.46

t-values in parenthesis

* at 5% level of significance

According to OLS result, there is no significant relationship of investor's sentiment premium in determining future returns of portfolio. Fama Macbeth procedure also confirms the insignificance of investor's sentiment on future returns. Thus, investor's sentiment is a non-priced variable. There is no reward given to investors for investing in low sentiment firms. The risk return relationship is proved to be non-linear in this case. These results are presented in table 5.22 below.

Table 5.22: Fama Macbeth Test for the two factor model

	2007- 2013
λ_{0t}*(Intercept)*	-0.0737
	(-1.93)*
λ_{1t}*(MKT)*	0.0995
	(1.50)
λ_{2t}*(IS)*	-0.024
	(-0.64)
R^2	0.04

t-values in parenthesis

* at 5% level of significance

Table 5.23 reports the statistical significance of the difference between returns of IS sorted portfolios and market returns. Panel 1 exhibits difference between average returns of low sentiment and high sentiment portfolios and its statistical significance. Panel 2 exhibits the difference between the average returns of low sentiment portfolio and market returns and its statistical significance. Panel 3 shows the difference between the average returns of high sentiment portfolio and market returns and its statistical significance.

No significant difference was found in either of the panel which shows that both low sentiment and high sentiment portfolios failed to outperform the market. Low sentiment portfolios earn more returns than high sentiment portfolio but the difference has no statistical significance. The results are consistent with the results of Fama Macbeth methodology.

Table 5.23: Comparison between returns of Sentiment Sorted Portfolios & Market Returns

	R(LS)	*R(HS)*	*Rm-Rf*	*Difference*
Panel 1	0.0016	0.0008		0.0008 (0.052)
Panel 2	0.0016		0.00281	-0.00122 (-0.15)
Panel 3		0.0008	0.00281	-0.00197 (-0.25)

t-values in parenthesis

5.6Two Factor Model (Market premium & Media Coverage Premium)

This section discusses the cross sectional relationship between Media Coverage and expected returns. This is the last model of this thesis having two risk factors. According to Lily Fang & Joel Peress (2009), no-coverage stocks in general earn higher returns than high-coverage stocks in order to compensate investors for bearing information risk. Adding Media Coverage to CAPM will take the following form of equation:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \quad + \beta_1(R_{mt} - RFR_t) + \beta_2(MC_t) + \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

$R_{mt} = Ln(I_t/I_{t-1})$

$MC_t = R_{no\ MC} - R_{MC}$

μ_t= error term

The chance of multicollinearity is prevalent where there are multiple explanatory variables. To check for the multicollinearity between explanatory variables, the first step is to calculate the correlation matrix for them. If there exist strong correlation between any of the two variables, then VIF (variance inflationary factor) should be calculated to check for the multicollinearity. The following correlation matrix indicates negative relationship between market premium and media coverage premium. Keeping in view the negative 50% correlation, VIF should be calculated to check for the multicollinearity.

Table 5.24: Correlation between Market premium & Media Coverage Premium

	MKT	MC
MKT	1	
MC	-0.506	1

VIF is calculated for the above variables through the following formula:

$$VIF = 1/(1 - \text{Adj } R^2)$$

The acceptable range for VIF is from 1 to 5. The above VIF gives the value of 1.33. It eliminates the existence of multicollinearity between market premium and media coverage premium. Therefore, these two variables can be used simultaneously as explanatory variables.

Descriptive statistics of Portfolio's returns, MKT, NMC, MC & MC premium are shown below in table 5.25.

Table 5.25: Descriptive Statistics for Market Premium & Media Coverage Premium

	R_{it}-RFR_t	R_{mt}-RFR_t	*NoMedia Coverage*	*Media Coverage*	*MC*
Mean	-0.0123	0.0028	-0.0017	-0.00327	0.0016
Std Dev	0.0638	0.0815	0.0605	0.065	0.0415
Count	108	108	108	108	108

The above table confirms the theoretical relationship of the returns of MC sorted portfolios. No media coverage stocks earn higher than stocks which have news in the media. This difference is yet to be statistically proved in table 5.28. One pass regression of the above equation shows the following results.

Table 5.26: OLS regression results for the two factor model

	2004-2013
Intercept	-0.015
	(-3.63)*
Rm-Rf	0.6865
	(11.52)*
MC	0.6045
	(5.17)*
R Square	0.57

t-values in parenthesis

* at 5% level of significance

According to OLS result, media coverage premium have significant relationship with portfolio's current returns. Fama Macbeth procedure also confirms the insignificant relationship of Media Coverage premium and future returns. Thus, media coverage is a non-priced variable. These results are presented in table 5.27 below.

Table 5.27: Fama Macbeth Test for the two factor model

	2007- 2013
λ_{0t}*(Intercept)*	-0.136
	(-2.92)*
λ_{1t}*(MKT)*	0.15
	(2.24)*
λ_{2t}*(MC)*	0.016
	(0.473)
R^2	0.10

t-values in parenthesis

* at 5% level of significance

Table 5.28 reports the statistical significance of the difference between returns of MC sorted portfolios and market returns. Panel 1 exhibits difference between average returns of no media coverage stocks and returns of stocks having media coverage and its statistical significance. Panel 2 exhibits the difference between the average returns of NMC portfolio and market returns and its statistical significance. Panel 3 shows the difference between the average returns of MC portfolio and market returns and its statistical significance. No significant difference was found in either of the panel which shows that both no media coverage and media coverage portfolios failed to outperform the market. Panel 1 indicates that "No Media Coverage" firms earn higher returns than "Media Coverage" firms but the spread is not statistically significant.

Table 5.28: Comparison between returns of Media Coverage Sorted Portfolios & Market Returns

	R(NMC)	*R(MC)*	*Rm-Rf*	*Difference*
Panel 1	-0.0017	-0.00327		0.0015
				(0.377)
Panel 2	-0.0017		0.00281	-0.0045
				(-0.65)
Panel 3		-0.00327	0.00281	-0.0061
				(-1.34)

t-values in parenthesis

5.7 Fama French Three Factor Model

FF three factor model considers SMB and HML along with market premium to determine the portfolio's subsequent returns. FF three factors model is stated in the following form:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \quad + \ \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \ \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

MKT = R_{mt}- R_{ft}

SMB= ½* [(S/H – B/H) + (S/L – B/L)]

HML= ½* [(S/H – S/L) + (B/H – B/L)]

μ_t= error term

Descriptive statistics for FF three factors are shown below in table 5.29.

Table 5.29: Descriptive Statistics- Fama& French Three Factors

	Rit-RFRt	***MKT***	***SMB***	***HML***
Mean	-0.01245	0.00281	0.002672	0.008897
Std Dev	0.062263	0.081443	0.042276	0.030864
Sample Variance	0.003877	0.006633	0.001787	0.000953
Kurtosis	0.264119	10.03712	2.413918	1.784035
Skewness	-0.32404	-2.07969	-0.38537	0.826112

The above table indicates that market premium is the most volatile portfolio. It is due to the uncertain economic environment of Pakistan. Value premium is the most efficient portfolio out of three portfolios because it offers the highest return bearing lowest risk. Correlation among explanatory variables is estimated to explore the possibility of multicolinearity problem and results are reported in table 5.30 below.

Table 5.30: Correlation Matrix-Fama and French Three Factors

	MKT	***SMB***	***HML***
MKT	1		
SMB	-0.50934	1	
HML	0.355273	0.192444	1

Again a negative 50% correlation exists between market premium and size premium. VIF is calculated to explore the possibility of multicollinearity between them. It has a value of 1.85 which is within the tolerance limit of 5. So both variables can be used simultaneously. However the model should be used with caution as multicolinearity may lead to incorrect decision.

OLS estimates are reported in table 5.31 to see the impact of market premium, size premium & value premium on the portfolio's current returns are reported in table 5.31.

Table 5.31: OLS results: FF Three Factors

	2004-2013
Intercept	-0.017
	(-3.8)*
Rm-Rf	0.6344
	(8.97)*
SMB	0.502
	(3.868)*
HML	0.108
	(0.6596)
R Square	0.57

t-values in parenthesis

* at 5% level of significance

According to OLS result, market premium and size premium have significant impact on portfolio's current returns while value premium is not helpful in determining the portfolio's returns. Fama Macbeth results in table 5.32 depicts that FF three factors model is not valid in Pakistan. None of the three factors have significant results for determining the future returns.

Table 5.32: Fama Macbeth Results: FF Three Factor Model

	2007- 2013
λ_{0t}*(Intercept)*	-0.159
	(-2.33)*
λ_{1t}*(MKT)*	0.18
	(1.48)
λ_{2t}*(SMB)*	0.029
	(0.63)
λ_{3t}*(HML)*	0.0424
	(1.58)
R^2	0.11

t-values in parenthesis

* at 5% level of significance

5.8 Asset Growth Based Four Factor Model:

Fama French three factor model is extended by adding a new variable i.e asset growth, that can explain the returns which are not captured through SMB and HML. This model is stated in the following form:

$$\boldsymbol{R_{pt} - RFR_t = \alpha \quad + \ \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \mu_t}$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

MKT = R_{mt}- R_{ft}

SMB = ¼* [(S/H/HAG – B/H/HAG) + (S/H/LAG – B/H/LAG) + (S/L/HAG – B/L/HAG) + (S/L/LAG – B/L/LAG)]

HML = ¼* [(S/H/HAG- S/L/HAG) + (S/H/LAG- S/L/LAG) + (B/H/HAG - B/L/HAG) +(B/H/LAG - B/L/LAG)]

AG = ¼* [(S/H/LAG- S/H/HAG) + (S/L/LAG - S/L/HAG) + (B/H/LAG - B/H/HAG) + (B/L/LAG- B/L/HAG)]

μ_{it}= error term

Descriptive statistics of the four factors are reported below in table 5.33.

