Asset Pricing and Stylized Facts for a Multi-Factor World: A Model beyond Conventional Anomalies

By

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Dedication

To my beloved parents, husband & kids;

To whom I owe my whole life.

To my respected mentor & supervisor, who made me able to conduct this research, helped me, and gave me courage and support.

To my friends & students, who care for me, helped me,

and pray for me,

To all……

With millions of thanks and gratitude

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"If you are grateful, I will give you more"

Surah Ibrahim, V. 7

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All my commendations to my parents, husband, family members and all the close friends whose precious advices and moral support helped me to achieve this milestone and without whom I would not be able to reach this point of my life.

I don't know how far I have been successful in collating the relevant information and transforming it into a real well knit document worth presenting to galaxy literates, but surely it gave me enough confidence and acumen which will be a valuable asset for me in times to come.

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LIST OF ABBREVIATIONS

APT	Arbitrage Pricing Theory
CSR	Cross Sectional Regression
BCN	Barth, Cram & Nelson
BE/ME	Book equity/Market Equity
CAPM	Capital Asset pricing Model
CML	Capital Market Line
EMH	Efficient Market Hypothesis
F & F	Fama and French
HML	High minus Low
IFRS	International financial reporting System
ILLIQ	Illiquidity
INSH	Institutional Shareholding concentration
LIQ	Liquidity
MOM	Momentum
QFR	Quality of financial reporting
SECP	Securities & Exchange Commission of Pakistan
SMB	Small Minus Big
SML	Security Market Line
T & D	Transparency & disclosure
TSR	Time Series Regression

ABSTRACT

This dissertation is aimed to provide an insight about analysing and testing various asset pricing anomalies in stock returns which either are un-addressed or not yet well explained in the existing asset pricing literature. Moreover, two-pass regression methodology is used to explore the relationship between equity returns, market premium, size premium, value premium, institutional ownership premium, quality of financial reporting premium and liquidity premium for the period June 2002 to June 2012 by using data of 189 companies listed at Karachi Stock Exchange (KSE).

The findings provide an insight to develop a new theoretical framework and give fresh perspective into the puzzling empirical linkages documented in the existing literature between equity market returns and firm-specific-characteristics, such as size, value, ownership structure, financial reporting quality, and liquidity. The results suggest that Fama and French three-factor model (1992) produces significant loadings when tested for Pakistan's equity market and is helpful in explaining portfolio returns but the explanatory is lower as compared to the four-, five-, and, six factor models. Likewise, the four factor model based on institutional ownership concentration further explains the relationship between equity returns and risk factors. The suggested five factor and six factor models based on the quality of financial reporting and liquidity premium are also found equally good in explaining asset returns. On the contrary, results indicate that the above cited models failed to explain the relationship between future returns and factor betas in second pass regression indicating, models' invalidity for testing period. Further, two approaches are used for testing asset pricing models i.e. time-series regression (TSR) & cross-sectional regression (CSR) to check the robustness. The results of both approaches are found consistent.

The study also tests the model in two extreme economic regimes named as bull and bear in finance literature. The findings of bull and bear market test give same results in two economic regimes. The results imply that institutional ownership concentration increases information availability and the findings are in line with monitoring hypothesis that states that institutional investors create value by effective monitoring that ultimately translates into equity market returns. In addition, quality financial reporting helps to improve information environment and is an important consideration for investors while making their investment decisions. Moreover, liquidity premium has been found as a critical factor in explaining asset returns and excess returns account for liquidity premium. The study reports that significant market, size, value, ownership, quality of financial reporting and liquidity premium exists for stocks traded at Karachi Stock Exchange.

Keywords: systematic risk; asset pricing; size effect; value effect; institutional ownership premium; quality of financial reporting premium; Liquidity risk premium; Fama and French three factor model; style investing; bull and bear market; two-pass regression

JEL Classification: G11; G12; G14

CHAPTER 1

INTRODUCTION

1. Background

The most prominent feature of the modern finance which distinguishes it from economic theory is its exclusive focus on capital markets. The models proposed by finance theory have provided some insight into the environment in which financial decisions are made. The renowned efficient market hypothesis (EMH) and other theories such as irrelevance theory (M&M), Markowitz's mean-variance theory, capital asset pricing model (hereafter CAPM), and Black-Scholes-Merton approach to option pricing are the core components of modern finance. The foundation stone of modern finance is laid down on three basic assumptions: capital markets are efficient; investors exploit all available arbitrage opportunities and investors are rational in their decision making (Dimson, 1999).

The core proposition of the finance theory is that higher risk is compensated with higher return. The fundamental assumption of most of the financial economic theories is that all investors are risk averse and the relationship between risk and return is explained by risk-premia i.e. return yield above the risk-free rate. The systematic risk premia is first explained by Sharpe (1964) who proposed a single factor CAPM, which is an extension of Markowitz's renowned mean-variance theory (Markowitz, 1954). The development of the mean-variance approach and CAPM have entirely changed the way in which academicians and practitioners do investment analysis. These theories are primarily based on the belief that market participants behave in a rational manner and incorporate all available information in decision making process, and hence, capital markets are efficient and security prices reflect all information.

It is a challenge for investors to realize excess returns in today's developed equity markets. The conventional or traditional finance theory states that markets are efficient, where individual investors form homogenous expectations and make rational economic decisions. The capital markets are informationally efficient, and equilibrium price reflects all available

information. The efficient market hypothesis (EMH henceforth) states that there is limited, if any, opportunity to yield excess returns and there is no free lunch in the market.

The efficient market hypothesis is one of the most important paradigms in modern finance. It has always been of a great interest to the finance community and a source of discussion between professionals and academicians since its evolution. In 1978, Jensen declares his conviction that *"There is no other proposition in economics which has more solid empirical evidence supporting it*".[1]The renowned efficient market hypothesis (EMH) hereafter, has been sub-categorized into three forms based on classical taxonomy of information content: weak-form efficient market hypothesis, semi-strong form efficient market hypothesis and strong-form of efficient market hypothesis.

The efficient market hypothesis has been put on trial recently and subjected to critical re-examination. The primary evidence indicates that the efficacy of EMH has gone astray. Many studies have documented that the equilibrium models based on EMH failed to represent trading norms in real capital markets. Therefore, the aggregate market behaviour, cross-section of average returns, and investors' trading behaviour cannot be easily understood within the traditional finance paradigm. A more precise description of capital markets is therefore needed to account for such aspects.

At earlier stage of its development asset pricing theory appears to be more focused on valuation of individual securities. In more recent past, advancements in technology and availability of pricing data have forced academicians and security analysts to switch their attention towards broader aspects of valuation techniques. The recent advancements in asset pricing theory play a vital role in growth of financial markets, in particular, derivative markets.

The capital market theory evolves in 1964. In later part of twentieth century several statistical tests are conducted by researchers to examine various aspects of asset pricing (e.g., Fama & French three-factor model, 1992). However, paradox revealed in testing of asset pricing model in different settings and times influences further development of new theoretical model.

[1] Jensen (1978).

It is a basic principle of financial economics that high risk assets are likely to yield higher returns. This risk-return trade-off underlies the conceptual frame work of asset pricing and investment decision making in financial markets. In late 1970s, empirical studies in finance identify many anomalies and excess return opportunities. The emergence of these anomalies criticize neo-classical finance school of thought by arguing that investors do not always behave rationally and influence the prices in such a way that leads to inefficiencies. Academic research and practitioners in finance agree that efficient market hypothesis does not hold all the time and it is possible to out-perform the market and earn abnormal gains at least in the short run. The investors use technical and fundamental analysis to beat the market and identify factors to forecast market behaviour and price dynamics. The academic literature and practitioners in finance accept factor and factor based models as core of modern trading strategies (e.g., CAPM; APT; Fama & French three factor and five models, 1992, 2014; Carhart four factor model, 1997). These factor based models are used in all phases of asset management: portfolio construction, portfolio selection, and performance evaluation.

These factors are constructed on cross-sectional characteristics of stocks. The most debated factors in literature are size premium, value premium, momentum etc. Primarily, these factors are identified to capture some economic insight. Secondly, they help to understand the asset pricing with reference to their exposure to sources of macro-economic shocks and security's fundamental risk.

The existing research in finance indicates that assets with same characteristics exhibit similar behaviour. These factors can be differentiated across different samples and markets. The robustness of these factors is also across different time-periods. The existing literature classifies these factors into three broader categories that is, macro-economic influences or shocks (APT, 1986), firm-specific cross-sectional characteristics (Fama & French Factor based models) and statistical factors. The macro-economic exposures like interest rates; exchange rates etc. are time-series that measure observable economic activity.

1.1 Theoretical Background

This section gives a brief introduction of asset pricing theories for the sake of theorizing with the variables of interest.

1.1.1 Asset Pricing Theories

The fundamental paradigm of capital market theory is based on risk return trade-off. Therefore, the core of modern portfolio theory is to figure out real risk proxies that determine stock returns or it can be stated that asset pricing theory deals with identification of risk sources and determination of premium for bearing such risks. The work on this fundamental relationship of risk and return starts when Markowitz (1952) presents his mean-variance analysis and optimal portfolio selection mechanism.

The modern asset pricing regime is based on capital asset pricing model (CAPM) and arbitrage theory (APT). These quantitative models have underpinned the rational expectations based theories (Markowitz, 1952; Sharpe, 1964; Ross, 1976).

1.1.2 Markowitz's Mean Variance Theory

The mean-variance theory presented by Markowitz (1952) plays a vital role in the development of modern portfolio theory and became a mile stone in laying down the foundation stone for the CAPM. This theory provides descriptive finance a mathematical and quantitative direction and concept of diversification and efficient frontier is considered as a rule of thumb for modern portfolio analysis that is why he is regarded as "father" of modern portfolio theory. The economic rationale behind this theory is risk-averse behavior of market participants. According to the mean-variance approach, an investor invests in a portfolio at time t that generates stochastic return at time t+1. While making investment decisions, he merely focuses on the mean and variance of return distribution. Markowitz entirely rejects the idea of existence of a portfolio with maximum expected return and minimum variance. He states that:

"*The portfolio with maximum expected return is not necessarily the one with minimum variance. There is a rate at which the investor can gain expected return by taking on variance, or reduce variance by giving up expected return.*"

Underlying motive of above mentioned proposition is to maximize utility in terms of risk measured by standard deviation of stock returns for a given expected return. The key contribution of Markowitz's work is his differentiation between riskiness of individual security and variability of returns of individual portfolio. In words of Markowitz:

"*In trying to make variance small it is not enough to invest in many securities. It is necessary to avoid investing in securities with high covariance among themselves.*"

1.1.3 Capital Asset Pricing Model

Capital market theory evolves in 1964 when Sharpe proposes Capital Asset Pricing Model for portfolio analysis. Sharpe extends the insight of Markowitz (1959) work by adding securities that are likely to co-move with market. The CAPM determines the risk-return relationship under conditions of general market equilibrium. A key innovation of this theory is introducing a risk-free asset in asset choice paradigm. An efficient portfolio is the one that lies on the efficient frontier and a line tangent to this portfolio intersects the vertical axis at the risk-free rate. The portfolio corresponding to the tangency point is regarded as market portfolio or super-efficient portfolio, representing most optimal amalgamation of risk and return achieved by combining this super-efficient portfolio and a position in the risk-free investment. The investors can take long or short position in the risk-free security on the basis of their risk appetite. The core assumption of the model is that security returns are linearly related to broader movements in the market index. The degree of sensitivity of a security to market is dubbed as beta. The model also assumes that security-specific returns are generated with known mean and variance parameters.

Within CAPM paradigm, agents optimizing their portfolios interact in market and agree upon the joint distribution of returns. Consequently, they derive prices to equilibrium. Therefore, an asset with higher systematic risk is likely to give higher return and vis-à-vis. Beta, a measure of systematic risk, is defined as covariance of an asset's return with the market portfolio's return. The key implications of CAPM are the quantification of portfolio systematic risk, the required rate of return for investors, and the hurdle rate for project evaluation.

In traditional CAPM framework, both return and risk increase in a linear fashion along the straight-line from the risk-free rate (RFR hereafter) to the market portfolio, that is, capital market line (CML), which is further extended to the creation of a security market line (SML henceforth).The SML visually represents the relationship between risk and the expected or the required rate of return on an asset. The equation of SML, together with estimates for the

return on a risk-free asset and on the market portfolio, can generate required rates of return for any asset based on its systematic risk.

Although, CAPM has been regarded as the most renowned model amongst asset pricing models, however, it's been highly criticized by academicians and practitioners. The traditional CAPM developed by Sharpe (1964), Linter (1965), and Black (1972) implies that there is a positive relationship between an asset's expected return and its systematic risk. It considers market beta as the only risk factor that explains cross-sectional differences in returns. Roll's critique in 1976 brings a turning point in empirical testing of CAPM. Roll totally negates considering market beta as the only measure of systematic risk by arguing that market index should include all assets and wealth of mankind. Therefore, the market portfolio proxy used in the theoretical framework of CAPM does not represents the true market portfolio. Furthermore, the emergence of asset pricing anomalies such as P/E anomaly (Basu, 1977), size (Banz, 1981), value anomaly (Rosenberg, 1985) further explains that these anomalies have systematic influence on security prices.

Fama & French (1992) are the first who propose a multi-factor model that explains cross-sectional differences in equity returns. They identified two firm-specific characteristics, viz. size and book-to-market factors, affecting stock returns. Back in 1972, the study of Scholes, Jensen, and Black put the CAPM on trial by showing that low beta stocks may earn high returns. Such empirical evidence strongly suggests that widely used market beta cannot be regarded as the only factor explaining stock returns. Roll (1977) presented the idea that stock indexes cannot be used as a proxy for the true market portfolio. He argues that doing so can definitely lead to CAPM being un-testable. A true market portfolio comprises all assets and liabilities like human capital, real estate, art work and so on, or anything that investors can hold as an investment. However, the market for such assets either does not exist or it is unobservable. Campbell (1993) associates asset's expected returns to its covariance with the market portfolio and factors forecasting stock returns.