Table 5.33: Descriptive Statistics: Asset Growth based Four Factors

	Rit-RFRt	*MKT*	*SMB*	*HML*	*AG*
Mean	-0.0123	0.00281	0.002703	0.008903	-0.0005
Std Dev	0.06379	0.081443	0.042334	0.030939	0.025105
Kurtosis	0.37378	10.03712	2.421384	1.777993	0.622261
Skewness	-0.2007	-2.07969	-0.3875	0.819038	0.020051

Value premium is considered to be the efficient portfolio because it yields the highest average returns of 0.0089 assuming comparatively low level of risk. Market premium is considered to be the most volatile portfolio having the highest level of standard deviation (0.08) bearing low level of returns (0.00281), hence market portfolio is inefficient. Asset growth portfolio yields negative average returns which are almost negligible. Before analyzing the role of asset growth in explaining subsequent return in the presence of MKT, SMB, and HML, it is appropriate to examine correlation among the explanatory variables to check the multicollinearity. Table 5.34 presents the correlation among the four explanatory variables.

Table 5.34: Correlation Matrix- Asset Growth based Four Factors

	MKT	*SMB*	*HML*	*AG*
MKT	1			
SMB	-0.50888	1		
HML	0.353807	0.19457	1	
AG	-0.0134	0.24598	0.228646	1

Asset Growth is not correlated to any of the other explanatory variables. The chances of multicollinearity are eliminated here. Therefore, asset growth can be used simultaneously with MKT, SMB & HML.

Results of OLS regression performed to see the impact of Market premium, Size premium, Value premium & Asset Growth premium on the portfolio's current returns are reported in table 5.35.

Table 5.35: OLS results: Asset Growth based Four Factors

	2004-2013
Intercept	-0.017
	(-4.1)*
Rm-Rf	0.6272
	(9)*
SMB	0.477
	(3.67)*
HML	0.226
	(1.44)
AG	0.236
	(1.4)
R Square	0.60

t-values in parenthesis

* at 5% level of significance

According to OLS result, market premium and size premium have significant impact on portfolio's current returns while value premium and asset growth premium are not helpful in determining the portfolio's lagged returns.

Table 5.36 shows the Fama Macbeth results of the above four factor model. It clearly indicates that value effect and asset growth effect are dominant in explaining the future returns of portfolio. Asset growth is a priced variable and it has a significant relation with the equity's future returns. The explanatory power of this model has increased to 19% (R^2= 19%) as compared to all the previous models of this thesis. Adding asset growth enhances the ability of the model to predict subsequent returns. These results are in accordance with Cooper et al (2008) & Lipson et al (2011). Higher the risk higher will be the returns statement stand valid for value premium and asset growth premium. Investor will be rewarded for bearing the risk of investing in high BMR firms and low asset growth firms.

This model is partially valid in context of Pakistani equity market.

Table 5.36: Fama Macbeth Results: Asset Growth based Four Factor Model

	2007- 2013
λ_{0t}(Intercept)	-0.045
	(-0.61)
λ_{1t}(MKT)	-0.015
	(-0.113)
λ_{2t}(SMB)	0.012
	(0.170)
λ_{3t}(HML)	0.057
	(2.2)*
λ_{4t}(AG)	0.095
	(2.02)*
R^2	0.19

t-values in parenthesis

* at 5% level of significance

5.9 Investor Sentiment Based Five Factor Model:

In the five factor model, role of market premium, size premium, value premium & asset growth premium are examined simultaneously with investor's sentiment premium. This is the first non-fundamental variable which we will add to our previous four factors. Investor sentiment is included in the model as Wurgler & Baker (2008) and Chuang et al (2010) provide evidence that investor sentiment significantly explain subsequent returns. This model will take the following form of equation:

$$R_{pt} - RFR_t = \alpha_+ \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \mu_t$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

$MKT = R_{mt} - R_{ft}$

SMB = 1/8* [(S/H/HAG/LS - B/H/HAG/LS) + (S/H/HAG/HS -B/H/HAG/HS) + (S/H/LAG/LS - B/H/LAG/LS) + (S/H/LAG/HS - B/H/LAG/HS) + (S/L/HAG/LS - B/L/HAG/LS) + (S/L/HAG/HS - B/L/HAG/HS) + (S/L/LAG/LS - B/L/LAG/LS) + (S/L/LAG/HS - B/L/LAG/HS)]

HML = 1/8* [(S/H/HAG/LS - S/L/HAG/LS) + (S/H/HAG/HS - S/L/HAG/HS) + (S/H/LAG/LS - S/L/LAG/LS) + (S/H/LAG/HS - S/L/LAG/HS) + (B/H/HAG/LS - B/L/HAG/LS) + (B/H/HAG/HS - B/L/HAG/HS) + (B/H/LAG/LS - B/L/LAG/LS) + (B/H/LAG/HS - B/L/LAG/HS)]

AG = 1/8* [(S/H/LAG/LS - S/H/HAG/LS) + (S/H/LAG/HS - S/H/HAG/HS) + (S/L/LAG/LS - S/L/HAG/LS) + (S/L/LAG/HS - S/L/HAG/HS) + (B/H/LAG/LS - B/H/HAG/LS) + (B/H/LAG/HS - B/H/HAG/HS) + (B/L/LAG/LS - B/L/HAG/LS) + (B/L/LAG/HS - B/L/HAG/HS)]

IS = 1/8*[(S/H/HAG/LS - S/H/HAG/HS) + (S/H/LAG/LS - S/H/LAG/HS) + (S/L/HAG/LS - S/L/HAG/HS) + (S/L/LAG/LS - S/L/LAG/HS) + (B/H/HAG/LS - B/H/HAG/HS) + (B/H/LAG/LS - B/H/LAG/HS) + (B/L/HAG/LS - B/L/HAG/HS) + (B/L/LAG/LS - B/L/LAG/HS)]

Descriptive statistics for the five factors are reported below in table 5.37.

Table 5.37: Descriptive Statistics: Sentiment based Five Factors

	Rit-RFRt	***MKT***	***SMB***	***HML***	***AG***	***IS***
Mean	-0.0123	0.00281	0.002696	0.008982	-0.00049	0.005199
Std Dev	0.63794	0.081443	0.042192	0.030421	0.024959	0.045807
Kurtosis	0.373775	10.03712	2.368777	1.768639	0.647823	10.19945
Skewness	-0.2001	-2.0797	-0.4012	0.86957	-0.0275	-0.25168

The -0.25 value of skewness interprets that investor sentiment is left skewed but the value is close to “zero” which indicates normal skewness. On the other side kurtosis is very high indicating a peaked data. Higher kurtosis of the data demonstrates that very high values are saturated in some of the years and very low values are saturated in other years. The high values cancel the low values making the average sentiment factor close to “zero”, thereby reducing the effect of investor sentiment. It can be further authenticated by the OLS results of the above equation. Table 5.38 reports the OLS results.

Table 5.38: OLS results of five factor model

	2004-2013
Intercept	-0.015
	(-3.5)*
Rm-Rf	0.607
	(8.59)*
SMB	0.438
	(3.264)*
HML	0.278
	(1.7)*
AG	0.196
	(1.24)
IS	-0.031
	(-1.15)
R Square	0.61

t-values in parenthesis

* at 5% level of significance

OLS results clearly indicate that investor’s sentiment has insignificant impact on the equity’s current returns. The Co-efficient of determination has a high value of 61% but two of its variables are insignificant. It leads us to the doubt of multicollinearity among some of the independent variables. To eliminate our doubt, we first calculate the correlation matrix of the five explanatory variables. Let us have a look at the correlation matrix stated below.

Table 5.39: Correlation Matrix-Five Factors

	MKT	*SMB*	*HML*	*AG*	*IS*
MKT	1				
SMB	-0.51056	1			
HML	0.339681	0.202046	1		
AG	-0.01614	0.262683	0.254165	1	
IS	-0.0819	-0.17425	-0.03583	-0.1586	1

By closely analyzing the correlation matrix no strong relationship exists between Investor' Sentiment and the rest of the variables. The chances of multicollinearity are eliminated here. Therefore, investor sentiment can be used simultaneously with MKT, SMB, HML & AG.

Table 5.40 shows the Fama Macbeth results of the above five factor model. The five factor model has an explanatory power of 34% which is considered to be very massive in asset pricing model. None of the researches has yet found such robust results. All the factors except market premium has significant role in determination of expected returns.SMB, HML, AG, & IS all have significant impact on the future returns of the portfolio and they can be successfully used by investors to predict future returns. Market premium is the only non-priced variable according to this model but it may be the result of a common component present among the market premium and other four variables. That common component of market premium is explained by SMB, HML, AG & IS, thereby making market premium insignificant. All the variables except market premium are priced variable and can be used by investors in investment decisions with a high success rate. Asset growth premium and investor sentiment premiums have negative sign indicating the negative relationship between risk and returns. The statement "higher the risk higher will be the reward" does not stand valid for asset growth premium and investor sentiment premium. Hersh Shefrin (2007) in his book mentioned the survey of managers done by the Fortune Magazine. The survey highlighted that managers expect a negative relationship between the risk and return. They expect higher returns from safer stocks and lower returns from riskier stocks. Our results are consistent with this real time survey from managers of U.S based firms.

Another good sign is that intercept of the model is also not significant, thereby fulfilling one of the assumptions of CAPM/extended CAPM. Finding a more appropriate model for determining future prices is a continued process but, this model is giving the maximum output than any other model so far.

Table 5.40: Fama Macbeth Results: Investor's Sentiment based Five Factor Model

	2007- 2013
λ_{0t}(Intercept)	-0.034
	(-0.45)
λ_{1t}(MKT)	0.068
	(0.9)
λ_{2t}(SMB)	0.1423
	(4.14)*
λ_{3t}(HML)	0.072
	(1.9)*
λ_{4t}(AG)	-0.11
	(-2.6)*
λ_{5t}(IS)	-0.146
	(-2.176)*
R^2	0.34

t-values in parenthesis

* at 5% level of significance

5.10 Proposed Six Factor Model

In six factor model, the role of market premium, size premium, value premium, asset growth premium & investor's sentiment premium is examined along with a new risk factor which captures the effect of media coverage on expected stock returns. This model will take the following form of equation:

$$R_{it} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t$$

Where:

R_{pt} = portfolio's return for the period 't'

R_{ft}= Risk free rate

α= Management's alpha

MKT = R_{mt}- R_{ft}

SMB = 1/16* [(S/H/HAG/LS/MC - B/H/HAG/LS/MC) + (S/H/HAG/LS/NMC - B/H/HAG/LS/NMC) + (S/H/HAG/HS/MC - B/H/HAG/HS/MC) + (S/H/HAG/HS/NMC - B/H/HAG/HS/NMC) + (S/H/LAG/LS/MC - B/H/LAG/LS/MC) + (S/H/LAG/LS/NMC - B/H/LAG/LS/NMC) + (S/H/LAG/HS/MC - B/H/LAG/HS/MC) + (S/H/LAG/HS/NMC - B/H/LAG/HS/NMC) + (S/L/HAG/LS/MC - B/L/HAG/LS/MC) + (S/L/HAG/LS/NMC - B/L/HAG/LS/NMC) + (S/L/HAG/HS/MC - B/L/HAG/HS/MC) + (S/L/HAG/HS/NMC - B/L/HAG/HS/NMC) + (S/L/LAG/LS/MC - B/L/LAG/LS/MC) + (S/L/LAG/LS/NMC - B/L/LAG/LS/NMC) + (S/L/LAG/HS/MC - B/L/LAG/HS/MC) + (S/L/LAG/HS/NMC - B/L/LAG/HS/NMC)]

HML = 1/16* [(S/H/HAG/LS/MC - S/L/HAG/LS/MC) + (S/H/HAG/LS/NMC - S/L/HAG/LS/NMC) + (S/H/HAG/HS/MC - S/L/HAG/HS/MC) + (S/H/HAG/HS/NMC - S/L/HAG/HS/NMC) + (S/H/LAG/LS/MC - S/L/LAG/LS/MC) + (S/H/LAG/LS/NMC - S/L/LAG/LS/NMC) + (S/H/LAG/HS/MC - S/L/LAG/HS/MC) + (S/H/LAG/HS/NMC - S/L/LAG/HS/NMC) + (B/H/HAG/LS/MC - B/L/HAG/LS/MC) + (B/H/HAG/LS/NMC - B/L/HAG/LS/NMC) + (B/H/HAG/HS/MC - B/L/HAG/HS/MC) + (B/H/HAG/HS/NMC - B/L/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/L/LAG/LS/MC) + (B/H/LAG/LS/NMC - B/L/LAG/LS/NMC) + (B/H/LAG/HS/MC - B/L/LAG/HS/MC) + (B/H/LAG/HS/NMC - B/L/LAG/HS/NMC)]

AG = 1/16* [(S/H/LAG/LS/MC - S/H/HAG/LS/MC) + (S/H/LAG/LS/NMC - S/H/HAG/LS/NMC) + (S/H/LAG/HS/MC - S/H/HAG/HS/MC) + (S/H/LAG/HS/NMC - S/H/HAG/HS/NMC) + (S/L/LAG/LS/MC - S/L/HAG/LS/MC) + (S/L/LAG/LS/NMC - S/L/HAG/LS/NMC) + (S/L/LAG/HS/MC - S/L/HAG/HS/MC) + (S/L/LAG/HS/NMC - S/L/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/H/HAG/LS/MC) + (B/H/LAG/LS/NMC - B/H/HAG/LS/NMC) + (B/H/LAG/HS/MC - B/H/HAG/HS/MC) + (B/H/LAG/HS/NMC -

B/H/HAG/HS/NMC) + (B/L/LAG/LS/MC - B/L/HAG/LS/MC) + (B/L/LAG/LS/NMC - B/L/HAG/LS/NMC) + (B/L/LAG/HS/MC - B/L/HAG/HS/MC) + (B/L/LAG/HS/NMC - B/L/HAG/HS/NMC)]

IS = 1/16*[(S/H/HAG/LS/MC - S/H/HAG/HS/MC) + (S/H/HAG/LS/NMC - S/H/HAG/HS/NMC) + (S/H/LAG/LS/MC - S/H/LAG/HS/MC) + (S/H/LAG/LS/NMC - S/H/LAG/HS/NMC) + (S/L/HAG/LS/MC - S/L/HAG/HS/MC) + (S/L/HAG/LS/NMC - S/L/HAG/HS/NMC) + (S/L/LAG/LS/MC - S/L/LAG/HS/MC) + (S/L/LAG/LS/NMC - S/L/LAG/HS/NMC) + (B/H/HAG/LS/MC - B/H/HAG/HS/MC) + (B/H/HAG/LS/NMC - B/H/HAG/HS/NMC) + (B/H/LAG/LS/MC - B/H/LAG/HS/MC) + (B/H/LAG/LS/NMC - B/H/LAG/HS/NMC) + (B/L/HAG/LS/MC - B/L/HAG/HS/MC) + (B/L/HAG/LS/NMC - B/L/HAG/HS/NMC) + (B/L/LAG/LS/MC - B/L/LAG/HS/MC) + (B/L/LAG/LS/NMC - B/L/LAG/HS/NMC)]

MC = 1/16*[(S/H/HAG/LS/NMC - S/H/HAG/LS/MC) + (S/H/HAG/HS/NMC - S/H/HAG/HS/MC) + (S/H/LAG/LS/NMC - S/H/LAG/LS/MC) + (S/H/LAG/HS/NMC - S/H/LAG/HS/MC) + (S/L/HAG/LS/NMC - S/L/HAG/LS/MC) + (S/L/HAG/HS/NMC - S/L/HAG/HS/MC) + (S/L/LAG/LS/NMC - S/L/LAG/LS/MC) + (S/L/LAG/HS/NMC - S/L/LAG/HS/MC) + (B/H/HAG/LS/NMC - B/H/HAG/LS/MC) + (B/H/HAG/HS/NMC - B/H/HAG/HS/MC) + (B/H/LAG/LS/NMC - B/H/LAG/LS/MC) + (B/H/LAG/HS/NMC - B/H/LAG/HS/MC) + (B/L/HAG/LS/NMC - B/L/HAG/LS/MC) + (B/L/HAG/HS/NMC - B/L/HAG/HS/MC) + (B/L/LAG/LS/NMC - B/L/LAG/LS/MC) + (B/L/LAG/HS/NMC - B/L/LAG/HS/MC)]

Descriptive statistics of the proposed six variables are reported in table 5.41.

Table 5.41: Descriptive Statistics for Proposed Six Factor Model

	Rit-RFRt	***MKT***	***SMB***	***HML***	***AG***	***IS***	***MC***
Mean	-0.0123	0.00281	0.0038	0.006	-0.001	0.0029	-0.0002
Std Dev	0.064	0.0814	0.039	0.032	0.028	0.0502	0.0307
Kurtosis	0.374	10.037	1.827	1.548	1.723	15.207	1.882
Skewness	-0.201	-2.08	0.086	0.549	-0.251	0.4326	0.449

It has been observed in all the previous models including the proposed six factor model that market is over-performing all other portfolios. Market premium is considered as an efficient portfolio throughout all the asset pricing models tested in this study. Asset growth has proved to be the less risky premium among all the models. Market premium and investor's sentiment premium have the highest kurtosis which depicts that higher values of market premium and sentiment premium are clustered around some of the years. All the other variables have almost normal skewness and kurtosis indicating no major abnormality in data. OLS results of the proposed six factor model are presented below in table 5.42.

Table 5.42: OLS results of the proposed six factor model

	2004-2013
Intercept	-0.0162
	(-4.3)*
Rm-Rf	0.5839
	(8.69)*
SMB	0.0349
	(0.284)
HML	0.3776
	(2.66)*
AG	0.3176
	(2.304)*
IS	0.1137
	(1.08)
MC	0.6899
	(4.92)*
R Square	0.69

t-values in parenthesis

* at 5% level of significance

OLS results clearly indicate that Investor's Sentiment and size has insignificant impact on the equity's lagged returns. The Co-efficient of determination has a high value of 69% but two of its variables are insignificant. It leads us to the doubt of multicollinearity among some of the independent variables. To eliminate our doubt, we first calculate the correlation matrix of the proposed six explanatory variables. Let us have a look at the correlation matrix stated below.

Table 5.43: Correlation Matrix-Proposed Six Factors

	MKT	***SMB***	***HML***	***AG***	***IS***	***MC***
MKT	1					
SMB	-0.4938	1				
HML	0.40001	0.07549	1			
AG	-0.0141	0.29319	0.24518	1		
IS	-0.6212	0.37122	-0.3310	0.04565	1	
MC	-0.2322	0.09822	0.09392	0.11388	0.42676	1

The above correlation matrix does not show any strong relationship between the explanatory variables except IS and MKT (-0.6). To see multicollinearity, VIF was calculated. The resultant value was within the tolerance level (VIF=3). Therefore, all the six variables can be used simultaneously. Fama Macbeth results are reported in the following table to see whether these premiums have any role in determining the portfolio's subsequent returns.