1.1.4 Arbitrage Pricing Theory (APT)

The foremost criticism on the CAPM is that it takes into consideration only a single factor in determining return of a security. In other words, the systematic risk measured in relation to the market risk is the only determinant of stock returns. In traditional CAPM framework, there is no factor other than the market factor that affects the equity returns. In 1986, Roll and

Ross addressed this problem by presenting a new model known as Arbitrage Pricing Theory (APT). Likewise the CAPM, APT also assumes a linear relationship between portfolio risk and return. However, the model has fewer assumptions as compared to the CAPM. The following assumptions are required to hold APT:

1. The capital markets are perfectly competitive.
2. Investors opt more wealth over less wealth.
3. The return generating stochastic process is a linear function of K-risk factors.

The APT can be substituted for CAPM as both assume linearity in the risk-return relationship and their co-variation with a random variable. In CAPM framework, this risk is measured as covariance of a security's returns with the market portfolio's return while APT interprets it as a measure of un-diversifiable risk. The covariance is interpreted as risk premium and the slope coefficient exhibits the linear relationship between risk and return. Such relationship is closely tied to Markowitz's mean-variance efficiency.

Chen, Roll and, Ross (1986) propose one of the first large-scale empirical tests of the APT. In the APT framework, all investors believe in stochastic properties of returns. It is a K-factor model, where returns of capital assets are consistent with a factor structure. According to Ross, in the absence of no arbitrage opportunities, expected returns are linearly related to factor loadings. The factor betas or loadings are proportional to an asset's return's covariance with the factor. As noted, the theory assumes that the stochastic process generating asset returns can be expressed as a K-factor model.

The arbitrage pricing theory does not identify the factors that contribute the return generating process. Numbers of factors have been studied in various parts of world.[2] Since inception of APT, the academic debate remained on the number and the factors that are significant in explaining security returns. Early empirical test of APT by Roll and Ross (1980) use factor analysis to identify factors which were priced in US stock market. Yet, the major criticism on the technique used it is that factors have no economic interpretation. Later in 1986, Chen, Roll & Ross use observed macro-economic factors as risk factors. They argue that the price of security is discounted future cash flow and therefore choice of the factor includes any systematic shock that may affect stock returns. They only report changes in industrial

[2] For example, see Clare & Thomas (1994) and Haque & Sarwar (2012). For more on this issue, see the literature review chapter of the thesis.

production, spread between yield on short-term and long-term government bonds, spread between yield on low- and high-grade bonds, expected and unexpected changes in the inflation rate influence stock returns.

Likewise CAPM, the empirical tests of APT are also subject to the criticism by various researchers. Shanken (1985) argue that the approximation implied by APT is so vague that it is impossible to get exact pricing relationship with existing assumptions. They further argue that previous tests of APT merely test the model in equilibrium form. Therefore, controversy leads to the fact that there are fundamental limitations to the empirical verification of APT like CAPM.

1.1.5 Fama and French Three-Factor Model (1992)

The asset pricing paradigm has been changed significantly during last couple of decades. The risk factors other than volatility have been identified that are significant in explaining cross-sectional differences in returns. Indeed, empirical research has identified numbers of factors other than the systematic risk, which are significant in explaining variations in cross-sectional returns.

Cochrane (2001) writes:

"We once thought that the capital asset pricing model (CAPM) provided a good description of why average returns on some stocks were higher than others. Now we recognize that the average returns of many investment opportunities cannot be explained by the CAPM. We once thought that long-term interest rates reflected expectations of future short-term rates. Now, we see time-varying risk premiums in bond and in stock markets. The strength and usefulness of many <empirical> results are hotly debated, as are the underlying reasons for many of these new facts. But the old world is gone." (Recent developments in Finance).

The most renowned of these factors based models is the Fama and French (1992) three-factor model. Their model corresponds to the following three factors to explain cross-sectional return difference: market, size and book to market value. The efficacy of their model has been tested by Fama and French (1996) and other studies. Most of these studies found this model more suitable in explaining average returns, as compared to the CAPM. Fama and French (2004) consider CAPM as most powerful and undoubtedly satisfying predictor of

risk-return. But unfortunately, most of the times, they find empirical results of model do not support argument. Several subsequent empirical studies provide strong support to the Fama and French (1992) three-factor model. A notable effort was made by Carhart's (1997) who presented a four-factor model by adding momentum to the existing Fama and French three factor model. Moreover, Fama & French (1998) report liquidity premium associated with stock returns. Recently, Fama and French (2015) proposed five-factor model by adding two more factors viz. investment and profitability. They use 5X5 sorts to construct size, value, investment and, profitability portfolios exhibiting different investment styles. Further researchers identify of different risk factors such as maturity and default risk (Fama and French, 1993); dividend-yield (Shanken, 1997).

1.1.6 Theory of Market Microstructures

Over the past few decades, theory of market microstructures has become an imperative strand in explaining the relationship between liquidity and stock market returns. Although, market microstructures usually deal with trading mechanism in capital markets, it also affects security pricing, liquidity, transaction cost, asset pricing, corporate finance, and international finance. Specifically, in the field of asset pricing, abundant research is available to demonstrate significance of liquidity as priced model to determine asset expected returns. This study adds liquidity as priced factor in Fama and French three-factor model to examine its role in explaining equity market returns.

1.1.7 Behavioural Portfolio Theory

Neither the assumptions nor the conclusions of classical finance match the reality. For instance, the postulate from the efficient markets hypothesis that returns must follow a random walk is not confirmed by the actual market data. Similarly, even if there is some structure in the dynamics of economic variables, it does not represent the real economy very well. A natural way to start developing a theory that better matches the reality is to observe agents' behaviour in the economy either empirically (e.g., observing individual portfolios) or experimentally. The assumption of complete rationality underlying the efficient market hypothesis is wishful thinking that may be quite off from reality.

The collapse of rational expectation theories leads researchers to be sceptical regarding an investor's rationality assumption. It results in consideration of well-documented behavioural

biases in asset pricing models that helped to explain anomalous behaviours of the capital markets. The behavioural finance proposes more realistic explanation of agents' behaviour in determination of cross-sectional differences in returns. This is a necessary step to understand how investors select their portfolios and how do they devise their trading strategies. The two building blocks of behavioural finance are 'limits to arbitrage' and 'beliefs and preferences'.

The traditional finance approach to understand asset pricing is through models where agents act rationally and exhibit consistent beliefs, on the flip side, behavioural finance proposes some critical elements to understand how agents deviate from rational behaviour and how anomalies are created due to investor's irrationality. Thus, behavioural finance provides more pragmatic analysis of agent's behaviour and its impact on asset prices. Further, it helps to understand how agents interact in the market and what the outcome of their interaction is.

The existing literature provides strong evidence on the significance of information asymmetry and signalling effect in asset pricing (Kelly & Lustig, 2011). The study finds that uninformed demand falls as asymmetry increases. Showing consistency with the rational expectation models with multiple assets and multiple signals, declines in demand are larger when more investors are uninformed. It would cause more variable signals, larger turnover, uncertain payoffs, and the lost signal is more précised. The prices fall partially and expected returns will exhibit more sensitivity towards liquidity risk. Their study confirms persistence of information asymmetry phenomenon in asset pricing, and implies that asymmetry is a primary channel that links liquidity to stock prices.

Moreover, the demands of institutional investors are quite different from individual investors in a market. The core of this inconsistency stems from agent-principal conflict. Delegated portfolio management by institutional investors causes significant effects on prices in equity markets. Thus, it provokes the need of asset pricing models that takes into account agency conflict (Brennan & Li, 2008). Since security prices in equity markets are determined by their respective demand and supply, the effect of demands of individual verses institutional investors must be reflected in security prices.

It is observed that humans have innate tendency of grouping objects and thoughts. This classification is more persuasive in financial markets. While making investment decisions, investors classify assets into different categories, e.g., value *verses* growth stocks, large *verses* small capitalization stocks etc. These asset classes are referred as investment styles.

This phenomenon focuses on asset allocation among different asset classes instead of individual securities. An asset class possesses distinct characteristics from another asset class. Both institutional and individual investors peruse style investing for certain reasons. Major reason of this categorization is that it makes information processing easier (Mullainathan, 2000). This classification also helps investors to evaluate performance of professional money managers with respect to different investment styles (Sharpe, 1992).

The fund allocation among few investment styles is rather easier than searching for hundreds of securities. The style investing is more attractive for institutional investors as they prefer to follow systematic rule of asset allocation. This growing importance of style investing requires assessing its usefulness in security valuation. Some investment styles are permanent over the years and some vanish away after some time. Barberis and Shleifer (2003) develop a model of asset allocation based on style investing. They remark that, *"Money managers are now increasingly evaluated relative to a performance benchmark specific to their style."*

They explore the dynamic relationship of asset prices and investment styles with special reference to relative past performance of an asset class corresponding to specific investment style. The proposed model in this study combines style-based strategies with a credible mechanism for how these investors select portfolios among different investment styles.

1.2 Critical Appraisal and Research Gap

More or less all of the theories on asset pricing leave several further questions than providing answers to previously raised questions. The critical review of empirical literature on asset pricing anomalies is an attempt to amalgamate the empirical findings and theoretical work in a holistic concept that has drawn the following conclusions:

1. A notable shortcoming in existing portfolio paradigm is the lack of a well-sustained theory on factors based models. As a result, it is really difficult to bear out the soundness of existing empirical findings with theoretical justifications (Dimson, 1999).

2. The existing asset pricing models endure the lack of consistent methods in estimating systematic risk premium. Therefore, literature on the risk-return relationship is highly fragmented and incomplete.

3. The absence of unified identification of idiosyncratic risk factors make empirical findings debatable as to whether these factors are systematic in nature and whether their impact on equity prices is negative or positive. It generates different mispricing hypotheses. Hence, researchers are unable to answer observing phenomenon with rational asset pricing theory. The previous literature states that excess returns are not essentially result of risk premia associated with certain risk factors rather they are result of mispricing that prevails in the market. Since, there is absence of a generally accepted asset pricing model, it is hard to identify an explicit reason of potential mispricing.

4. The literature on asset pricing indicates various possible reasons of mispricing. Sometimes, market inefficiency and irrational investors cause mispricing (Bartov, Radhakrishnan, & Krinsky, 2000), in addition to this, limited attention by investors (Hirshleifer, David A. 2014), information acquisition cost (Landsman, Miller, Peasnell, and Yeh 2011), limits to arbitrage, transaction costs (Ng, Rusticus, & Verdi 2008, Zhang, Cai, & Keasey 2010), divergence of opinions (Garfinkel & Sokobin 2006), and market timings (Mashruwala & Mashruwala 2011) are the main reported reasons of mispricing, other than well-known asset pricing anomalies. This study only focuses on asset pricing factors that may cause mispricing, and trading strategies formulated on such characteristics may fetch excess returns for investors. As there is a lack of consensus amongst various explanations of excess returns, this study presumes that excess returns are systematically related to risk factors being identified.

5. The lack of theoretical foundation of the factors identified in empirical research has risen doubts regarding their generalizability and about their ability to forecast returns across different markets and time periods (Fama and French, 1992). Nevertheless, there is a great need to analyse these factors in different settings to assess degree of their generalizability. Empirical evidence shows that the factors like corporate governance mechanism and the structure of the economy of business organization affect the nature of priced risk anomalies. Therefore, renowned three factor model may not be considered as a useful tool in explaining stock returns (Novak & Petr, 2010, Griffin, 2010). The differences in corporate governance practices, capital market regulations, and economic parameters have a significance effect on relevance of risk factors (Hassan & Javed, 2011). This study is aimed to investigate relevance of these factors for Pakistan's capital market.

6. The recent developments in asset pricing literature open a debate whether these factors are global or economy specific (Griffin, 2010; Fama & French. 2014). As, Pakistan is an emerging market and asset pricing dynamics of such markets are quite different from developed markets. Specifically, the ownership premium and quality of financial reporting factors have specific relevance in Pakistan's context. Given these contents, it is very likely that financial markets in Pakistan not only suffer from market imperfections but also asymmetric information problem exists more profoundly. Therefore, Pakistan seems more relevant and interesting case for such analysis. Definitely, empirical evidence from such emerging markets helps to enhance our understanding of the asset pricing models.

1.3 Problem Statement

The study of Fama and French (1992, 1993) reveals that CAPM beta is not the only factor that explains cross-sectional return differences. This study proposes an alternative model by incorporating institutional ownership and quality of financial reporting over and above the market, size, value, and liquidity factors. When default risk increases rational investor require a higher return as compensation and low return when risk decreases. By and large, finding rational explanation of asset pricing anomalies is possible. This implies that abandoning the rational asset pricing paradigm may be premature. Therefore, Fama and French's (1992, 1993) model can be replicated by inculcating new non-conventional factors suggesting a better explanation of systematic risk. Thus, this study aims to investigate a number of asset pricing anomalies that can give rational explanation of cross-sectional differences in asset returns. The differences in corporate governance practices, capital market regulations, and economic parameters may have a significant effect on relevance of the risk factors. This study also aims to explore the degree of relevance of these factors and their pricing in Pakistan's equity market.