Table 5.44 reports some outrageous results. The co-efficient of determination has a value of 37% which is even more than the previous model. All the variables have significant impact on portfolio's subsequent returns except media coverage premium which have weak significance. It can be used as the perfect asset pricing model predicting the future returns. So far, none of the models have given 37% predictability of future returns, ensuring all the variables have significant role in determining the cross sectional returns. All the proposed six factors are considered as priced if they are used in a single model. Investors can use this model for their investment decision with a high success rate. This model may be a milestone in the finance literature having the pronounced formula for successfully predicting the future returns. Media coverage premium, if not highly significant, but cannot be ignored because it has a t value equals to -1.6 which is considered significant at 88% confidence level.

Another aspect of this model is that the risk return relationship has proved to be negative in the three variables we added to the Fama French three factor model. All the risk premium of asset growth, investor sentiment &media coverage shows negative signs indicating the negative relationship among these variables and their respective reward. As Hersh Shefrin (2007) in his book mentioned a survey of managers of U.S based firms done for the Fortune Magazine. The survey revealed the expectation of managers regarding the risk and return to be negative. They expect lower returns from riskier stocks and higher returns from safer stocks. Our results are consistent with the survey results. The results are shown in table 5.44 below.

Table 5.44: Fama Macbeth Results: Proposed Six Factor Model

	2007- 2013
λ_{0t}(Intercept)	-0.095
	(-1.12)
λ_{1t}(MKT)	0.178
	(1.9)*
λ_{2t}(SMB)	0.191
	(4.6)*
λ_{3t}(HML)	0.109
	(2.52)*
λ_{4t}(AG)	-0.13
	(-3)*
λ_{5t}(IS)	-0.13
	(-2)*
λ_{6t}(MC)	-0.073
	(-1.6)
R^2	0.37

t-values in parenthesis

* at 5% level of significance

Table 5.45 reports the result of Fama Macbeth methodology applied on the proposed six factor model. This time, we have applied the Fama Macbeth methodology on various portfolios. Various portfolios are taken as dependent variable and Fama Macbeth methodology is applied, finding the impact of MKT, SMB, HML, AG, IS & MC on future returns of portfolios. The following portfolios are taken as dependent variables: P, S, B, S/H, S/L, B/H & B/L. This test will help the investors make more focused and narrowed down decisions. Our findings stress the importance of the use of different dependent variables. When we apply diverse dependent portfolios, we find starkly different results. For some test portfolios the risk factors seem positively priced, for some negatively priced, and for others, they appear not to be priced at all. Thus, focusing on one type of dependent portfolio (overall portfolio P), as is so often done in the empirical asset pricing literature, can cause misleading results.

Table 5.45: Fama Macbeth Methodology with Changing Dependent Variables

Dependent Variable	**Inter**	**MKT**	**SMB**	**HML**	**AG**	**IS**	**MC**	**Adj R^2**	**F sig**
P	0.142	-0.253	0.1532	-0.06	0.158	-0.094	0.0214	0.22	**0.00**
t-statistics	0.824	-0.9	1.27	-0.68	**2.191**	-1.076	0.368		
S	-0.133	0.0651	0.1509	0.027	0.0451	-0.132	0.0282	0.25	**0.00**
t-statistics	-1.096	0.2783	1.3425	0.315	0.5818	-1.605	0.6226		
B	0.14	-0.218	0.1201	0.004	0.165	-0.012	0.0363	0.17	**0.00**
t-statistics	0.669	-0.8	0.81	0.061	**2.194**	-0.109	0.448		
S/H	-0.027	0.0346	0.1172	-0.04	0.0538	-0.181	-0.005	0.21	**0.00**
t-statistics	-0.187	0.136	0.8833	-0.42	0.8328	-1.544	-0.064		
S/L	-0.145	0.0901	0.0731	0.049	0.0841	-0.119	0.0628	0.26	**0.00**
t-statistics	-1.899	0.4461	0.8249	0.717	1.1049	**-2.093**	**2**		
B/H	0.5	-0.626	0.2343	-0.05	0.222	-0.108	-0.037	0.13	**0.02**
t-statistics	1.296	-1.389	1.2648	-0.49	**2.2711**	-0.613	-0.397		
B/L	0.001	-0.041	0.135	0.036	0.1218	0.0185	0.1421	0.12	**0.03**
t-statistics	0.007	-0.19	1.0828	0.695	**2.04**	0.2356	1.7524		

This new idea generated some interesting results. All the models have F significance value less than 0.05 which depicts the fitness of all model but the factor premiums are not significant. If you closely look at the table 5.43, Asset Growth is the only variable which has significant role in determining the future returns of most of the portfolios i.e. P, B, B/H, B/L.

The previous models tested in this research also revealed Asset Growth as the significant factor among all the asset pricing models tested, otherwise, all the other factors premiums have different results when tested in different models. It accentuates the importance of asset growth premium. Asset growth retains its forecasting ability on all subgroup of firms for which other documented predictors of the cross-section lose much of their predictive ability.

5.11 Comparison of Models

Comparative position of explanatory power of all the ten models is reported in table 5.46.

Table 5.46: Comparative Statement of R^2

MODELS	R^2
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \mu_t$	1%
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_{it}) + \mu_t$	14%
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(HML_t) + \mu_t$	11%
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(AG_t) + \mu_t$	16%
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(IS_t) + \mu_t$	4%
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(MC_t) + \mu_t$	10%
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \mu_t$	11%
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \mu_t$	19%
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \mu_t$	34%
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t$	37%

Above table explains that the explanatory power of the proposed six factor model is highest. Therefore, it can be concluded that MKT, SMB, HML, AG, IS & MC anomalies exist in Karachi stock market and these anomalies can be used simultaneously to earn above normal returns. These results can be linked up with the market efficiency that Karachi stock exchange is inefficient in its semi strong form for the period 2004-2013.

Another common aspect among all the models is the management's alpha. Table 5.47 provides comparative values of management's alphas (intercept) for all the models tested in this research.

The formula for alpha can be derived from all the models. For example, the value of alpha derived through CAPM is expressed as follows

$$\alpha_{it} = (R_{it} - R_f) - \beta_{i1}(R_m - R_f)$$

From the above equation alpha is used to determine how much the realized return of the portfolio varies from the required return. The above alphas provide us with a fair standard of portfolio manager performance. A positive alpha indicates the portfolio manager performed better than was expected based on the risk borne by the investor. All the ten asset pricing models tested in this research bears negative alphas assuming that manager's performances are not up to the mark indicating the poor management of the portfolios under consideration. Yexiao Xu (2001) gave another reason for the negative sign of alpha which will be discussed at the end of this section.

Table 5.47: Comparative Statement of Management's α

MODELS	**(Sig) Mgt's α**
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \mu_t$	-1.8
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(SMB_{it}) + \mu_t$	-2.7
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(HML_t) + \mu_t$	-2.2
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(AG_t) + \mu_t$	-3.3
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(IS_t) + \mu_t$	-2
$R_{pt} - RFR_t = \alpha + \beta_1(R_{mt} - RFR_t) + \beta_2(MC_t) + \mu_t$	-3
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \mu_t$	-2.3
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \mu_t$	-0.6
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \mu_t$	-0.5
$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t$	-1.1

The above table shows that the first seven models have significant negative management effect on the expected returns while in the last three models management's role is insignificant in determining the expected returns. The significance of the variables is showing an inverse relationship with the significance of their respective intercepts. Last three models have almost all the priced variables but their management's alphas are insignificant. Contrary is the case with the first seven models. These fund managers have poorly managed the funds. The more are they working on improving the models, the more are they getting farther from significant negative impact on expected returns. In fact, an investment manager should not only avoid losing money for the client and should make a certain amount of money, but in-fact should make more money than the passive strategy of investing.

According to Yexiao Xu (2001), observing a positive alpha is pure luck. He emphasized on the bias present in Jensen's alpha. Based on the evidence, one should question the overall consistency and the ability of alpha to predict excess returns. Ferson and Warther (1996) also argued that a non-zero alpha could result from a shift in the risk exposure of a security or fund. When future returns are high, managers would increase their holdings in risky stocks and would scale back their risk exposure when the expected returns are low. If this is the case, they suggest a different reason that could result in positive Jensen's alpha, the non-linear compounding returns.

Yexiao Xu (2001) concludes that the investors be cautious when interpreting Jensen's alpha as a measure of abnormal performance of a fund. Instead, it may simply indicate a possible existence of bias in the beta estimator. Due to limitation in the return frequency of the sample firms, it is impossible to obtain an unbiased estimate of Jensen's alpha, if a non-zero alpha, in fact, exists. Yexiao Xu (2001) investigated a similar bias in this measure due to the temporal aggregation effect of returns. Kang & Lee (2013) also proved that Jensen's alpha may be biased performance measure even for public-information-based portfolios, and the bias can be substantial even when the underlying asset pricing model holds.

Keeping in view the biased nature of Jensen's alpha, results of table 5.47 may be misleading.

According to these results, all of the models tested in this research are badly managed portfolios. This is in contrast to the explanatory power of the models. How can a best fit model, having an explanatory power of 37%, assuring all the variables as statistically significant is poorly managed. It indicates the possible existence of bias in our Jensen's alpha as a measure of portfolio manager performance.

5.12 Industry Specific Asset Pricing Model:

The proposed six factor model is now tested on all the non-financial industries. The portfolios will remain the same as in the case of proposed six factor model but the average returns of the industry are taken as dependent variable instead of average returns of overall portfolio. Fama Macbeth methodology is applied on the following models:

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.1}$$

Where:

R_{pt} = average returns of automobile & parts industry for the period 't'

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.2}$$

Where:

R_{pt} = average returns of beverages industry for the period 't'

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.3}$$

Where:

R_{pt} = average returns of chemical industry for the period 't'

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.4}$$

Where:

R_{pt} = average returns of construction industry for the period 't'

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.5}$$

Where:

R_{pt} = average returns of electricity industry for the period 't'

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.6}$$

Where:

R_{pt} = average returns of engineering industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.7}$$

Where:

R_{pt} = average returns of food industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.8}$$

Where:

R_{pt} = average returns of oil & gas industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.9}$$

Where:

R_{pt} = average returns of textile industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.10}$$

Where:

R_{pt} = average returns of pharma & bio tech industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.11}$$

Where:

R_{pt} = average returns of general industrial industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.12}$$

Where:

R_{pt} = average returns of household goods industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.13}$$

Where:

R_{pt} = average returns of travel & leisure industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.14}$$

Where:

R_{pt} = average returns of forestry industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.15}$$

Where:

R_{pt} = average returns of industrial metal & mining industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.16}$$

Where:

R_{pt} = average returns of tobacco industry for the period ‘t’

$$R_{pt} - RFR_t = \alpha \quad + \beta_1(MKT_t) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(AG_t) + \beta_5(IS_t) + \beta_6(MC_t) + \mu_t \quad \text{eq 5.17}$$

Where:

R_{pt} = average returns of miscellaneous industry for the period ‘t’

The results of the above 17 models are shown below in table 5.48. values of co-efficient of the respective variable are shown with their t-values in parenthesis.

Table 5.48: Fama Macbeth Results – Industry Wise Multifactor Asset Pricing Model

Industry	Intercept	β(MKT)	β(SMB)	β(HML)	β(AG)	β(IS)	β(MC)	Adj R^2
Automobile & parts	0.0689 (0.567)	-0.044 (-0.302)	0.1039 (1.304)	-0.0104 (-0.39)	**0.1058* (2.387)**	**-0.1790* (-3.31)**	-0.0044 (-0.1)	0.188
Beverages	**0.1364* (2.457)**	-0.1206 (-1.244)	-0.0096 (-0.14)	0.0462 (0.855)	-0.0036 (-0.09)	-0.0592 (-1.62)	-0.0284 (-0.67)	0.130
Chemical	**-0.4379* -2.73159**	**0.578* (2.5261)**	-0.135 (-1.35)	**0.249* (2.797)**	0.0187 (0.518)	-0.141 (-1.87)	0.0138 (0.352)	0.06
Construction	0.1374 (0.9493)	-0.293 (-1.467)	0.2095 (1.871)	0.0302 (0.782)	0.0794 (1.509)	0.1753 (1.626)	**0.280* (2.663)**	0.1821

Electricity	-0.21709 (-1.5739)	0.39345 (1.5302)	0.0651 (0.592)	-0.0297 (-0.51)	0.0378 (0.614)	-0.270 (-2.59)	**-0.167* (-1.93)**	0.155
Engineering	-0.312 (-1.354)	0.398 (1.7123)	0.087 (0.876)	0.9876 (1.567)	-0.0345 (-0.98)	**1.270* (2.01)**	-0.156 (-1.51)	0.145
Food	0.031758 0.372759	-0.1288 (-0.562)	0.0804 (0.614)	-0.0177 (-0.44)	0.0524 (0.759)	0.0955 (1.114)	0.0358 (0.606)	-0.014
Oil & gas	-0.0031 (-0.0108)	-0.1113 (-0.376)	-0.1019 (-0.65)	0.0008 (0.008)	-0.062 (-0.78)	-0.1642 (-1.57)	-0.061 (-1.05)	-0.007
Textile	0.071653 (0.4923)	-0.087 (-0.339)	0.0491 (0.442)	-0.033 (-0.52)	0.0678 (1.06)	-0.1072 (-1.64)	0.0163 (0.406)	0.16
Pharma & bio tech	0.063876 (0.8626)	-0.2095 (-1.728)	0.0392 (0.621)	-0.0204 (-0.59)	0.0466 (0.95)	0.081 (1.750)	**0.115* (2.769)**	0.156
General industrial	-0.0468 (-0.3396)	0.0296 (0.1588)	-0.034 (-0.39)	0.0232 (0.461)	0.0542 (0.913)	-0.043 (-0.44)	0.0387 (0.630)	0.04
Household goods	-0.02595 (-0.51)	-0.057 (-0.580)	0.077 (1.535)	0.0114 (0.280)	0.047 (1.11)	0.0702 (0.853)	0.0846 (1.577)	0.048
Travel & Leisure	-0.09149 (-0.9928)	0.0029 (0.0213)	-0.021 (-0.55)	0.019 (0.342)	0.065 (1.169)	0.0563 (0.750)	0.0231 (0.517)	-0.028
Forestry	**0.16353* (2.05783)**	**-0.300* (-2.489)**	**0.176* (2.443)**	**-0.075* (-2.03)**	0.0315 (0.655)	0.0501 (0.859)	-0.0187 (-0.37)	0.038
Ind metal & mining	-0.03545 (-0.6139)	-0.167 (-1.643)	0.0516 (0.803)	0.072 (0.997)	0.0213 (0.589)	0.0418 (1.24)	0.0706 (1.596)	-0.023
Tobacco	-0.09381 (-0.9178)	0.08793 (0.547)	-0.0517 (-0.66)	-0.0917 (-1.26)	-0.0285 (-0.71)	-0.0491 (-1.47)	-0.0338 (-0.73)	0.008
Miscellaneous	**-0.0843* (2.010)**	0.8698 (0.8769)	**0.753* (1.981)**	-0.4309 (-1.86)	-1.238 (-0.99)	-1.0576 (-1.87)	1.3983 (0.564)	0.10

t-values in parenthesis

* at 5% level of significance

The results mentioned above depicts that the proposed six factor asset pricing model applies on none of the non- financial industries of Karachi stock exchange. Market premium, size premium, value premium and growth premium have significant impact in predicting the future returns of only forest industry. No other industry has got any worth mentioning results. Our proposed six factor model had convincing results to be considered for pricing the assets but the same has no value in predicting the results of any of the industry except for forestry and that also partially. It depicts that our proposed six factor model is not industry specific for the period 2004-2013.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study probes into defining a comparatively appropriate asset pricing model for Pakistani equity market for the period 2004-2013 by using monthly equity prices. Multifactor asset pricing models are a powerful tool for the statistical formulation of return generating processes and can thus make detailed risk analysis easier. This study goes into two directions. First, it tested the validity of single factor and various multifactor asset pricing models to predict overall portfolio returns. A total of ten models were tested by applying the Fama Macbeth methodology (1973). Out of those ten models, one was CAPM, five were two factors models, Fama French three factor model, a four factor model, a five factor model and finally the proposed six factor model. Secondly, it tested the prediction power of multifactor model to predict the industry based portfolio returns. The multifactor model was then applied to seventeen industries.

CAPM's validity was checked and it was found that the beta of the security had no significant role in determining the future returns. Theoretically, the market premium should have significant positive impact on the expected returns while intercept should be zero, but our results were different from the theory. Market premium was not statistically different from zero while the intercept had statistical significance in determining the future returns. The explanatory power of the model was too weak i.e. 3%, therefore, market premium was not considered as a priced variable which can effectively determine the future returns. As CAPM became invalid, the study leads to adding some other factors. Review of literature discloses the use of various anomalies in asset pricing models. In this quest, size premium, value premium, asset growth premium, investor sentiment premium & media coverage premium were added to the market premium one by one. All these variables were added with market premium to construct two factor models and Fama Macbeth methodology was applied. Study revealed the following characteristics of various two factor models.

The first two factor model is the impact of market premium and size premium on expected returns. As per theory small firms earn more than the big firms but the difference between the returns of large cap and small cap firms was not statistically significant in our study. Both big and small portfolios failed to out-perform the market. None of the variable was priced in this model. No multicollinearity was found between any of the variable. The explanatory power however increased to 14% as compared to CAPM (R^2=3%).

Value premium was added to the market premium after the size premium failed to determine the future returns. As per theory high BMR firms earn more than low BMR firms. In our results, the returns of high BMR firms were statistically different from low BMR firms but both high & low BMR firms failed to out-perform the market. HML (value premium) was found to be a priced variable, therefore, it can be concluded that HML has a significant role in determining the future returns. No multicollinearity was found between any of the variables. The explanatory power of the model however decreased to 11% as compared to the previous two factor model (14%). This decrease may be due to the reason that size premium was more rigorous and powerful than the value premium.

Asset growth premium was then added to CAPM. Asset growth was a new anomaly tested for the first time in Pakistani equity market to capture the effect of changes in assets towards the determination of future returns. As per theory, low asset growth firms earn more returns than high asset growth firms. Our results supported the relationship developed by Titman et. Al (2008). The returns from the market premium and asset growth premium were statistically different from zero and had significant role in determining the expected returns. No multicollineraity was found between asset growth and market returns. The explanatory power of the model was 16 % which was considered worthy. Asset growth was the only premium among six premiums used in this thesis, which yielded the same significant results either it was tested alone or in the presence of several other variables. It highlights the importance of asset growth premium as an economically significant variable in determining the future returns. In other words, none of the research so far has considered asset growth premium as an insignificant and non-priced variable. Therefore, Asset Growth premium should not be ignored while constructing an effective asset pricing model as it captures the unambiguous fragment of the subsequent returns determination process.

The above four variables were firm specific variables also known as fundamental variables.

According to the concept of “fusion investing”, expected returns are a function of fundamental as well as noise factors. Investor sentiment was the next premium to be tested along with market premium for the prediction of future returns. As sentiment is an unquantifiable phenomenon, therefore, a proxy was used to quantify it in numerical terms. Turnover was used as a proxy for investor sentiment. As per theory, low investor sentiment firms earn higher returns than high sentiment firms, but the difference was not statistically significant. Both the low sentiment and high sentiment portfolios failed to out-perform the market. Fama Macbeth results showed that both the market premium and investor sentiment premium had no role in determining the future returns. Both were not priced according to this two factor model. The explanatory power of the model was also too weak i.e. R^2=4%. The adjusted R^2 was even 0% which depicted no role of investor sentiment premium and market premium in determining the future returns of the securities.