1.4 Research Questions

The core purpose of this study is to empirically evaluate the traditional asset pricing models, viz. and to propose a new multi-factor model by incorporating two new factors – quality of financial reporting and institutional ownership premium. To achieve the underlying objectives, the study seeks the answers of the following research questions:

1. What and how systematic risk factors affect Pakistan's equity market?
2. To what extent traditional and proposed asset pricing models help determining systematic risk premium in Pakistan's equity market?
3. Whether existing asset pricing models explain the equity market returns?
4. How corporate governance contributes in explaining equity market returns?
5. Whether quality of financial reporting is priced by market?
6. Are abnormal gains earned by various trading strategies "free-lunch", or compensations for some economic risk?

1.5 Objectives of the Study

The fundamental objective of this study is twofold. First, to re-examine the validity of the existing model. Second, to propose new six-factor model and to compare the explanatory power of the newly proposed model with the exiting one. Specifically, the study has the following objectives.

1. To provide insight about the applicability of existing asset pricing models in the equity market of Pakistan.
2. To provide insight about the role of ownership structure in explaining asset prices.
3. To investigate the impact of quality of financial reporting of firms on stock returns.
4. To investigate the persistence of risk premiums in bull and bear market regimes.
5. To test the robustness of proposed model using time-series regression (TSR) and cross-sectional regression (CSR) approaches.
6. To propose integrated multi-factor models that can explain the prices of financial assets with reference to their exposure to the fundamental characteristics or market behaviour.

1.6 Significance and Potential Contributions of the Study

This study has several contributions into the finance literature.

1.6.1 Theoretical Contribution

1. Primarily, the study links the concepts of disclosure practices and ownership structure to equity returns. A major contribution of this study is inclusion of corporate

governance factors, accounting anomalies, and market based factors in one single model of asset pricing for Pakistan's equity market.

2. The proposed model serves as empirical representations of trading strategies. Using portfolio returns as dependent variables and factors as explanatory variables, a trading strategy can be devised by investors, by exploiting premium associated with an anomaly or a characteristic. If there is a premium associated with identified risk factor then a strategy will yield abnormal returns.

3. Theoretical asset pricing models consistently assume that investors have heterogeneous information. An important contribution of this study is to establish the empirical relevance of information asymmetry and asset prices. As, the study takes into the account quality of financial reporting as a risk factor to address the problem of information asymmetry in context of asset pricing.

4. This study introduces the two factors ownership premium and quality of financial reporting premium in the asset pricing model. To the best of our knowledge, the existing literature is silent. Despite few studies in the same vein, none has introduced these factors into the asset pricing model in similar spirit. Hence, there is a vigorous need to bridge the existing vacuum in the literature by exploring new factors

5. This study compares the explanatory power of proposed six-factor with the existing ones.

1.6.2 Practical/Contextual Contribution

1. Using factor and forecasting models is central to portfolio management function. These models provide analytical support to analysts and portfolio management teams. For instance, models are used as a way to reduce the investable universe to a manageable number of securities so that, analysts can perform fundamental analysis on a smaller group of securities.

2. The factor-based portfolio construction helps investors to invest in a particular fund if they understand and agree with the basic idea behind the factor based trading

strategies. Factors give portfolio managers a tool in communicating to investors what themes or style they are investing in. Unlike prior studies, this study considers excess returns on sorted portfolio (investment styles) as dependent variables. Such analytical framework enables us how risk factors explain excess returns on different investment styles.

3. The factors assessed in various risk models are often used by risk managers to crumble variability of returns from risky securities. Simultaneously, these models are useful for portfolio construction, covariance construction, and risk analysis.

4. Empirical evidence suggests wide use of CAPM in estimating cost of equity for the projects in making capital budgeting decisions. The proposed multi-factor models has greater utility for corporate managers as it enables them to cost equities properly.

1.7 Limitations of the Study

1. This study does not examine the forecasting performance of the existing model for out of the sample and for another country, as this is beyond the scope of the study. However, the proposed model can be replicated for other financial markets.
2. Biases such as survivorship bias may exist while evaluating the results and drawing conclusions.

1.8 Organization of the Study

Chapter 1 consists of introduction of the topic, problem statement, research questions, objectives, and theoretical & practical contributions of the study. The rest of the thesis is organized as follows: Chapter 2 gives overview of the theoretical background on asset pricing. It comprehensively discusses related literature on asset pricing models and asset pricing anomalies to be addressed. Chapter 3 outlines the data description, methodology and builds a model by extending existing model of Fama and French (1992). Finally, the last two chapter report the empirical findings, discussion and conclusion of the study.

CHAPTER 2

LITERATURE REVIEW

This chapter consists of the review of the previous theoretical as well empirical studies on asset pricing models. In particular, Section 2.1 presents historical background of asset pricing. Section 2.2 presents literature review on size effect and asset pricing. The empirical evidence on value effect and asset pricing is given in Section 2.3, while the studies related to

institutional ownership and equity market returns are reviewed in Section 2.4. Similarly, the review of the studies in quality of financial reporting and liquidity and their relationship with equity market returns are presented in Sections 2.5 and 2.6, respectively. Last but not the least, empirical evidence on asset pricing in Pakistan's equity market return is given in Section 2.7.

Asset pricing theory explains how prices of financial assets are determined in an uncertain world. Since the development of asset pricing theory, several alternative proxies for systematic as well as idiosyncratic risk have been identified. Sharpe (1964) considers this idiosyncratic behaviour, as sensitivity of assets to broader movements in the market, or more precisely, to the macro-economic shocks (Ross, 1976). As systematic risk cannot be diversified away so it should be rewarded by risk premium that implies the pricing of risk in stock returns.

Asset pricing anomalies such as size, book-to-market and, momentum have opened a challenge to asset pricing theory since its evolution. The risk premium associated with these factors provides critical inputs in explaining the cross-sectional expected return on risky assets. On the other hand, magnitude, robustness, and, pervasiveness of these premia have become central point in debates on the validity of efficient market hypothesis. The robustness of these asset pricing anomalies has been tested in many markets for different time settings and asset classes (Lakonishok,et al.1991; Hawawin & Keim 1995; Fama & French 1992;Griffin et al. 2003; Maskowitz & Pedersen 2012). Avast body of literature is also available on asset pricing models which explains stock returns based on these risk factors (Fama & French 1992; Carhart 1997; Moskowitz et al. 1995; Hassan & Javed 2011). These factor based models open the theoretical debate on the underlying explanation of excess returns associated with these risk factors. At best, the given explanations can be sub-categorized into rational risk-based and behavioural explanation of asset pricing anomalies. In the following sections, we thoroughly review the existing empirical studies on abovementioned risk factors. For readability, we present the review on each underlying factor separately.

2.1 Historical Background

Recently, both theorists and empiricist have emphasized on the broader aspects of pricing of risky assets in capital markets. Modern asset pricing theory is based on a framework which

explains how the systemic risk is priced in financial markets and how investors are rewarded for bearing such risk.

The seminal work on asset pricing by Sharpe (1964), who proposed Capital Asset Pricing Model (CAPM), assumes that individual stocks returns exhibit linear co-movement with the market portfolio. This preliminary work of Sharpe (1964) helped in understanding the concept of risk measurement and diversification and simplified the process of quantifying co-movement of stock returns. Therefore, it became quite easier to understand the relationship between prices of the assets and their risk characteristics. Thus, CAPM is regarded as underpinning model that provide foundation for development of modern asset pricing theory.

Capital Asset Pricing Model assumes that investors hold efficient portfolios in terms of either minimum risk at a given level of return or maximum returns at given level of risk to maximize their expected utility. The model predicts that stocks having higher risk (betas) are expected to yield higher returns. Early investigations for validity of this model were based on the same assumptions. Linter and Mossins' CAPM assumes that the slope of security market line should be equal to market risk premium while the intercept should be equal to the risk-free rate.

The development of the capital market theory led to many testable hypotheses. Early meticulous test of the CAPM are performed by Black, Jensen, and Scholes (1972; hereafter BJS) by constructing monthly portfolios rather than using data on individual stocks. BJS's (1972) study finds that the relationship between excess returns and security beta is linear in nature and beta explains cross-sectional return differences. BJS suggest that constitution of the portfolios mitigates the problem of firm-specific variation in return and in turn improves the precision of beta estimates. This approach reduces the chance of statistical error that arises while working on individual stocks. The study reports that portfolios with high (low) beta yield higher (lower) returns.

Fama & Macbeth (1973) re-examine the model and their findings are also consistent with central prediction of BJS. They test linearity of the relationship and find a positive association between average return of security and their subsequent betas. They also report that the volatility of returns does explain the residual variation in stock returns which is not solely explained by beta. Although, the early investigation of the model supports the theory

but later tests of the model result in many controversies and raises the question on the validity of CAPM. Moreover, academic community started casting their doubts on the model's ability to explain variation in cross-sectional returns.

Seminal work of BJS and Fama and Macbeth are considered as methodological breakthroughs in testing CAPM. According to their approaches, in first phase, the risk factors are estimated by regression stock returns on market return, and then in the second phase, average expected returns are regressed on the estimated betas in cross-sectional framework. BJS pinpoint that this test does not give direct explanation of existence of beta factor i.e. zero-beta CAPM. This issue is later addressed by Fama and Macbeth who modified second-pass regression by performing cross-sectional regressions on monthly basis and then taking time-series average of estimated risk premiums.

Two-pass estimation methodology of BJS (1972) and Fama and Macbeth (1973) still suffer from innate statistical problems as betas used in second-pass regression are itself estimates of first-pass regression. This approach results in statistical error which causes estimated risk premiums to be smaller than actual risk premiums. However, BJS and Fama & Macbeth tried to reduce this error by forming portfolios but they could eliminate it partially.

One major criticism on CAPM is from Roll (1977) who argues that it is impractical to have a portfolio that contains all assets and liabilities in the market and no true or real world proxy of the market portfolio exists. Hence, empirical testing of CAPM becomes questionable. He also states that the only testable aspect of CAPM is the mean-variance efficiency of the market portfolio. If a true proxy of market portfolio is available then CAPM holds. It is not justified to use stock market index as a proxy of the market portfolio. Chen, Roll & Ross (1977) provide alternative explanation of the cross-sectional return differences by proposing arbitrage pricing theory (hereafter APT). They further argue that macro-economic shocks have an effect on asset prices and hence responsiveness or sensitivity of a security towards these macroeconomic changes is a justified proxy for systematic risk. However, APT could not replace CAPM entirely due to complexities faced by researchers in its empirical testing but still Roll's critique is considered very useful for academic community to assess true empirical power of CAPM. In early 1980s, empirical findings of many studies suggest deviations from this linear risk-return trade off. During past three decades, many asset pricing anomalies have been identified that openly challenge validity of CAPM.

Fama & Fench (1992) extend CAPM and added two other asset pricing anomalies along with the market beta to explain variation in cross-sectional returns. They use Fama & Macbeth (1973) procedure and arrive at the conclusion that the market beta is not the only factor that fairly proxies systematic risk. There are other firm-specific factors such as firm size and book-to-market ratio that increase the explanatory power of the model and capture variation in returns.

Pettengill et al. (1995) using Fama & Macbeth (1973) approach, address the problem of negative observations in assessing market and portfolio risk premiums encountered by researchers while testing CAPM. They divide the data sets into positive and negative subsets and named them up-market and down-markets respectively. They, further subdivided sample period into portfolio formation, estimation, and testing periods. For first two steps, it employs the methodology of Fama & Macbeth (1973), third step is modified by taking into the account the bull and bear market phenomenon. Beta estimates of the second step were regressed with returns of third period and report a linear but conditional relationship between realized risk premiums and security betas for periods of up-market and a negative relationship in periods of down-market.

2.2 Size Effect and Asset Pricing

A negative relationship between stock returns and market capitalization of a firm is known as size anomaly or size effect. Empirical evidence shows that size factor appears significant in CAPM. Banz (1981) examines empirical relationship between total market value of a firm and its returns and find that the small capitalization firms tend to earn higher returns than large capitalization firms. The study tests the CAPM and examines whether residual variation is explained by firm size or not and reports presence of a significant size effect. Basu (1997) identifies the price-to-earnings ratio as a significant factor that explains cross-sectional return differences. These findings do support the argument that CAPM may be missing some aspects from real world phenomenon, but these deviations are not that imperative to reject theory in an out right way.

Enormous literature is available on the relationship between firm's size and equity market returns. Banz (1981) argues that uncertainty as a result of insufficient information regarding small firms causes size effect. Reinganum (1981) examines size effect using a sample of 566

firms listed at NYSE and finds that the excess returns for both small and large firms underperformed market by 0.6% per month. Reinganum (1981) uses a shorter time span. However, the study is later replicated by Brown et al. (1984) for a longer period of time. The study reports a linear relationship between returns and mean size of all the sample firms. Lamoureux & Sanger (1989) find a positive monotonic relation between firm size and share price and report a negative relationship between size and bid-ask spread. The results of the study are confirmed by Fama & French (1992) by identifying the book-to-market equity (BE/ME) ratio as a most significant determinant of cross-sectional return differences. They argue that the existence of size effect is due to the standard asset pricing model's (CAPM) inability to incorporate large exposure to the underlying risk factor associated with firm's market value. Risk based explanation of size anomaly raises questions regarding the validity of existing asset pricing model i.e. CAPM.

No unanimous view has been found so far on the effect of size on stock returns. Size has been used as systematic risk proxy due to number of reasons. Small firms are having higher exposure to the macro-economic shocks as compared to large firms. Macro-economic influences may adversely affect their earnings prospects (Chan et al, 1985). The study considers small firms as 'fallen angels' or 'marginal firms' with low earnings, high leverage and inefficiency which perform poorly over the long period of time. It argues that risk faced by such firms is not captured by market index heavily weighted towards large cap firms.