The last two factor model tested in this thesis included the market premium along with media coverage premium. As per theory, firms having no media coverage earn higher returns than firms having media coverage. Our results supported the theory. No media coverage firms earned higher returns than firms covered by media. Both the NMC & MC failed to out-perform the market. Fama Macbeth result showed that media coverage premium had no role in determining the future returns while market premium could be considered for determining the future returns. Media coverage premium was not a priced variable according to this model. However, the explanatory power of the model was good i.e. R^2=10%. This explanatory power may be due to the significance of market premium in this model.

After testing two factor models, the famous Fama & French three factors model was then tested to see the role of market premium, size premium & value premium in determining the future returns. Multicollinearity was checked and was not prevalent among any of the three variables. None of the variable was significant but still the explanatory power of this model was 11%. This was due to the significance of management’s alpha. It could be concluded from these results that Fama & French three factor model does not exist in Pakistani equity markets.

Market inefficiency and uncertain political/economic situation in the country appeared to be major factors responsible for the inapplicability of these models. Volatile market conditions resulted in unexpected changes in systematic risk due to which predictability of returns based on constant beta values tends to result in deviations of actual returns from values determined through these models. Also it may be the case that stock prices are subject to manipulation by a small number of key players.

After the failure of Fama French three factor model, the asset growth premium was added to the model to check for any changes in the model's explanatory power. The problem of multicollinearity was addressed and no multicollinearity was found among any of the four variables used in this model. As earlier explained the results of all the four factors i.e. MKT, SMB, HML & AG supported their theoretical direction. Value premium and Asset Growth premium had significant positive impact on future returns while Market premium and Size premium had no significant role in determining the future returns of the portfolio. The explanatory power of the model improved as compared to the previous models (R^2= 19%).

The process of finding a closely accurate model for asset pricing is still in development phase. In this quest, Investor Sentiment premium was added to the previous four factor model to check its pricing behavior. Some interesting results had been established. All the variables were priced except market premium. The explanatory power jumped up to 34% which was considered to be very worth mentioning as no study so far in Pakistani context had got 34% explanatory power. No multicollinearity exists among the five variables in question. 34% of the future returns were explained through these five variables: MKT, SMB, HML, AG & IS. It was great achievement of this study to develop such a model which could help the investors through a successful investment decision. Investors can base their investment decision on these five factors and can minimize the uncertainty involved in the future returns.

The final proposed model was yet to be tested. Media Coverage premium was added to the previous five factor model. The results of the proposed model were even more thrilling and exciting. The explanatory power moved up to 37% which was even higher than our five factor model. All the variables had significant impact on future returns of portfolio at 0.05 level of significance. All the variables had significant role in determining the future returns.

Media coverage premium had weak significance at 88% confidence level nonetheless it could not be avoided as it had weak but significant impact in determining the future returns. It could be concluded from this research that investors can use the proposed six factor model with a high rate of accuracy for pricing their financial assets.

Future returns are not only a function of fundamental and noise variables but macroeconomic variables also have significant role in determining the future returns which we have not considered in this study. If we add macroeconomic variables to the proposed six factor model, it may enhance the explanatory power of the model. The remaining of the explanatory power (1-0.37=0.63) may be explained by adding other variables.

In a comparison among the ten asset pricing models tested in this research, our final model of six factors best explains the equity returns in Pakistani equity markets during our study period i.e. June 2004 – June 2013. We noticed that the six factor model had almost the same explanatory power (37%) as the five factor model (34%). It had not explained much the future returns as compared to the five factor model. The explanation was interesting. From Merton (1973) perspective, perhaps the six factors were related to five rather than six unknown state variables that were the source of special risk premiums. William L Megginson in his book "Corporate Finance Theory" proposed the same conclusions. He also argued that in practice one factor may be proxying for more than one factors. We also noticed that asset growth premium, investor sentiment premium and media coverage premium had negative signs. Hersh Shefrin (2007) in his book gave the reason for the negative signs of risk premiums. He mentioned a survey of managers. Those managers judge the relationship between risk and return as negative. Those managers expect higher returns from safer stocks and vice versa.

The proposed six factor model when applied to industry based portfolios yielded different results. The proposed model did not predict the average returns of industry based portfolio. We tested the proposed six factor model on seventeen industries. None of the industry returns were fully explained by the proposed multifactor asset pricing model. We found that industry-based portfolio do not take into account the explanatory ability of market risk premium, SMB, HML, AG, IS & MC. It is therefore, finally concluded that asset pricing model is not industry specific and is country specific. Zeng et al., (2010) also explained that multifactor asset pricing models fails to explain the cross section of returns of industry-based portfolios and there are some other factors which are relevant to industries. The proposed model is thus not designed for explaining the industry returns because every industry has its own dynamics and its returns are affected by different variables, therefore, a general asset pricing model cannot cater the returns of industry-based portfolio.

It is worth mentioning here that keeping portfolios of different characteristics as dependent variables in Fama Macbeth methodology was a new dimension of this study. In our view all other researchers only estimated OLS regression, keeping various portfolios as dependent variables while in our study Fama Macbeth methodology was applied on portfolios of various characters like S, B, S/H, S/L, B/H, & B/L. The conclusion drawn from this test was that Asset Growth is the only variable which was priced in every subset of portfolio. Therefore, asset growth premium can be used by investors without any hesitation.

Finally we still have far to go to present an ideal asset pricing model having a high predictive ability of the future returns, but at least we are closer than we were before all the famous and valid models for determining prices of financial assets like Capital asset pricing model, Fama French three factor model & Carhart (1997) four factor model.

6.2 Recommendations

CAPM should not be relied upon by investors for designing investment strategies as market risk premium is not supportive in predicting the future returns of portfolios. It might mislead investors in valuation of underlying securities.

Market premium, Size premium, Value premium, Asset Growth premium, Investor Sentiment premium & Media Coverage premium are priced by Pakistani equity market, therefore, these six variables can be used simultaneously without any ambiguity for designing investment decisions and strategies.

Since media tend to report information biased in favor of companies, it is suggested that managing firm's relations with the media is important, since it can affect their stock price.

This study will help market regulators in devising their policies. Investors, corporate managers and professional money managers will be benefited from this study.

6.3 Further Research

i) Based on our research results, other researchers who are interested in this topic are recommended to do research studying a large sphere of emerging markets of Asia using sophisticated econometric tools, like tests for heteroskedasticity and autocorrelation of residuals should be performed. Evidence of heteroskedasticity in residuals has shown that it plays an important role in CAPM/extended CAPM tests.

ii) The proposed six factor model has proved to be priced. It would be interesting to apply the model to predict the returns of each firm.

iii) Asset Growth premium should be decomposed to get the fractional impact of all the element of asset growth premium on future returns. Six proxies of investor's sentiment should be integrated into a sentiment index. Sentiment Index should then be added to asset pricing model as a factor.

iv) The proposed model should be tested in developed markets. A comparative study should be conducted on various countries to get a trans-country view of asset pricing.

REFERENCES

Alam, N. (2013). Macroeconomic Variables, Firm Characteristics and Stock Returns during Good and Bad Times: Evidence from SEA. Asian Journal of Finance & Accounting, 5(2), 159-182.

Aldaarmi, A., Abbodb, M., & Salameh, H. (2015). Implement Fama and French and capital asset pricing models in Saudi Arabia stock market. Journal of Applied Business Research, 31(3), 953.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. Journal of international economics, 64(1), 89-112.

Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. Journal of Financial Economics, 17, 223-249.

Anatolyev, S. (2008). A 10-year retrospective on the determinants of Russian stock returns. Research in International Business and Finance, 22(1), 56-67.

Anderson, C. W., & Garcia-Feijóo, L. (2006). Corporate Investment, Book-to-Market, Firm Size and Stock Returns: Empirical Evidence. Journal of Finance, 61(1), 171-194.

Anderson, C. W., & GARCIA-FEIJÓO, L. (2006). Empirical evidence on capital investment, growth options, and security returns. The journal of finance, 61(1), 171-194.

Andrew, A., Liu, J., & Schwarz, K. (2010). Using Stocks or Portfolio in Tests of Factor Models: working paper.

Antoniou, A., Holmes, P., & Priestley, R. (1998). The Effects of Stock Index Futures Trading on Stock Index Volatility: An Analysis of the Asymmetric Response of Volatility to News (Digest Summary). Journal of Futures Markets, 18(2), 151-166.

Arrow, K. J., Forsythe, R., Gorham, M., Hahn, R., Hanson, R., Ledyard, J. O., . . . Nelson, F. D. (2008). The promise of prediction markets. SCIENCE-NEW YORK THEN WASHINGTON-, 320(5878), 877.

Avramov, D., & Chordia, T. (2006). Asset pricing models and financial market anomalies. Review of financial Studies, 19(3), 1001-1040.

Azeez, A., & Yonezawa, Y. (2006). Macroeconomic factors and the empirical content of the Arbitrage Pricing Theory in the Japanese stock market. Japan and the World Economy, 18(4), 568-591.

Baker, M., & Stein, J. C. (2004). Market liquidity as a sentiment indicator. Journal of Financial Markets, 7(3), 271-299.

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns.

The journal of finance, 61(4), 1645-1680.

Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market: National Bureau of Economic Research Cambridge, Mass., USA.

Baker, W., & Dumont, G. (2014). Equity analyst recommendations: a case for affirmative disclosure? Journal of Consumer Affairs, 48(1), 96-123.

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

Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. Handbook of the Economics of Finance, 1, 1053-1128.

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.

Bekaert, G., Harvey, C. R., & Lundblad, C. (2007). Liquidity and expected returns: Lessons from emerging markets. Review of financial Studies, 20(6), 1783-1831.