Jagannathan & Wang (1996) test the model by using a sample of NYSE and Amex listed stocks for the period 1962-90 by assuming that betas are time-varying. They sorted the firms on the basis of market capitalization. These size sorted portfolios are further sub-sorted on the basis of beta estimates. The study also considers human capital element by taking growth rate per capita income to measure return on aggregate investment. Their findings strongly support the CAPM when betas are not constant over the period of time. Fletcher (1997) uses Pettengill et al.'s (1995) approach to test conditional CAPM in UK market by using size sorted portfolios. Their findings support Pettengill et al. (1995) earlier work on the same lines. The results show a positive and significant relationship between beta and risk premiums in periods of positive risk premiums and vice-versa. The study also reports that size effect is insignificant in explaining return differences.

Vassalou & Xing (2004) study size and value effects and report size effect to be the only significant factor within the highest default risk quintile. The study defines default risk as a firm's inability to service its debt. Dichev (1998) relates size effect with a firm's financial distress level. The study uses profitability and bankruptcy as measures of financial distress and reports that small firms are financially distressed and, the distress risk as systematic risk factor better explains existence of size effect. Another plausible reason for the existence of size effect is reported in the literature is the January effect. It is observed that returns for small firms are enormously high for small firms as compared to large firms (Friend & Lang, 1988). An alternative explanation of size effect is transaction cost or liquidity risk. Several studies suggest that the size effect is due to high trading cost for small firms which ultimately results in high systematic risk that needs compensation by investors. The CAPM and micro structure based models of asset pricing abstract from liquidity issues. Stoll & Whaley (1983) assess the size effect after incorporating transaction cost and find that it is not possible to gain abnormal returns after transaction cost adjustment. They report a significant size effect after consideration of transaction cost.

Amihud & Mendelson (1986) propose a theoretical model and relate expected returns to increasing bid-ask spread. They argue that an investor requires compensation for expected trading cost. On the other hand, Schultz (1983) states that the size effect cannot be solely explained with transaction cost differences between small and large firms. According to Coleman (1997), size measured as market capitalization of a firm is a deceptive explanation of market returns. The investors have fallacy that the companies with large market capitalization provide higher returns as compared to the companies with considerably low market capitalization.

Datar et al. (1998) use turnover as a proxy of liquidity and find that turnover explains cross-section of returns after controlling of size and value factors. Several studies on liquidity risk reveal that illiquidity is considered as risk to investors and small firms exhibit more sensitivity towards this state variable (Amihud 2002). One of the shortcomings that makes the liquidity argument weak is that it does not take into the account seasonality of size effect. Keim (1983) examines the size anomaly and reports higher excess returns for small firms over the period of 1963-79 during the month of January. The study observes that the size premium varies over the years and is unstable over the period of time.

Several studies provide evidence on the size effect in international markets, other than US market. The results of these studies are consistence at first sight. It is evident that small firms tend to outperform large firms in both developed and developing markets. Although, the reliability of these international empirical evidence is limited either due to use of small data periods or they suffer from data problem. Very few studies exist that provide robustness of results related to these risk-adjusted returns and many studies reveal that the size effect is reversed in later period for many markets.

Levis (1985) examines the size effect for market value sorted portfolios for UK market for the period 1958-1982 and reports a significant monthly size premium of 0.40%. Strong and Xu (1997) replicate the work of Levis (1985) for a different time period (1973-1992) for capitalization sorted portfolios and observe a significant size premium of 0.61% per month for UK market. Dimson & Marsh (1998) use index data for the UK and the US for the period 1955-1988. The study employs multivariate sorts on the basis of market capitalization of individual stocks and reports significant size premium. They later revisited their work for a different time period (1988-1997) for the same UK market and observe that the size effect is reversed and a negative premium of -0.47% per month is reported.

A growing body of literature provide strong evidence suggesting emerging and developed markets differ from each other in several aspects, the attitude of traders/investors towards the risk is common across the markets. This commonality in risk averse behaviors of investors cause size premium to appear consistent across the markets. The persistence of size premium across both types of markets can also be justified as follows. Although, the level of development in both markets is different, corporate firms have similar size-inherent advantages and disadvantages. Therefore, small size firms are perceived risky not only in developed market but also in emerging and developing markets. Therefore, investors of small firms require higher premium. Several studies examine and report significant monthly size effect for different markets across the world (Australia: Beedles (1992); Canada: Elfakhani et al. (1998); Belgium: Hawawini, Michel, and Corhay (1989); New Zealand: Gillan (1990); Taiwan: Ma and Shaw (1990).

Empirical methodology to test the size effect has been largely criticized in the literature. Berk (2000) negates Fama & French (1992) methodology of sorting stocks into market value based portfolios and further sub sorting of these portfolios on the basis of beta. This multivariate

technique methodology has a strong implication to investigate explanatory power of CAPM within size sorted deciles. Berk (2000) criticizes the technique by arguing that it is biased towards testing asset pricing model in the second step. The study further argues that selecting variable in the first step on the basis of its empirical relationship with returns within the sub groups implies that the probability of rejecting the null hypothesis of a flat-beta relationship is low. He shows that if asset pricing model is employed incorrectly, it results in an inverse relationship of size with part of return not explained by the model.

Behavioural finance school of thought offers alternative explanations for the existence of size effect. Chan (1991) suggests that small firms are the ones that performed badly in the past and investors usually prone to invest in large stocks. Lakonishok, Shleifer & Vishny (1992) relate the size effect with agency concerns by professional money managers as investment in small stocks is not easily justifiable. Moreover, incomplete information is available regarding small firms. Merton (1987) examines big size effect. He argues that well-known stocks with higher investment base tend to yield higher expected returns. Further, magnitude of size effect also depends upon market micro-structures, trading mechanisms, efficiency of capital markets and investor type

After reviewing the literature on the existence of the size effect in international developed equity markets, it is very likely that the size effect will also exits in emerging and developing markets such as Pakistan. In fact, we find only a handful studies that have incorporated size effect while examining asset pricing in Pakistan (Javed 2008; Hassan & Javed 2011). Although, the size effect has been previously assessed in Pakistan's equity market, it is needed to revisit size effect empirically in Pakistan's equity market in different time period and in more sophisticated empirical framework to build strong arguments against data snooping concerns. Therefore, this study includes size factor into the account while examining the impact of other factors to avoid any specification bias. Therefore, the following hypothesis has been built on the basis of literature reviewed:

Hypothesis 1: There exists a positive relationship between size premium and stock returns.

2.3 Value Effect and Asset Pricing

The existence empirical literature on asset pricing reveals the efficacy of book-to-market ratio in explaining stock returns since long (Rosenberg et al. 1995; Fama & French 1992, 1993,

1996; Lakonishok, Shleifer, and Vishny 1994). A positive relationship between stock returns and book value to market value of equity of a firm is known as value anomaly or value effect. Stattman (1980) & Rosenberg et al. (1985) suggest that book equity-to-market equity ratio of a firm is a relevant factor in determination of U.S.A. market. Chan et al. (1991) reports a positive relationship between BE/ME ratio and Japanese equity returns. Moreover, Daniel et al. (1997) examine the cross-sectional variation in Japanese stock market and observe that value effect is significant in explaining return differences. Chui & Wei (1998) study book-to-market effect in Pacific Basin emerging markets and find value effect significant for all of these emerging markets except Malaysia, Korea & Hong Kong.

In 1992, Fama & French provide the evidence that book-to-market ratio and firm size can capture much of the variation in explaining cross-sectional return differences. The study also confirms that the value effect persists in many international stock markets. The study further reports that value stocks tend to be traded at a low price relative to their cash flow fundamentals like dividends and future earnings and are thus categorized as undervalued by investors. Value stocks outshine the growth or glamour stocks. Fama & French (1995) highlight that firms with low BE/ME ratio show evidence of persistent higher returns than high BE/ME ratio firms. Asgharian & Hansson (2000) examine the size and value effect in Swedish Stock Exchange and produce evidence contrary to the existing literature and link this behaviour to the effects of Swedish crisis period i.e. 1990-94.

Fama & French (1992) develop a three factor model with two additional factors other than market beta i.e. size and B/M and their findings show that this model captures cross-sectional return variation for US market in better way as compared to CAPM. Fama & French argue that existence of size and value premia are reward for the risk borne by investors. Fama & French (1995) associate high B/M factor with firm distress level and consider low B/M stocks as growth stocks with sustained profitability and small stocks low profitable as compared to large stock. Investors are compensated for holding such riskier stocks with high distress level and low profitability. Fama & French (1998) provide evidence of size, value, and momentum premium for international markets. . The study tests the model for three regions i.e. America, Europe, and Japan and report plausible explanation of average return of portfolios when sorted on basis of size and B/M.

Academic debate on Fama & Frecnh three factor model is focuses on two central points. First argument implies that stocks with high BV/MV imply a higher required rate of return or discount rate. The second approach views the presence of BV/MV anomaly as a proxy for mispricing as a result of systematic errors made by investors with arbitrage constraints. Fama & French (1995) and Chen et al. (1998) argue that one explanation for higher expected returns for value stocks is higher risk premium required by investors due to their persistent low earnings, high distress level, low dividend pay offs and high financial leverage. Literature also documents the presence of value premium due to data snooping and selection bias.

Consistent with the mispricing hypothesis, Phalippou (2007) proposes an alternative explanation of value premium. He argues that the value premium is driven by stocks held by individual investors rather than institutional investors. They report a decreasing relationship between value premium and institutional ownership concentration. Jariya et al. (2013) investigate the size and book-to-market factors in explaining stock returns for Sri Lankan Stock market. Empirical findings of their study highlight two new findings: the size effect is insignificant for Sri Lankan equity market and the book-to-market factor has a negative relationship with stock returns. Griffin & Lemmon (2002) examine the relevance between the value effect and financial distress risk of a company and argue that the investor's required rate of return is higher for distressed firms and it exhibits sensitivity to change in BE/ME of a firm. Frazzini et al. (2014) challenge standard methodology of pricing book-to-market factor by using the current period's book-to market ratio instead of lagged period and state that Book-to-price ratio based on same lag can better forecast stock returns.

Empirical literature provides many credible reasons for the existence of value effect. Number of studies indicate that causes of value effect is embedded in an investor's behaviour (Lakonishok, Shleifer &Vishny (1994). The study argues that value firms are the firms that have poor performance history. If investors over extrapolate past bad performance, it results in over reaction which will eventually lead to a low stock price and high future returns. Penman (1991) argues that low book-to-market stocks remain more profitable than high book-to-market stocks for at least five preceding years after the portfolios formulation period. It further provides evidence regarding the persistence of book-to-market anomaly and behavioural school of thought regards this phenomenon due to investors' over reaction.

Another behavioural explanation of value effect provided in the literature is that investors dislike value stocks, whereas they like growth stocks

To construct the book-to-market equity ratio (BE/ME), book value of shareholder's common equity from the accounting period ending at least three months before the month's beginning and market value of equity from month beginning is generally used. The minimum three-month lag follows a standard procedure that ensures that the accounting information is known to the market at that time (Rosenberg, 1985). On the basis of the literature review, we construct the following hypothesis.

Hypothesis 2: There exists a positive relationship between value premium and stock returns.

2.4 Institutional Ownership and Asset Pricing

Ownership structure is referred as equity distribution with respect to voting rights and identity of equity holders. Ownership structure has gained attention in recent past as corporate governance is one of the major issues for both market regulators and investors. These structures are considered as determinants of managerial incentives and economic efficiency of business corporations (Jensen & Meckling, 1976). Empirical literature verifies that ownership structure plays a vital role in good governing companies. Ownership structure of a firm allows differentiation between different classes of shareholders such as institutions, family, foreign investors, state etc. (Shelefir & Vishney, 1997).

In emerging markets, ownership structure significantly differs from the one exits in developed economies. In most of emerging markets, the ownership is concentrated in hands of family group or state. The literature on corporate governance agrees upon the importance of ownership structure and acknowledge its importance. Prior literature shows that excess control over ownership results in stock value (Claessens et al., 2002). Wang & Jiang (2004) report a significant relationship between ownership structure and the firm performance in Chinese listed companies. A popular version of this link is that ownership structures are are designed to confiscate wealth of minority shareholders, and discount in stock prices exhibit high risk premium charged by investors.

Marcinicin (1999) examines the impact of distinguished ownership structures and stock prices and reports that the presence of a dominant non-government investor has a positive impact on share prices. If dominant investors possess inside information and are known to do so, the mere fact of buying into a company sends a signal to uninformed outsiders. It can be concluded that this positive impact on share prices was due to expectations of better corporate governance, not to the fact that those investors possessed inside knowledge.

Bennett (2004) examines the effect of ownership structure on the market assessment of asset sales. He has identified three types of ownership structures: widely held, large block of outside investors and inside investors. The study reports a positive announcement effect on firms with large block outside investors than widely held firms and inside shareholder for both buying and selling firm samples.

Albuquerque & Wang (2005) argue that parting ownership allows controlling shareholders to seek their private benefits at the cost of outside minority shareholders. The study argues that controlling shareholders have discretion of distorting corporate investment and pay out policies. The study also affirms that countries with weaker investor protection entail overinvestment, higher dividend yields, high interest rate, high equity premiums and volatility, and low book-to-market values.

Over the past few decades, the role of institutional investors in capital markets has grabbed attention of both academicians and practitioners. Institutional holdings have increased enormously over the last few years. This suggests that it is important to study the role of institutional investors as equity-holders that may affect stock market prices and volatility. A vast body of literature is available which examines the effectiveness of institutional investors in developed countries like the UK and the USA. There is also growing body of knowledge available exploring the role of institutional investors in emerging markets. The shareholding pattern of Asian firms has been predominated by concentrated ownership. (Aoki, Jackson & Miyajima, 2007; Claessens, Djankov & Lang, 2000; La Porta, Lopez-de-Silanes & Shleifer, 1999; Shleifer & Vishny, 2012).

Several studies examine the role of institutional investors in context of the effect of monitoring on stock prices, earnings management, and firm profitability. In Pakistan, the focus of institutional investment related studies is more on its impact on corporate

governance mechanism and shareholders activism. Not much literature is available on the impact of these institutional holdings on stock market performance of a firm. This specific study is aimed to investigate the relationship between institutional ownership concentration and stock returns from Pakistan's perspective. This study makes a contribution to the existing empirical literature examining the role of institutional investors and financial reporting quality on stock returns by adding these two firm specific factors in standard Fama and French three factor model (1992). Monitoring hypothesis states that institutional investors due to the magnitude of wealth invested are likely to manage and monitor their investments more actively. This active monitoring by institutional investors will result in improvements in stock prices, profitability, and overall performance of firm (Brous & Kini, 1994).

On the other hand, private benefit hypothesis states that large institutional investors have access to private information which they can be used for trading purposes (Kim, 1997). In such case, these large block-holders may force management not to disclose high quality earnings. The study in hand focuses on monitoring hypothesis where a positive relation is hypothesized between institutional ownership concentration and its outcome i.e. increased stock prices. Since developing economies have relatively weaker investor protection, concentrated ownership structure and poor governance practices, this empirical evidence lends further support to test the hypothesis in emerging market of Pakistan.

Over the past two decades, informational aspect of the pricing process has got significance in theoretical research in financial economics. The literature provides strong evidence of clientele effect in ownership structures suggesting the special concerns of institutional investor. Gompers & Merick (2001) report more institutional holdings in liquid and larger stocks. Falkenstein (1996) show that mutual fund investment is more inclined towards large and liquid firms, about which, lot of information is available. Scharfstein and Stein (1990) argue that investment managers should avoid return outcomes revealing them as uniformed traders. Institutional investors have an informational advantage because they possess a significant amount of investment experience and expertise

Both academic literature and capital market trend show a significant growth in institutional ownership since last two decades. The literature in behavioural finance indicates that individual investors are more prone to judgment biases than institutional investors (Lakonishok & Vishny, 1994). In addition to this, institutional investors have more expertise

and resources to gather and analyse data and sometimes have information advantage regarding selective disclosure over individual investors. The literature regards institutional investors as more sophisticated and informed traders. Many recent empirical investigations support this claim.

Dennis & Weston (2002) examine the price impact of institutional trading and find that institutional ownership is positively related to micro structure based measure of informed trading. Sias et al. (2004) find that institutional trading significantly affects pricing dynamics of equity market due to information content of their trade. Previous literature reveals that institutional investors outperform the market and retail traders as well (Daniel et al. 1997; Nofsinger & Sias 1999; Wermers 2000). This study is also aimed to investigate the role of institutional players in explaining asset pricing in financial market of Pakistan.

Gompers & Metrick (2001) examine the relationship between institutional ownership and liquidity after controlling for size. Moreover, Phalippou (2004) shows that institutional ownership is negatively related to Amihud's (2002) illiquidity ratio and suggests that institutional trading has both long lasting and temporary price effects. He relates this temporary effect to informational content of financial markets.

The literature presents three plausible explanations for price effect of institutional trading. One possible explanation is that institutional investors unearth private information about stocks and expose it through their trading that will ultimately lead to price effects (Hara 1987, Kyle 1985, Boehmer & Kelley 2009). Second reason for this permanent price effect is that institutional investors' long term demand and supply curves are not perfectly elastics as they view stocks as imperfect substitutes. Thus, other investors on other side of the demand created by institutional investor lower (higher) prices to buy (sell) stocks (Shleifir 1986; Bagwell 1991; Mendenhall 1996; Greenwood 2005). The third explanation focuses on temporary price effect of institutional investors' trading. The literature implies this temporary price effect is a result of slow investment capital movement to trading opportunities (Duffie 2010).

Firms with institutional ownership concentration show different stock market reaction than other firms. High institutional holding results in a concentrated ownership structure by majority stake holder. Ownership concentration by institutional investors affects both cash

flow rights (ownership) and voting rights (control). In the literature, there are two perspectives regarding effect of concentrated ownership on cross-sectional return variation, one is the managerial entrenchment effect other one is incentive alignment effect.

Under the incentive alignment perspective, concentrated ownership works as a bridge to reduce agency cost by aligning interests of majority and minority shareholder (Grossman and Hart, 1980; Shleifer and Vishny, 1986; 1997; Kaplan and Minton, 1994). Mitton (2002) reports that highly concentrated firms performed better during East Asian financial crisis. On the other hand, highly concentrated firms can make a convincing commitment by building a reputation for not exploiting interests of minority shareholder (Gomes, 2000). Grossman & Stigliz (1980) argue that firms with concentrated ownership will disclose better firm specific information that will result in low information cost to minority shareholders. Minority shareholders are in a better position to harvest the benefits from this information environment created by dominating shareholders. This improved information environment facilitates informed traders, which results in more information incorporation into the stock prices. Therefore, under incentive alignment hypothesis, cross-section return variation is inversely (positively) related to ownership concentration

Under managerial entrenchment effect, controlling or dominating shareholders have a motive to divert firm resources at the expense of minority shareholders (Morck et al., 2000; Claessens et al., 2002; Fan and Wong, 2002). Managers can also exploit their control over firm by engaging themselves in self-dealing transactions (Morck, 1996). In either case, it restricts them to leak related information. This limits the information disclosure to outside shareholders. On the flip side, in order to overcome information opacity and to avoid the risk of exploitation by dominating shareholders, outside investors with weak protection try to seek private information actively, and have to bear higher cost associated with acquisition and processing of information. As a consequence of this high cost due to concentrated ownership, informed traders are hindered to incorporate firm specific information in stock prices (Roll 1988; Morck et al. 2000; Fernandes & Ferreira 2009). As a result, stock prices of concentrated firms do not reflect all available information. Thus, under entrenchment perspective, it is expected that cross sectional return variation is positively related with ownership concentration.

The current study explains another paradigm that may affect stock returns by considering ownership structure factor. Specifically, the current study purposes to examine the

relationship between firm's ownership structure and equity returns by extending the Fama & French three factor model (1992). To examine the effect of ownership structure on stock returns, we test the following hypothesis.

Hypothesis 3: There exists a significant relationship between ownership premium and stock returns.

2.5 Quality of Financial Reporting and Asset pricing

Both corporate disclosures and accounting information play a vital role in financial markets and provides a fundamental base for corporate investors for efficient asset allocation. Information disclosed in financial reports of a company helps investors in their asset allocation decisions. An investor can use these general purpose accounting statements to forecast free cash flows of an entity, estimate associated risk, and identify fundamental value of the firm's stock which is compared with its market price to make investment decisions.

Disclosure quality and transparency in financial reporting are one of the most vital elements of good corporate governance. Financial reporting transparency and information disclosure have gained special attention recently due to special concerns of regulators and investors. In badly governed firms, managers are likely to use information to hunt private benefits. They may take information advantage that may lead to increased agency cost borne by shareholders.

The impact of corporate governance on asset prices is an important and significant issue in current investment world. Gompers, Ishii, and Metrick (2003) and Cremers and Nair (2005) find that governance directly influences stock returns. Saragih et al. (2013) investigate the impact of ownership concentration, foreign holding, and audit quality on the amount of information incorporated in stock prices. They directly related stock price synchronicity to information related to earnings.

There are plenty of studies on the effect of corporate governance on stock market returns. Poor disclosure practices are a common attribute of emerging markets. The current study aims to investigate synchronized relationship between stock returns and financial reporting

quality by arguing that firms with bad quality of financial reporting exhibit poor stock market performance.

Prior literature provides sufficient evidence on relationship of disclosure practices and its impact on stock returns. Findings in prior literature are consistent with the proposed hypothesis, that better disclosure practices are allied with better equity returns. Disclosure quality is used as firm-level corporate governance proxy by Mitton (2002) to evaluate impact of corporate governance practices on stock prices. Healy et al. (1999) argue that increased disclosure ratings lead to increase in stock liquidity, institutional ownership, analyst following, and stock prices.

Patel and Dallas (2002) report the significant relationship between transparency and disclosure rankings. Their findings are based on annual reports of US firms' transparency and disclosure rankings, size and, P/E ratio as additional determinants of equity returns. They have also shown that the quality of financial reporting based on transparency and disclosure measure negatively affects security risk. One way to reduce such information asymmetry between managers and outside investors is to carry out external audits by independent auditors. It lends credibility to reported financial statements (Dopuch, 1986). As per the prior literature reviewed, none of the study investigates the significance of audit quality in firm-specific information capitalization context.

The literature indicates various facets that can be used to measure quality of financial reporting such as current earnings ability to predict future earnings, timeliness, and earnings quality (Ball, Robin, & Sadka, 2008; Roychowdhury & Watts, 2007). Earnings quality has always been a point of debate for both academicians and practitioners in accounting and finance literature. The central point of this debate lies on the extent to which accounting earnings can gauge future cash flows. Empirical evidence suggests that poor mapping of accounting accruals into cash flows decreases information content of accounting earnings which in turn results into low earnings quality. Retail and institutional investors possess different abilities to process earnings related information and if earnings quality is poor it may result differentially informed trading and worsen information asymmetry in financial markets (Kyle 1985; Diamond & Verrecchia 1991; Kim & Verrecchia 1994). This information asymmetry results in larger compensation demands by liquidity providers in form of wider bid ask spreads and higher required rate of return.

In Pakistan as an emerging economy, most of firms have concentrated holdings by families and government agencies. In such setup, institutional investors based corporate governance model is much needed where high-quality and timely information is demanded by such strong investors which may help to reduce information asymmetry among management and stakeholders. Despite the fact that accounting and regulatory bodies are strictly imposing reporting rules and standards, quality of reporting is becoming questionable instead of quantity of informativeness. Corporate transparency has become a serious concern for investors.

Financial reporting quality is a theoretical concept and academicians and practitioners have not identified a uniform method to capture this multi-dimensional concept. Earnings quality is widely used as measure to judge quality of financial reporting. Since earnings quality itself is not a directly measureable phenomenon, several measures as proxies of earnings quality have been identified in empirical literature by many researchers (Francis et al. 2006; Schipper & Vincent 2003; Dechow & Schrand 2010). Most of the measures whirl around institutive and plausible conceptions regarding desirable characteristics of accounting standards being adopted. The choice of the measure is a critical research design issue and has a trivial impact on research results.

The literature in accounting suggests market based and accounting based measures of financial reporting quality. Francis, LaFond, Olsson, & Schipper (2004, 2005) provide evidence that financial reporting quality matters for expected returns. The study suggests that accounting based measures have greater explanatory power as compare to market based measures to assess financial reporting quality. The study explores seven quality measures and report significant but not economically large correlation among these measures. It suggests that there is little overlap among them. On the contrary, Dechow, Ge & Schrand (2010) report significant and negative correlations between various measures of earnings quality which indicates that conflicting results may be obtained by employing different proxies.

Liu et al. (2005) use abnormal accruals and accrual quality and form hedge portfolios based on these accrual measures. The study uses accrual measures as priced risk factors and explains the possibility that corporate insiders can earn abnormal gains from trading based on

these factors. The study reports that abnormal accruals and quality accruals are significant priced risk factors.

Marinovic (2010) examines the impact of earnings management on market reactions with assumption of uncertainty where mangers can bias reported earnings. He finds earnings persistence as a significant measure of earnings quality. The existing literature provides mixed evidence regarding reporting quality as priced risk factor. Easley & O'Hara (2004) suggest that information asymmetry among market participant is itself a source of systematic risk. Lambert et al. (2007) examine the effect of idiosyncratic information on risk premium and find that increased risk premium is a result of changes in covariance between a firm's cash flows with the cash flows firms in the economy.

Ng (2011) suggests that information and disclosure quality has a significant association with liquidity risk. It finds that better information quality results in lower liquidity risk, and in turn, the lower cost of capital. Hughes et al. (2007) examine information signals in context of asset pricing models. The findings of his study suggest that information signals are either diversifiable or captured by existing priced risk factors. Barth et al. (2006) relate the cost of capital to the financial statement transparency and quality. They suggest that greater transparency results in lower cost of capital.

It is a unanimously agreed argument that financial reports are an important source of information for corporate stockholders. Institutional investors use financial information to plan and evaluate their investments. Institutional investors' reliance on non-financial information indicates that earnings related information is either irrelevant or already incorporated into stock prices. These empirical findings suggest that financial reporting quality matters from security pricing point of view. The contention that institutional investors use financial information to manage and evaluate their portfolios is consistent with the previous literature that documents evidence of market reactions around earnings announcements (Potter, 1992; El-Gazzar, 1998).

Quality of financial reporting, disclosure attributes and its effect on cost of capital have always been a subject of interest for practitioners and researchers. But how information reporting quality is associated with asset pricing has now become contemporary issue for

researchers in finance. The consideration that whether disclosure/reporting quality risk is systematic in nature and priced in capital markets is still unanswered.

This study is aimed to investigate whether financial reporting quality matters for investors in addition to the other information in market and whether quality of financial reporting is a priced risk factor in equity market of Pakistan. This study employs one of the most appropriate and convincing proxy used by Barth, Cram, & Nelson (2001) to examine the relationship between financial reporting quality and subsequent stock returns of the firms operating in Pakistan.

Hypothesis 4: There exists a significant relationship between quality of financial reporting premium and stock returns.