Bekaert, G., Harvey, C. R., & Lundblad, C. T. (2003). Equity market liberalization in emerging markets. Journal of Financial Research, 26(3), 275-299.

Berger, D., & Turtle, H. (2012). Cross-sectional performance and investor sentiment in a multiple risk factor model. Journal of Banking & Finance, 36(4), 1107-1121.

Berk, J. B., Green, R. C., & Naik, V. (1999). Optimal investment, growth options, and security returns. The journal of finance, 54(5), 1553-1607.

Bhandari, L. C. (1988). Debt/equity ratio and expected common stock returns: Empirical evidence. The journal of finance, 43(2), 507-528.

Bhatti, U., & Hanif, M. (2010). Validity of capital assets pricing model: Evidence from KSE-Pakistan. European Journal of Economics, Finance and Administrative Sciences(20).

Black, F. (1972). Capital market equilibrium with restricted borrowing. The Journal of Business, 45(3), 444-455.

Boguth, O., & Simutin, M. (2015). Leverage constraints and asset prices: Insights from mutual fund risk taking. Rotman School of Management Working Paper(2517704).

Breeden, D. T. (1979). An intertemporal asset pricing model with stochastic consumption and investment opportunities. Journal of financial economics, 7(3), 265-296.

Brennan, M. J., Chordia, T., & Subrahmanyam, A. (1998). Alternative factor specifications, security characteristics, and the cross-section of expected stock returns. Journal of financial economics, 49(3), 345-373.

Brown, G. W., & Cliff, M. T. (2004). Investor sentiment and the near-term stock market. Journal of Empirical Finance, 11(1), 1-27.

Brown, G. W., & Cliff, M. T. (2005). Investor Sentiment and Asset Valuation*. The Journal of Business, 78(2), 405-440.

Buss, A., & Vilkov, G. (2012). Measuring equity risk with option-implied correlations. Review of financial Studies, 25(10), 3113-3140.

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

Chan, H. W., & Faff, R. W. (2005). Asset pricing and the illiquidity premium. Financial Review, 40(4), 429-458.

Chan, L. K., Karceski, J., Lakonishok, J., & Sougiannis, T. (2008). Balance sheet growth and the predictability of stock returns. University of Illinois at Urbana-Champaign working paper.

Charles, M. C. (2003). The magic of markets. China Accounting Review 1. 219-240.

Chen, N.-F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. Journal of business, 383-403.

Chuang, W.-J., Ouyang, L.-Y., & Lo, W.-C. (2010). The impact of investor sentiment on excess returns a Taiwan stock market case. International Journal of Information and Management Sciences, 21(1), 13-28.

Chui, A. C., & Wei, K. J. (1998). Book-to-market, firm size, and the turn-of-the-year effect: Evidence from Pacific-Basin emerging markets. Pacific-Basin finance journal, 6(3), 275-293.

Coakley, J., Dotsis, G., Liu, X., & Zhai, J. (2014). Investor sentiment and value and growth stock index options. The European Journal of Finance, 20(12), 1211-1229.

Cooper, M. J., Gulen, H., & Schill, M. J. (2006). What best explains the cross-section of stock returns. Paper presented at the Exploring the asset growth effect, AFA 2007 Chicago Meetings Paper.

Cooper, M. J., Gulen, H., & Schill, M. J. (2008). Asset growth and the cross-section of stock returns. The Journal of finance, 63(4), 1609-1651.

Damodaran, A. (2015). Equity risk premiums (ERP): Determinants, estimation and implications–The 2015 Edition. Estimation and Implications–the.

Daniel, K., & Titman, S. (1999). Market efficiency in an irrational world. Financial Analysts Journal, 55(6), 28-40.

Datar, V. T., Naik, N. Y., & Radcliffe, R. (1998). Liquidity and stock returns: An alternative test. Journal of Financial Markets, 1(2), 203-219.

De Bondt, R., & Henriques, I. (1995). Strategic investment with asymmetric spillovers. Canadian Journal of Economics, 656-674.

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. Journal of political Economy, 703-738.

De Vries, M. (2012). Industry returns, single and multifactor asset pricing tests. Discussion paper University of Notingham.

Dhankar, R. S., & Esq, R. (2005). Arbitrage pricing theory and the capital asset pricing model-evidence from the Indian stock market. Journal of Financial Management & Analysis, 18(1), 14.

Diether, K. B., Malloy, C. J., & Scherbina, A. (2002). Differences of opinion and the cross section of stock returns. The journal of finance, 57(5), 2113-2141.

Ding, C. G., Wang, H.-J., Lee, M.-C., Hung, W.-C., & Lin, C.-P. (2014). How Does the Change in Investor Sentiment over Time Affect Stock Returns? Emerging Markets Finance and Trade, 50(sup2), 144-158.

Eckbo, B. E., & Thorburn, K. S. (2008). Corporate restructuring: breakups and LBOs. Elsevier/North-Holland Handbook of Finance Series.

Edmans, A., Garcia, D., & Norli, Ø. (2007). Sports sentiment and stock returns. The journal of finance, 62(4), 1967-1998.

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

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

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

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. Journal of financial economics, 116(1), 1-22.

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

Fang, L., & Peress, J. (2009). Media coverage and the cross-section of stock returns. The journal of finance, 64(5), 2023-2052.

Fang, L. H., Peress, J., & Zheng, L. (2009). Does your fund manager trade on the news? Media coverage, mutual fund trading and performance. Media Coverage, Mutual Fund Trading and Performance (March 18, 2009).

Ferguson, N. J., Philip, D., Lam, H. Y., & Guo, J. M. (2015). Media content and stock returns: The predictive power of press. Multinational Finance Journal, 19(1), 1-31.

Ferson, W. E., & Harvey, C. R. (1993). The risk and predictability of international equity returns. Review of financial Studies, 6(3), 527-566.

Ferson, W. E., & Warther, V. A. (1996). Evaluating fund performance in a dynamic market. Financial Analyst Journal, 52(6), 20-28.

Fisher, K. L., & Statman, M. (2000). Cognitive biases in market forecasts. The Journal of Portfolio Management, 27(1), 72-81.

Fletcher, J. (2000). On the conditional relationship between beta and return in international stock returns. International Review of Financial Analysis, 9(3), 235-245.

Fraser, P., Hamelink*, F., Hoesli, M., & Macgregor, B. (2004). Time-varying betas and the cross-sectional return–risk relation: evidence from the UK. The European Journal of Finance, 10(4), 255-276.

Gleason, C. A., Bruce Johnson, W., & Li, H. (2013). Valuation model use and the price target performance of Sell-Side equity analysts*. Contemporary Accounting Research, 30(1), 80-115.

Gleason, C. A., & Lee, C. M. (2003). Analyst forecast revisions and market price discovery. The Accounting Review, 78(1), 193-225.

Groenewold Fraser, N. (1997). Share prices and macroeconomic factors. Journal of Business Finance & Accounting, 24(9-10), 1367-1383.

Guadalupe, M., Kuzmina, O., & Thomas, C. (2010). Innovation and foreign ownership: National Bureau of Economic Research.

Guan, J., & Ma, N. (2003). Innovative capability and export performance of Chinese firms. Technovation, 23(9), 737-747.

Hansson, B., & Hordahl, P. (1998). Testing the conditional CAPM using multivariate GARCH-M. Applied Financial Economics, 8(4), 377-388.

Harris, M., & Raviv, A. (1993). Differences of opinion make a horse race. Review of Financial studies, 6(3), 473-506.

Hassan, A., & Javed, M. T. (2009). An empirical investigation of the causal relationship among monetary variables and equity market returns. The Lahore journal of economics, 14(1), 115.

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

Hersh Shefrin. (2007). Behavioural corporate finance: Decision that create value. McGraw Hill Publishing.

Heston, S. L., & Sinha, N. R. (2014). News versus sentiment: Comparing textual processing approaches for predicting stock returns. Robert H. Smith School Research Paper.

Hoffmann, A. O., Post, T., & Pennings, J. M. (2013). Individual investor perceptions and behavior during the financial crisis. Journal of Banking & Finance, 37(1), 60-74.

Hwang, S., & Pedersen, C. S. (2004). Asymmetric risk measures when modelling emerging markets equities: evidence for regional and timing effects. Emerging markets review, 5(1), 109-128.

Issahaku, H., Ustarz, Y., & Domanban, P. B. (2013). Macroeconomic Variables and Stock Market Returns in Ghana: Any Causal Link? Asian economic and financial review, 3(8), 1044.

Jagannathan, R., & Wang, Z. (1996). The conditional CAPM and the cross-section of expected returns. The journal of finance, 51(1), 3-53.

Javid, A. Y. (2009). Test of higher moment capital asset pricing model in case of Pakistani equity market. European Journal of Economics, Finance and Administrative Sciences, 15(2009), 144-162.

Javid, A. Y., & Ahmed, E. (2008). Test of multi-moment capital asset pricing model: Evidence from Karachi Stock Exchange: Pakistan Institute of Development Economics Islamabad, Pakistan.

Jensen, M. C., Black, F., & Scholes, M. S. (1972). The capital asset pricing model: Some empirical tests.

Jensen, M. C., & Ruback, R. S. (1983). The market for corporate control: The scientific evidence. Journal of Financial economics, 11(1), 5-50.

Joseph, K., Wintoki, M. B., & Zhang, Z. (2011). Forecasting abnormal stock returns and trading volume using investor sentiment: Evidence from online search. International Journal of Forecasting, 27(4), 1116-1127.

Kane, G. C., Fichman, R. G., Gallaugher, J., & Glaser, J. (2009). Community relations 2.0. Harvard business review, 87(11), 45-50, 132.