2.6 Liquidity Risk Premium and Asset Pricing

Broader area of market micro structure has a strong theoretical and empirical linkage with asset pricing domain. Price formation models in capital markets imply that informed investors give rise to the illiquidity cost for uninformed investors. Thus, the require rate of return should be higher for illiquid stocks. Amihud & Medelson (1986) are the pioneers who discussed role of liquidity in capital markets. Although, the relationship between spread and relative risk has been tested by several studies (Black, Jensen and Scholes 1972; Fama and MacBeth, 1973; Black and Scholes, 1974) but Amihud & Medelson (1986) are the first who formed portfolios and examine the empirical relationship between excess returns, spread, and relative risk. They consider liquidity and trading cost as core of investment plans and find that stock returns include a significant liquidity premium. Several studies on micro structures (Kyle 1985, Easley & O'Hara 1987, Golsten 1989) suggest that information asymmetry caused by illiquidity can be captured in price impact of trade.

The existing literature on pricing of liquidity risk also associates illiquidity premium with investor's horizon. Amihud & Medelson (1986) argue that investors having long investment horizon require little premium and tend to hold illiquid stocks. They capture liquidity effect with bid-ask spread and suggest that expected returns increase with relative bid-ask spread.

Another aspect of liquidity risk being discussed in the literature is clientele effect. The literature indicates that small traders tend to invest in liquid stocks (Brennan &

Subrahmanyam, 1995). Thus, there is a probability of high institutional holding in relatively illiquid stocks.

The current study is also aimed to link diverse strands of finance i.e. asset pricing and market micro-structures. Liquidity risk is a concern for investors. Liquidity is defined as the ability to (1) trade quickly without significant price changes, and (2) the ability to trade large volumes without significant price changes (Amihud, 2002). Gompers & Metrick (1998) analyse how institutional investor act differently from other investors and that these differences have implications for stock prices and returns. The current study examines various stock characteristics preferred by institutional investors and explain the stability of these preferences over time. It shows that how changes in ownership structure constitute changes in relative stock prices of big and small capitalization firms and the contemporary desertion of the size premium.

Empirical evidence reveals that institutional investors prefer stocks with value characteristics, more liquidity, large capitalization, and low momentum based returns. Cerniglia and Kolm (2012) discuss the effects of liquidity risk during the "quant crisis" in 2007 and show how the rapid liquidation of quantitative funds affected the trading characteristics, price and factor-based trading strategies. It is a well-known and well-documented anomaly that premium for illiquid stocks are higher than liquid stocks. Trading volume and turnover, illiquidity ratio and other microstructure components of transaction cost, such as bid-ask spread are widely used measures or proxies of liquidity or illiquidity (Amihud and Mendelson, 1986).

Amihud and Mendelson (1986) consider liquidity premium as a rational compensation by investors for holding illiquid securities. But its nature is different from risk premium as it is represented by continuous drifts in continuous time models and is regarded as a factor or characteristic affecting stock returns. Pastor & Stambaugh (2005) argue that liquidity risk is priced in stock returns. Though, certain studies have shown that magnitude of this premium is quite higher than explained by rational asset pricing models (Constantinides, 1986; Vayanos, 1998).

Lee (2006) examines the relationship of liquidity and stock returns. Numerous empirical studies revisit the relationship and report that liquidity matters while estimating asset returns. Amihud et al. (2006) estimate required rate of return of an asset as a function of risk free rate

plus percentage transaction cost. The study of Naes, Randi, & Bernt (2008) links holding period, liquidity, and stock returns.

In past two decades, many micro-structure theories have been evolved and opened a new debate in asset pricing literature. As the existing paradigm is unable to map Amihud (2002) liquidity construct. These theories opened up avenue for a new debate that liquidity is endogenous and it relies on other asset specific variables. For example, liquidity is dependent on volatility while in traditional asset pricing paradigm volatility is related to expected returns. Lack of adequate control for systematic risk may cause liquidity to appear as priced factor (Amihud & Mendelson 1986; Brennan & Wang 2005).

Many researchers capture the impact of liquidity via volume. Baker & Stein (2004) argue that volume captures investor sentiment and liquidity itself is dependent on volume. Still, there is lack of consensus over measurement of liquidity. This specific study uses turnover ratio as measure of liquidity to examine its effect on stock returns.

Hypothesis 5: There exists a positive and significant relationship between liquidity premium and stock returns.

2.7 Asset Pricing in Pakistan's Equity Market

Asset pricing parameters and returns offered by emerging equity markets have also grabbed the attention of researchers and investors over a decade. Javed (2008) examines the multi-moment CAPM for Karachi Stock Exchange. The study extends the standard CAPM taking into account higher moments and assumes betas vary over the period of time. There results for un-conditional settings reveal that co-skewness risk premium exists and investors are rewarded for bearing such risk. However, their results show partial support for conditional high moments. The study uses co-skewness as an important determinant of cross sectional return variation.

Hassan & Javed (2011) explore the relationship between size premium, value premium and stock markets returns and find them priced risk factors in equity market of Pakistan. The study shows that Fama & French three factor model (1992) is more powerful than conventional CAPM in explaining stock returns for equity market of Pakistan. Hanif & Bhatti

(2008) test the validity of CAPM on Karachi Stock Exchange and report a mixed evidence and state that CAPM is a poor measure for estimating systematic risk.

Shah et al. (2012) investigate the applicability of Fama & French three factor model (1992) for Pakistan's equity market. The study sorts stock on the basis of three points, namely, small, medium and low size and book-to-market portfolios. The study compares standard CAPM, traditional Fama & French three factor model (1992) and modified Fama & French model and finds that modified model provides more appropriate explanation of risk-return relationship for equity market of Pakistan.

Haque & Sawar (2013) examine determinants of equity return in Pakistan's stock market and report book-to-market, discretionary accrual and volatility as significant factors in explaining stock returns. Javed et al. (2014) investigate the role of downside risk in explaining expected return. The study uses value-at-risk (VaR) as a proxy of downside risk. The results of the study show that VaR has greater explanatory power as compared to size and book-to-market factors.

Abbas et al. (2015) test the explanatory power of Fama & French three factor model (1992) for equity market of Pakistan. The study employs the standard methodology of sorting the stocks on the basis of size and book-to-market ratio factors and indicates that these factors are valid proxies for systematic risk as declared by past researchers. On similar lines, Rashid & Hamid (2015) test the downside-risk based capital asset pricing (D-CAPM henceforth) for equity market of Pakistan. They find negative risk premiums associated with DR-CAPM for the stocks which negatively co-vary with the downside market. However, they report a positive risk premium for the stocks having a positive co-movement with the declining market.

The purpose of this chapter is to provide a comprehensive theoretical review of asset pricing literature. Empirical perspective shows that asset pricing models keep on adding additional variables into pricing process. The review of previous literature suggests that the standard CAPM is a poor model in explaining stock returns particularly in case of Pakistan. Moreover, Fama & French Model (1992) considers size and value anomaly as priced risk factors and provides concrete basis to challenge single factor model. However, the literature shows mixed evidence on significance of these factors and implies sensitivity of these factors to

different time and economic settings. Recent development in asset pricing literature opens a debate whether these factors are global or economy specific (Griffin, 2010; Fama & French, 2014).

The current study is aimed to provide an empirical re-assessment of the model in equity market of Pakistan. Regardless of CAPM's immense popularity amongst financial market practitioner, it is important to take into consideration empirical weaknesses of the model and to re-investigate the hypothesis that up to what extent CAPM explains cross-sectional return differences in equity market of Pakistan. Another notable contribution of the study is that it examines how the existing asset pricing models are significant is explaining returns of portfolios constructed on the basis of various investment styles.

CHAPTER 3

METHODOLOGY

The current study primarily aims to compare explanatory power of standard CAPM and Fama & French three factor model with proposed four, five and six factor models. Therefore, the study employs the same methodology used by Fama & French (1992) to sort stocks and to formulate portfolios. The thesis then extends three four factor model to six factor model by adding ownership factor, quality of financial reporting factor and, liquidity factors.

3.1 Data Description & Methodology

3.1.1 Population and Sample

All non-financial firms listed at Karachi Stock Exchange are population of the study. The study uses a data set of 189 non-financial firms for the period 2002-2012. Fama & French (1992) and Davis et al. (2000) report that the sample size and time period has a significant effect on empirical results derived. Therefore, the study employs a data set of ten years to mitigate the problem.

3.1.1.1 Sample Construction and Initial Screening

The screening criteria applied in this study are very common in asset pricing literature. The study follows exiting practices to obtain robust and comparable estimates. Further, the sample selection criteria implemented in this study are in line with methodology adopted by Fama and French 1992. Following criterion are used to select the sample firms.

1. The companies are continuously listed at KSE for the period of analysis.
2. All companies are non-financial in nature.
3. The companies share the same accounting year.
4. Both market and accounting data is available for the sample firms for the study period.
5. Companies should be listed at the stock exchange for at least 12 months before portfolio formation. This condition ensures proper beta estimation.
6. Only firms with positive BV/MV are included in sample. The difficulties are due to abnormal condition of firms. Negative BV stocks will be automatically sorted into the

lowest portfolio deciles because of the negative sign instead of going into the highest deciles since, a negative market value is an attribute of highly financially distressed companies (Fame and French, 1992).

3.1.2 Data and Time-Period

The study is quantitative in nature and employs both market data and accounting data. This study employs the data of all the companies listed at Karachi Stock Exchange (KSE) for the period 2000 and 2012. The market data includes risk-free rate, stock returns, market return, market capitalization of stocks and, the stock turnover. Moreover, the share price is defined as closing price on the last trading day of month *t*. The study uses 6-month T-bill rates as a proxy of risk-free rate and the value-weighted index of Karachi stock exchange i.e. KSE-100 index is used as a proxy of market portfolio. T-bill rate is also adjusted to the monthly rate of return. Here, accounting data refers to the data published in annual reports of the companies i.e. information related to their ownership structure and accounting information to compute quality of financial reporting of the firms. The data is collected from balance sheet analysis published by state bank of Pakistan, annual reports of the sample companies and, websites of Karachi Stock Exchange and Business recorder.

3.2 Methodology

In asset pricing research, two approaches are widely used for the selection of factor affecting risk premium and stock returns. The first approach entails macro-economic factors and security market data to estimate systematic risk of the economy. The second approach is based on the firm-specific characteristics which are likely to explain cross-sectional return differences and sensitivity to the systematic risk. The second approach requires portfolio formation on the basis of such characteristics. The first approach was used by Chen, Roll, and Ross (1986), in which they used the macro-economic variables which capture the systematic risk. The second approach is used by Fama and French (1992) for analysis of their three factor model. Most critical issue in this approach is to identify the set of characteristics on the basis of which securities are ranked. The choice of the characteristics usually depends on the main objectives of research. The current study uses the later approach, which is widely used in asset pricing research. The approach has certain advantages over the former one, specifically when large amount of the data has to be analysed. It helps to minimize larger

time-series data to smaller number of observations and thus reduces the cross-sectional dimension of the joint distribution of returns. Blume (1970) gives the original motivation for creating portfolios of assets as it allows more efficient estimation of factor loadings. The study argues that if the errors in the estimated factor loadings are imperfectly correlated across the securities in a portfolio, they tend to off-set each other and enable factor risk premia to be estimated precisely. Moreover, the procedure of combining securities into the portfolios with similar characteristics reduces the effect of measurement error. The current study focuses on market, accounting, information based and firm-specific characteristics to perform the sorts.

3.2.1 Variable Description

The table below gives a details of the variables used in the study, their abbreviations, and descriptions.

Table 3.1: Variable Description

Variable	**Abbreviation**	**Description**
Portfolio Return	R_p	Excess return of the portfolio at time *t*
Dependent Variables		
Market return	R_m	Market return at time *t*
Size	SMB	Difference between the returns of the small size firms and the large size firms at time *t*
Book-to-market ratio	HML	Difference between the returns of high BV/MV and low BV/MV firms at time *t*
Institutional ownership concentration	INSH	Difference between the returns of the firms having high institutional ownership and the low institutional ownership at time *t*.
Quality of financial reporting	QFR	Difference between the return of the firms having good quality of financial reporting and returns of the

		firms having bad quality of financial reporting at time *t*.
Liquidity	ILLIQ	Difference between the returns of the liquid firms and the return of illiquid firms at time *t*.

3.2.2 Defining Variables

Fama & French (1992) use market, size and, value factors in three factor model as explanatory variables to explain the portfolio returns. The current study uses three factors namely institutional ownership, quality of financial reporting and, liquidity, in addition to Fama and French factors, to explain portfolio returns. The variables used in the study are measured using the following proxies:

3.2.2.1 Market Factor

The excess return on the market portfolio is known as the market factor. Theoretically speaking, market portfolio includes all available assets and liabilities in a market. Blume (1970) states that combining as much as securities as possible in a portfolio results in diversification of unique, individual or, firm-specific risk. Therefore, securities are exposed to the movements in market portfolio i.e. systematic risk. The current study uses KSE-100 index as a proxy of the market portfolio. The KSE-100 index is constituted on the basis of top market capitalization firms. Moreover, companies with highest market capitalization from each sector are also included to improve sectoral representation. The closing prices of KSE-100 index are used to calculate the market return.

3.2.2.2 Size Factor

Market capitalization is used as proxy to measure size of the firm. Following relationship is used to assess market value or size of the stock *"i"* on trading day *"t"* (Banz, 1981; Fama & French, 1992).

Market Value = Number of outstanding shares× Market price per share

3.2.2.3 Value Factor

Book to Market ratio of each stock is calculated as the total book-value of equity divided by market capitalization or market value of the stock *"i"* on trading day *"t"*. The book value of equity is taken from accounting data and market capitalization of the firm is taken as market value of equity (Rosenberg, 1985; Fama & French, 1992).

$$\text{Book-to-Market Ratio} = \frac{\text{Book Value of Equity}}{\text{Market Value of Equity}}$$

3.2.2.4 Institutional Ownership Factor

Institutional shareholding is measured as a percentage of shares held by institutional investors such as pension funds, banks, mutual funds, and insurance companies so on. Institutional ownership concentration (INSH) refers to the degree of concentration of shares which are owned by institutional investors in a firm.

$$\text{INSH} = \frac{\text{Shares owned by Institutions,Investment Companies \& Foreign Investors} \times 100}{\text{Total No.of Shares Outstanding}}$$

3.2.2.5 Quality of Financial Reporting Factor

This study does not modify or develop the methodology to measure the quality of financial reporting rather follows the Barth, Cram, & Nelson (2001) (BCN hereafter) model. Several studies use BCN (2001) model to assess power of current period accruals in predicting future cash flows (Johnson & Ramesh 1986; Finger 1994; Dechow et al. 1998; Othman 2012). The model suggests that future operating cash flows are predicted by current disaggregated earnings. The model emphasizes significance of accruals given that information reflected by these accruals regarding future cash flows is used by investors to predict firm's future cash flows. The model implies that investors are better off by using these accruals rather than realized cash flows in predicting future cash flows.

The quality of financial reporting measure is obtained from residuals of regression from next period cash flows and lagged period's earning component. These earning components are cash flow from operations and accruals segment of earnings. Accrual accounting is considered as a better indicator of firm's performance than current period's receipt and payment. On basis of this assumption, forward looking nature of accruals such as receivables can be assessed. The residuals obtained from equation given below provide a firm-specific measure of financial reporting quality. Absolute values of residuals are used, denoted by $|e_{i,t+1}|$, as proxy measure of financial reporting quality (QFR hereafter). The obtained residuals reflect magnitude of future cash flows unrelated to current disaggregated earning (Cohen 2008). Hence, lower value of residuals represent a higher financial reporting quality choice by firm. Lower the value of absolute error term $|e_{i,t+1}|$, higher will be the quality of financial reporting, which corresponds to higher level of cash flow predictability. Quality of financial reporting choice of firm is determined now, it is suggested that low value of absolute residuals indicate high choice of financial reporting quality by firm.

Using these residuals, financial reporting quality choice of a firm is determined and firms are then sorted on the basis of this reporting quality proxy to categorize them as 'Good financial reporting quality firms' and 'Bad financial reporting quality firms'.

$$CFO_{i,t+1} = \alpha + \beta_1 CFO_{i,t} + \beta_2 \Delta AR_{i,t} + \beta_3 \Delta INV_{i,t} + \beta_4 \Delta AP_{i,t} + \beta_5 DEP_{i,t} + \beta_6 Others_{i,t} + \varepsilon_{i,t+1}$$

where

$CFO_{i,t+1}$ = Cash flow from operations as per statement of cash flows for firm i at time t+1.

$CFO_{i,t}$ = Cash flow from operations as per statement of cash flows for firm i at time t. .

$\Delta AR_{i,t}$ = Changes in accounts receivable per the statement of cash flows;

$\Delta INV_{i,t}$= Changes in inventory account per the statement of cash flows;

$\Delta AP_{i,t}$= Changes in accounts payable per the statement of cash flows;

$DEP_{i,t}$=Total Depreciation and Amortization expenses;

$Others_{i,t}$ = The variable is calculated as *EARN*– (*CFO* + *ΔAR* - *ΔINV* - *ΔAP*- *DEP*) where EARN is the net;

$\varepsilon_{i,t+1}$= Error term

3.2.2.6 Liquidity Factor

Measurement of illiquidity has always been a point of debate for researchers and academicians. The literature on asset pricing cites employment of econometric techniques and bid-ask spread as direct measure of illiquidity. Amihud (2002) uses illiquidity ratio i.e. ratio of absolute returns to the trading volume as measure of liquidity. Brennan & Subrahmanyam (1996) propose relationship between price and order flows as a measure of liquidity. Pastor & Stambaugh (2003) suggest that return reversals capture inventory-based price pressures and liquidity can be gauged by the magnitude of return reversal upon high volume.

Most import concern relating measurement of liquidity is that different proxies yield mixed results. Though, these empirical findings do not support the underlying theory supporting the argument that illiquidity is a priced factor. For instance, Brennan & Subrahmanyam (1996) report an odd liquidity premium argument. The findings of their study suggest a negative relationship between bid-ask spread and returns. Spiegel & Wang (2005) find an insignificant relationship between liquidity and asset returns. The current study uses turnover ratio as a measure of liquidity of stock scaled by capitalization of the firm (Hassan & Javed, 2011).

$$\text{Turnover Ratio} = \frac{\text{Total Volume traded}}{\text{Capitalization}}$$

3.3 Portfolio Formation

The empirical work is asset pricing domain employs firm-specific characteristics to explain cross-sectional return differences and sensitivity to returns (Fama and French (1992, 1993, 1996, 1998, and 2014; Carhart 1997). The present study also uses the same approach where firm-specific characteristics are used to explain stock returns. The current study uses portfolios instead of individual stocks. The literature suggests that using portfolios eliminates the unsystematic risk and minimizes the errors in variable (EIV) problem (Thomas 1994). Fama & Macbeth (1973) and Chen et al. (1986) suggest that to reduce EIV and to mitigate the noise in individual stock returns, stocks should be grouped into the portfolios. Hence, the errors in stock returns are likely to cancel each other and aggregate affect becomes negligible (Blume 1970; Clare & Thomas, 1994). The portfolio formation process involves three core steps:

1. Ranking the securities with same characteristics to form the portfolios.
2. Estimating the factor premium by using return of the portfolio.
3. Using factor premium to explain return of the portfolio. Using factor premiums to explain return of the portfolio, based on 8X8 sorts.64 portfolios or investment styles are introduced.

3.3.1 Estimation Method

The estimation process for this study consists of two steps.

Step 1: By applying ordinary least square (OLS), with robust error term, we estimate the factor loadings (risk factor). While doing this we apply rolling beta estimation process. Specifically, we estimate factor loadings for each underlying portfolio taking 36-month window and then we continue this process by adding next month and dropping first month from the estimation window.

Step 2: After having obtained risk factors in the first step, we test the asset-pricing model by estimating the regression over the sample period, where we used estimated factor loadings/betas as independent variables and returns on portfolios as dependent variable. We iterate this procedure (both Step 1 and Step 2) for each portfolio.

3.4 Empirical Framework: The Base-Line Model-Fama & French Three Factor Model

To construct size based portfolios, market capitalization of each stock is calculated at the end of June for year t-1 and then stocks are arranged in descending order. On the basis of observed median, sample is divided into two size sorted portfolios. The portfolio comprising stocks below the median are categorized as "Small" and the portfolio comprising stocks above median is named as "Big".

These size sorted portfolios are further divided into two equally weighted sub-portfolios on the basis of book-to-market ratio. The small portfolio constitutes two sub-portfolios named S/H, and S/L (Small high and small low). Similarly, "Big" portfolio further forms two portfolios namely B/H and B/L (Big high and Big low, respectively). This process will result in formation of six further portfolios S, B, S/H, S/L, B/H, B/L Given that size and value portfolios are formed one year lagged period to analyse information is priced in returns of the next year.

To compute the factor-specific premium, two factors are constructed as zero-investment portfolios from six sub-portfolios. The approach employed for construction of size, value and ownership premium factor is same as used by Fama & French (1992), Hassan & Javed, (2008), Ammann & Steiner (2008).

$$MTK=R_{mt} - RFR_t$$

$$SMB = 1/2 * [(S/H – B/H) + (S/L-B/L)]$$

$$HML= 1/2 * [(S/H – S/L) + (B/H - B/L)]$$

where,

SMB (Small minus Big) = Size premium

HML (High book-to-market minus Low book-to-market) = Value premium

3.5 The Extended Frame Work: Proposed Four Factor Model

To construct institutional ownership premium factor (INSH hereafter), institutional ownership data has been extracted from annual reports of the sample firms for the study period. The approach employed for construction of size, value and ownership premium factor is same as used by Fama & French (1992).

For institutional ownership premium, size and book-to-market portfolios are arranged on the basis of their institutional holding in ascending order. The portfolios with high Institutional ownership concentration are categorize as high ownership portfolios (HO) and the portfolios with low institutional ownership concentration are categorize as low ownership portfolios (LO). It results into formation of 8 new sub-portfolios on the basis of institutional ownership concentration, *S/H/HO, S/H/LO, S/L/HO, S/L/LO, B/H/HO, B/H/LO, B/L/HO, and B/L/LO.* Given that size, value and institutional ownership portfolios are formed one year lagged period to analyse information is priced in returns of next year.

where,

SMB (Small minus Big) = Size premium

HML (High book-to-market minus Low book-to-market) = Value premium

INSH (High institutional ownership minus low institutional ownership) = Ownership premium

$MTK=R_{mt} - RFR_t$

SMB = 1/4[(S/H/HO-B/H/HO) +(S/L/HO-B/L/HO) +(S/L/HO-B/L/HO) + (S/L/LO-B/L/LO)]*

HML = 1/4[(S/H/HO-S/L/HO) +(S/H/LO-S/L/LO+ (B/H/HO-B/L/HO) + (B/H/LO-B/L/LO)]*

INSH=1/4[(S/H/HO-S/H/LO) +(S/L/HO-S/L/LO) + (B/H/HO-B/H/LO) + (B/L/HO-B/L/LO)]*

3.6 The Extended Framework: Proposed Five-Factor Model

To compute QFR premium, size and book-to-market and ownership sorted portfolios are arranged on the basis of their financial reporting quality choice, as determined by using BCN

(2001) model, in descending order. The portfolios with low QFR residuals are categorize as firms with good financial reporting quality (GQFR) and portfolios with low high QFR residuals are categorize as firms with bad financial reporting quality (BQFR). It results into formation of eight new sub-portfolios on the basis of quality of financial reporting, *S/H/HO/GQFR, S/H/HO/BQFR, S/H/LO/GQFR, S/H/LO/BQFR, S/L/HO/GQFR, S/L/HO/BQFR, S/L/LO/GQFR, S/L/LO/BQFR, B/H/HO/GQFR, B/H/HO/BQFR, B/H/LO/GQFR, B/H/LO/BQFR, B/L/HO/GQFR, B/L/HO/BQFR, B/L/LO/GQFR and B/L/LO/BQFR*, Given that size, value, institutional ownership and QFR portfolios are formed one year lagged period to analyse information is priced in returns of next year.

where,

SMB=1/8[(S/H/HO/GQFR-B/H/HO/GQFR)+(S/H/HO/BQFR-B/H/HO/BQFR)+(S/H/LO/GQFR-B/H/LO/GQFR)+(S/H/LO/BQFR-B/H/LO/BQFR)+(S/L/HO/GQFR-B/L/HO/GQFR)+(S/L/HO/BQFR-B/L/HO/BQFR)+(S/L/LO/GQFR-B/L/LO/GQFR) + (S/L/LO/BQFR-B/L/LO/BQFR)]*

HML=1/8[(S/H/HO/GQFR-S/L/HO-GQFR)+(S/H/HO/BQFR-S/L/HO/BQFR)+(S/H/LO/GQFR-S/L/LO/GQFR)+(S/H/LO/BQFR-S/L/LO/BQFR)+(B/H/HO/GQFR-B/L/HO/GQFR)+(B/H/HO/BQFR-B/L/HO/BQFR)+(B/H/LO/GQFR-B/L/LO/GQFR)+(B/H/LO/BQFR-B/L/LO/BQFR)]*

INSH=1/8[(S/H/HO/GQFR-S/H/LO/GQFR)+(S/H/HO/BQFR-S/H/LO/BQFR) +(S/L/HO/GQFR-S/L/LO/GQFR)+(S/L/HO/BQFR-S/L/LO/BQFR)+(B/H/HO/GQFR-B/H/LO/GQFR)+(B/H/HO/BQFR-B/H/LO/BQFR)+(B/L/HO/GQFR-B/L/LO/GQFR)+(B/L/HO/BQFR-B/L/LO/BQFR)]*

QFR=1/8[(S/H/HO/BQFR-S/H/HO/GQFR)+(S/H/LO/BQFR S/H/LO/GQFR)+(S/L/HO/BQFR-S/L/HO/GQFR)+(S/L/LO/BQFR S/L/LOGQFR)+(B/H/HO/BQFR-B/H/HO/GQFR)+(B/H/LO/BQFR-B/H/LO/GQFR)+(B/L/HO/BQFR-B/L/HO/GQFR)+(B/L/LO/BQFR-S/L/LO/GQFR)]*

3.4.4 The Extended Framework: Proposed Six Factor Model

To calculate ILLIQ premium, size and book-to-market, institutional ownership and quality of financial reporting sorted portfolios are arranged on the basis of their liquidity, measured using turnover ratio, in ascending order. The portfolios of firms with high turnover ratio are categorize as firms with high liquidity (LIQ) and portfolios with firms of low turnover ratio are categorize as firms with low liquidity (ILLIQ). It results in formation of 24 new sub-portfolios on the basis of liquidity, i.e. *S/H/HO/GQFR/LIQ, S/H/HO/GQFR/ILLIQ, S/H/HO/BQFR/LIQ, S/H/HO/BQFR/ILLIQ, S/H/LO/GQFR/LIQ, S/H/LO/GQFR/ILLIQ, S/H/LO/BQFR/LIQ, S/H/LO/BQFR/ILLIQ, S/L/HO/GQFR/LIQ, S/L/HO/GQFR/ILLIQ, S/L/HO/BQFR/LIQ, S/L/HO/BQFR/ILLIQ, S/L/LO/GQFR/LIQ, S/L/LO/GQFR/ILLIQ, S/L/LO/BQFR/LIQ, S/L/LO/BQFR/ILLIQ, B/H/HO/GQFR/LIQ, B/H/HO/GQFR/ILLIQ, B/H/HO/BQFR/LIQ, B/H/HO/BQFR/ILLIQ, B/H/LO/GQFR/LIQ, B/H/LO/GQFR/ILLIQ, B/H/LO/BQFR/LIQ, B/H/LO/BQFR/ILLIQ, B/L/HO/GQFR/LIQ, B/L/HO/GQFR/ILLIQ, B/L/HO/BQFR/LIQ, B/L/HO/BQFR/ILLIQ, B/L/LO/GQFR/LIQ, B/L/LO/GQFR/LIQ , B/L/LO/BQFR/LIQ, B/L/LO/BQFR/ILLIQ*