Kang, J., & Lee, S. (2013). A bias in Jensen's alpha when returns are serially correlated. Theoretical Economics Letters, 2013(3), 188-190.

Karpoff, J. M. (1986). A theory of trading volume. The journal of finance, 41(5), 1069-1087.

Khalid, S. (2010). Financial reforms and dynamics of capital structure choice: a case of publically listed firms of Pakistan. Available at SSRN 1653177.

Ki, Y. (2011). The CAPM and the High Frequency Trading: Will the CAPM hold good under the impact of high-frequency trading? , University of Kansas.

Kogan, L., & Papanikolaou, D. (2012). Economic activity of firms and asset prices. Annu. Rev. Financ. Econ., 4(1), 361-384.

Kogan, L., & Papanikolaou, D. (2014). Growth opportunities, technology shocks, and asset prices. The journal of finance, 69(2), 675-718.

Lakonishok, J., Shleifer, A., & Vishny, R. W. (1994). Contrarian investment, extrapolation, and risk. The journal of finance, 49(5), 1541-1578.

Lambert, M., & Hübner, G. (2013). Comoment risk and stock returns. Journal of Empirical Finance, 23, 191-205.

Lee, C., Shleifer, A., & Thaler, R. H. (1991). Investor sentiment and the closed-end fund puzzle. The journal of finance, 46(1), 75-109.

Lee, C., & Swaminathan, B. (2000). Price momentum and trading volume. The journal of finance, 55(5), 2017-2069.

Levine, R. (2001). International financial liberalization and economic growth. Review of international Economics, 9(4), 688-702.

Levy, H., Levy, M., & Benita, G. (2006). Capital Asset Prices with Heterogeneous Beliefs*. The Journal of Business, 79(3), 1317-1353.

Lewellen, J., Nagel, S., & Shanken, J. (2010). A skeptical appraisal of asset pricing tests. Journal of financial economics, 96(2), 175-194.

Lintner, J. (1965a). Security prices, risk, and maximal gains from diversification. The journal of finance, 20(4), 587-615.

Lintner, J. (1965b). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. The review of economics and statistics, 13-37.

Lintner, J. (1969). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets: A reply. The review of economics and statistics, 222-224.

Lipson, M. L., S., Mortal,M. J. Schill, (2011). On the scope and drivers of the asset growth effect. Journal of Financial Quantitative Analysis, 46(6), 1651-1682.

Litzenberger, R. H., & Ramaswamy, K. (1979). The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence. Journal of financial economics, 7(2), 163-195.

Liu, L. X., Sherman, A. E., & Zhang, Y. (2014). The long-run role of the media: evidence from initial public offerings. Management Science, 60(8), 1945-1964.

Lowry, M. (2003). Why does IPO volume fluctuate so much? Journal of financial economics, 67(1), 3-40.

Lucas Jr, R. E. (1978). Asset prices in an exchange economy. Econometrica: Journal of the Econometric Society, 1429-1445.

MacKinlay, A. C. (1995). Multifactor models do not explain deviations from the CAPM. Journal of financial economics, 38(1), 3-28.

Markowitz, H. (1952). Portfolio selection. The journal of finance, 7(1), 77-91.

Mayers, D. (1972). Nonmarketable assets and capital market equilibrium under uncertainty. Studies in the theory of capital markets, 1, 223-248.

Megginson, W. L. (1997). Corporate Finance Theory. Addison-Wesley, Long man publishing.

Meidyawati, A. (2012). Media Coverage and the Cross-Section of Stock Returns in Indonesia. Available at SSRN 2000692.

Mendel, B., & Shleifer, A. (2012). Chasing noise. Journal of financial economics, 104(2), 303-320.

Merton, R. C. (1973a). An intertemporal capital asset pricing model. Econometrica: Journal of the Econometric Society, 867-887.

Merton, R. C. (1973b). Theory of rational option pricing. The Bell Journal of economics and management science, 141-183.

Michailidis, G., Tsopoglou, S., & Papanastasiou, D. (2006). Testing the capital asset pricing model (CAPM): The case of the emerging Greek securities market.

Miller, E. M. (1977). Risk, uncertainty, and divergence of opinion. The journal of finance, 32(4), 1151-1168.

Mirza, N., & Alexandre, H. (2009). Size Value and Asset Quality Premium in European Banking Stocks.

Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F. (2010). Determinants of stock price volatility in karachi stock exchange: The mediating role of corporate dividend policy. International Research Journal of Finance and Economics, 55, 100-107.

Nishat, M., Shaheen, R., & Hijazi, S. T. (2004). Macroeconomic Factors and the Pakistani Equity Market [with Comments]. The Pakistan Development Review, 619-637.

Ofek, E. (1993). Capital structure and firm response to poor performance: An empirical analysis. Journal of financial economics, 34(1), 3-30.

Okeke, A. O. (2015). Economic Dependency And Underdevelopment In Africa: The Nigerian Perspectives, 2000-2010.

Oprea, D. S., & Brad, L. (2014). Investor sentiment and stock returns: evidence from Romania. International Journal of Academic Research in Accounting, Finance and Management Sciences, 4(2), 23-29.

Paudal, J., & Laux, J. (2010). A behavioral approach to stock pricing. A Journal of Applied Business Research, 26(3), 99-106.

Peress, J. (2014). The media and the diffusion of information in financial markets: Evidence from newspaper strikes. The journal of finance, 69(5), 2007-2043.

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

Polk, C., & P, Sapienza. (2009). The stock market and corporate investment: A test of catering theory. Review of Financial Studies, 22, 187-217.

Qu, Z., & Perron, P. (2007). Estimating and testing structural changes in multivariate regressions. Econometrica, 75(2), 459-502.

Raei, R., & Mohammadi, S. (2008). Fractional return and fractional CAPM. Applied Financial Economics Letters, 4(4), 269-275.

Roll, R. (1977). A critique of the asset pricing theory's tests Part I: On past and potential testability of the theory. Journal of financial economics, 4(2), 129-176.

Roll, R., & Ross, S. A. (1980). An empirical investigation of the arbitrage pricing theory. The journal of finance, 35(5), 1073-1103.

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.

Rouwenhorst, K. G. (1999). Local return factors and turnover in emerging stock markets. The journal of finance, 54(4), 1439-1464.

Sarwar, S., Hussan, W., & Malhi, S. N. (2013). Empirical Relation Among Fundamentals, Uncertainty and Investor Sentiments: Evidence of Karachi Stock Exchange.

International Review of Management and Business Research, 2(3), 674.

Scheicher, M. (2001). The comovements of stock markets in Hungary, Poland and the Czech Republic. International Journal of Finance & Economics, 6(1), 27-39.

Shaik, S. A. (2013). Testing CAPM on KSE stocks. Journal of managerial sciences, VII(2), 281-289.

Shank, J. D. (2012). Multifactor asset pricing models and industry portfolio investment strategies. Available at SSRN: http://ssrn.com/abstract=2286937 or http://dx.doi.org/10.2139/ssrn.2286937

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

Shefrin, H. (2008). A behavioral approach to asset pricing: Academic Press.

Shefrin, H., & Statman, M. (1994). Behavioral capital asset pricing theory. Journal of financial and Quantitative Analysis, 29(03), 323-349.

Shiller, R. J., Fischer, S., & Friedman, B. M. (1984). Stock prices and social dynamics. Brookings papers on economic activity, 1984(2), 457-510.

Solnik, B. H. (1974). An equilibrium model of the international capital market. Journal of economic theory, 8(4), 500-524.

Solomon, M., Russell-Bennett, R., & Previte, J. (2012). Consumer behaviour: Pearson Higher Education AU.

Stambaugh, R. F. (2014). Investment noise and trends: National Bureau of Economic Research.

Statman, R. (1980). On the existence of closed terms in the typed λ-calculus. I. 1980], Academic Press, London, 511-534.

Sun, Q., & Tong, W. H. (2000). The effect of market segmentation on stock prices: The China syndrome. Journal of Banking & Finance, 24(12), 1875-1902.

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. The journal of finance, 62(3), 1139-1168.

Titman, S., Wei, K. J., & Xie, F. (2004). Capital investments and stock returns. Journal of financial and Quantitative Analysis, 39(04), 677-700.

Tobin, J. (1958). Liquidity preference as behavior towards risk. The review of economic studies, 25(2), 65-86.

Tobin, J. (1969). A general equilibrium approach to monetary theory. Journal of money, credit and banking, 1(1), 15-29.

Tsai, C.-F., Lin, Y.-C., Yen, D. C., & Chen, Y.-M. (2011). Predicting stock returns by classifier ensembles. Applied Soft Computing, 11(2), 2452-2459.

Uygur, U., & Tas, O. (2012). Modeling the effects of investor sentiment and conditional volatility in international stock markets. Journal of Applied Finance and Banking, 2(5), 239.

Vega, C. (2006). Stock price reaction to public and private information. Journal of financial economics, 82(1), 103-133.

Wang, Y. M., Li, C. A., & Lin, C.-F. (2012). Investor sentiment of lottery stock: evidence from the Taiwan stock market. Investment Management and Financial Innovations, 9(2), 203-207.

Yexia, Z. (2001). Biases in using Jensen's alpha. Adnaces in Investment Analysis and Portfolio Management. 8(2001), 161-182.

Yacob, N. (2010). The Emerging Markets' Investor Sentiment Composite Index: A Test on Bursa Malaysia. Available at SSRN 1662800.

Yoshikawa, H. (1980). On the" q" Theory of Investment. The American Economic Review, 739-743.

Yiwei Zhao, Z. Y. (2015). Investor sentiment and Chinese A share stock market anomalies. International Journal of Economics and Finance , *7* (9), 293-312.

Zweig, M. (1973). A Stock Market Game Using FINANSIM Companies. Journal of Financial Education, 67-74.