Given that size, value, institutional ownership, QFR and liquidity portfolios are formed one year lagged period to analyse information is priced in returns of next year.

where,

SMB = 1/16[(S/HBM/HO/GQFR/HLIQ - B/HBM/HO/GQFR/HLIQ) + (S/HBM/HO/GQFR/LLIQ - B/HBM/HOGQFR/LLIQ) + (S/HBM/HO/BQFR/HLIQ - B/HBM/HO/BQFR/HLIQ) + (S/HBM/HO/BQFR/ILLIQ - B/HBM/HO/BQFR/LLIQ) + (S/HMB/LO/GQFR/HLIQ - B/HMB/LO/GQFR/HLIQ) + (S/HBM/LO/GQFR/LLIQ - B/HBM/LO/GQFR/LLIQ) + (S/HBM/LO/BQFR/HLIQ - B/HBM/LO/BQFR/HLIQ) + (S/HBM/LO/BQFR/LLIQ - B/HBM/LO/BQFR/LLIQ) + (S/LBM/HO/GQFR/HLIQ - B/LBM/HO/GQFR/HLIQ) + (S/LBM/HO/GQFR/LLIQ - B/LBM/HO/GQFR/LLIQ)+ (S/LBM/HO/BQFR/HLIQ - B/LBM/HO/BQFR/HLIQ) + (S/LBM/HO/BQFR/LLIQ - B/LBM/HO/BQFR/LLIQ) + (S/LMB/LO/GQFR/HLIQ - B/LMB/LO/GQFR/HLIQ) + (S/LBM/LO/GQFR/LLIQ - B/LBM/LO/GQFR/LLIQ) + (S/LBM/LO/BQFR/HLIQ - B/LBM/LO/BQFR/HLIQ) + (S/LBM/LO/BQFR/LLIQ - B/LBM/LO/BQFR/LLIQ)]*

HML = 1/16[(S/HBM/HO/GQFR/HLIQ - S/LBM/HO/GQFR/HLIQ) + (S/HBM/HO/GQFR/LLIQ - S/LBM/HOGQFR/LLIQ) + (S/HBM/HO/BQFR/HLIQ - S/LBM/HO/BQFR/HLIQ) +*

(S/HBM/HO/BQFR/LLIQ - S/LBM/HO/BQFR/LLIQ) + (S/HMB/LO/GQFR/HLIQ - S/LMB/LO/GQFR/HLIQ) + (S/HBM/LO/GQFR/LLIQ - S/LBM/LO/GQFR/LLIQ) + (S/HBM/LO/BQFR/HLIQ - S/LBM/LO/BQFR/HLIQ) + (S/HBM/LO/BQFR/LLIQ - S/LBM/LO/BQFR/LLIQ) + (B/HBM/HO/GQFR/HLIQ - B/LBM/HO/GQFR/HLIQ) + (B/HBM/HO/GQFR/LLIQ -B/LBM/HO/GQFR/LLIQ) + (B/HBM/HO/BQFR/HLIQ - B/LBM/HO/BQFR/HLIQ) + (B/HBM/HO/BQFR/LLIQ - B/LBM/HO/BQFR/LLIQ)+ (B/HMB/LO/GQFR/HLIQ - B/LMB/LO/GQFR/HLIQ) + (B/HBM/LO/GQFR/LLIQ - B/LBM/LO/GQFR/LLIQ) + (B/HBM/LO/BQFR/HLIQ - B/LBM/LO/BQFR/HLIQ) + (B/HBM/LO/BQFR/LLIQ - B/LBM/LO/BQFR/LLIQ)]

INSH= 1/16[(S/HBM/HO/GQFR/HLIQ - S/HBM/LO/GQFR/HLIQ) + (S/HBM/HO/GQFR/LLIQ - S/HBM/LO/GQFR/LLIQ) + (S/HBM/HO/BQFR/HLIQ - S/HBM/LO/BQFR/HLIQ) + (S/HBM/HO/BQFR/LLIQ - S/HBM/LO/BQFR/LLIQ) + (S/LMB/HO/GQFR/HLIQ - S/LMB/LO/GQFR/HLIQ) + (S/LBM/HO/GQFR/LLIQ - S/LBM/LO/GQFR/LLIQ) + (S/LBM/HO/BQFR/HLIQ - S/LBM/LO/BQFR/HLIQ) + (S/LBM/HO/BQFR/LLIQ - S/LBM/LO/BQFR/LLIQ) + (B/HBM/HO/GQFR/HLIQ - B/HBM/LO/GQFR/HLIQ) + (B/HBM/HO/GQFR/LLIQ -B/HBM/LO/GQFR/LLIQ) + (B/HBM/HO/BQFR/HLIQ - B/HBM/LO/BQFR/HLIQ) + (B/HBM/HO/BQFR/LLIQ - B/HBM/LO/BQFR/LLIQ) + (B/LBM/HO/GQFR/HLIQ - B/LMB/LO/GQFR/HLIQ) + (B/LBM/HO/GQFR/LLIQ - B/LBM/LO/GQFR/LLIQ) + (B/LBM/HO/BQFR/HLIQ - B/LBM/LO/BQFR/HLIQ) + (B/LBM/HO/BQFR/LLIQ - B/LBM/LO/BQFR/LLIQ)]*

QFR = 1/16[(S/HBM/HO/BQFR/HLIQ - S/HBM/HO/GQFR/HLIQ) + (S/HBM/HO/BQFR/LLIQ - S/HBM/HO/GQFR/LLIQ) + (S/HBM/LO/BQFR/HLIQ - S/HBM/LO/GQFR/HLIQ) + (S/HBM/LO/BQFR/LLIQ - S/HBM/LO/GQFR/LLIQ) + (S/LMB/HO/BQFR/HLIQ - S/LMB/HO/GQFR/HLIQ) + (S/LBM/HO/BQFR/LLIQ - S/LBM/HO/GQFR/LLIQ) + (S/LBM/LO/BQFR/HLIQ - S/LBM/LO/GQFR/HLIQ) + (S/LBM/LO/BQFR/LLIQ - S/LBM/LO/GQFR/LLIQ) + (B/HBM/HO/BQFR/HLIQ - B/HBM/HO/GQFR/HLIQ) + (B/HBM/HO/BQFR/LLIQ -B/HBM/HO/GQFR/LLIQ) + (B/HBM/HO/BQFR/HLIQ - B/HBM/HO/GQFR/HLIQ) + (B/HBM/HO/BQFR/LLIQ - B/HBM/HO/GQFR/LLIQ) + (B/LBM/HO/BQFR/HLIQ - B/LMB/HO/GQFR/HLIQ) + (B/LBM/HO/BQFR/LLIQ - B/LBM/HO/GQFR/LLIQ) + (B/LBM/LO/BQFR/HLIQ - B/LBM/LO/GQFR/HLIQ) + (B/LBM/LO/BQFR/LLIQ - B/LBM/LO/GQFR/LLIQ)]*

ILLIQIQ = 1/16[(S/HBM/HO/GQFR/ILLIQ - S/HBM/HO/GQFR/LIQ) + (S/HBM/HO/BQFR/ILLIQ -S/HBM/HO/BQFR/LIQ) + (S/HBM/LO/GQFR/ILLIQ - S/HBM/LO/GQFR/LIQ) + (S/HBM/LO/BQFR/ILLIQ - S/HBM/LO/BQFR/LIQ)+ (S/LMB/HO/GQFR/ILLIQ - S/LMB/HO/GQFR/LIQ) + (S/LBM/HO/BQFR/ILLIQ - S/LBM/HO/BQFR/LIQ) + (S/LBM/LO/GQFR/ILLIQ - S/LBM/LO/GQFR/LIQ) + (S/LBM/LO/GQFR/ILLIQ - S/LBM/LO/GQFR/LIQ) + (B/LBM/HO/GQFR/ILLIQ - B/HBM/HO/GQFR/LIQ) + (B/HBM/HO/BQFR/ILLIQ -B/HBM/HO/BQFR/LIQ) + (B/HBM/LO/GQFR/ILLIQ - B/HBM/HO/GQFR/LIQ) + (B/HBM/LO/BQFR/ILLIQ - B/HBM/LO/BQFR/LIQ) + (B/LBM/HO/BQFR/ILLIQ - B/LMB/HO/BQFR/LIQ) + (B/LBM/HO/BQFR/ILLIQ - B/LBM/HO/BQFR/LIQ) + (B/LBM/LO/GQFR/ILLIQ - B/LBM/LO/GQFR/LIQ) + (B/LBM/LO/BQFR/ILLIQ - B/LBM/LO/BQFR/LIQ)]*

3.5 Model Specification

The following multifactor models are proposed to test asset pricing in equity market of Pakistan. The study tries its best to identify factors that will be valuable in developing new model.

3.5.1 Fama & French Three-Factor Model

Following is the econometric form of Fama and French three factor model.

$$R_{pt} - R_{ft} = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where

R_{pt} = the expected return of portfolio at time t

R_{ft} = risk free rate at time t

R_{mt} = return of market at time t

SMB_t = the return of small size portfolio minus return of big size portfolio at time *"t"*

HML_t= the return of high BE/ME ratio portfolio minus return of low BE/ME ratio portfolio at time *"t"*

β_i=Factor betas or factor loadings.

$\varepsilon_{t=}$ the error term

Moreover, the return of a security *i* at time *t* are calculated by using the formula assuming continuous compounding of returns

$$R_{i,t} = ln\ (P_t / P_{t-1})$$

where,

R_i = Monthly continuously compounded return for security *I* at month t.

P_t = Closing share price of the stock at last trading day of month *t*

P_{t-1} = Closing share price of the stock at last trading day of month *t-1*

To compute, monthly returns of the market, month end closing index values of KSE-100 are taken and above stated approach has been used to quantify return series for market index.

$$R_{m,t} = ln\ (I_t / I_{t-1})$$

where,

$R_{m,t}$ = Monthly continuously compounded return for market index at month t.

I_t = Closing Index value of the KSE-100 on last trading day of month *t*

I_{t-1} = Closing Index value of the KSE-100 on last trading day of month *t-1*

The average return of a portfolio "*P* "at time *t* is calculated by using the formula assuming continuous compounding of returns

$$R_{p,t} = \frac{\Sigma Ri,t}{n}$$

where,

$R_{p,t=}$ Average return of Portfolio *"P"* for month *"t"*

n = No. of stocks in Portfolio *"P"*

3.5.2 The Four-Factor Model

The following four factor model is proposed for empirical testing.

$$R_{pt} - R_{ft} = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 INSH_t + \varepsilon_t$$

where,

R_{pt} = the expected return of portfolio at time t

R_{ft} = risk free rate at time t

R_{mt} = return of market at time t

SMB_t = difference between the return of small size portfolio minus return of big size portfolio at time *"t"*

HML_t= return of high BE/ME ratio portfolio minus return of low BE/ME ratio portfolio at time *"t"*

$INSH_t$ = difference between the return of firms having high institutional ownership minus return of firms having low institutional ownership at time *"t"*

β_i=Factor betas or factor loadings.

$\varepsilon_{t=}$ the error term

3.5.3 The Five-Factor Model

The following five factor model is proposed for empirical testing.

$$R_{pt} - R_{ft} = \alpha + \beta_1 (R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 INSH_t + \beta_5 QFR_t + \varepsilon_t$$

where,

R_{pt} = the expected return of portfolio at time t

R_{ft} = risk free rate at time t

R_{mt} = return of market at time t

SMB_t = difference between the return of small size portfolio minus return of big size portfolio at time *"t"*

HML_t= return of high BE/ME ratio portfolio minus return of low BE/ME ratio portfolio at time *"t"*

$INSH_t$ = difference between the return of firms having high institutional ownership minus return of firms having low institutional ownership at time *"t"*

QFR_t= difference between the return of firms having good quality of financial reporting minus return of firms having bad quality of financial reporting at time *"t"*

β_i=Factor betas or factor loadings.

$\varepsilon_{t=}$ the error term

3.5.4 The Six-Factor Model

The following six factor model is proposed for empirical testing.

$$R_{pt} - R_{ft} = \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 INSH_t + \beta_5 QFR_t + \beta_6 ILLIQ_t + \varepsilon_t$$

where

R_{pt} = the expected return of portfolio at time t

R_{ft} = risk free rate at time t

R_{mt} = return of market at time t

SMB_t = difference between the return of small size portfolio minus return of big size portfolio at time *"t"*

HML_t= return of high BE/ME ratio portfolio minus return of low BE/ME ratio portfolio at time *"t"*

$INSH_t$ = difference between the return of firms having high institutional ownership minus return of firms having low institutional ownership at time *"t"*

QFR_t= difference between the return of firms having good quality of financial reporting minus return of firms having bad quality of financial reporting at time *"t"*

$ILLIQ_t$ = difference between the return of liquid firms minus return of illiquid firms at time *"t"*

β_i=Factor betas or factor loadings.

$\varepsilon_{t=}$ the error term

3.6 Testing the Model in Bull and Bear Markets

The study also aims to investigate the persistence of estimated risk premia in both upturn (bull) and downturn (bear) markets. A bear period is characterized by financial markets downtrend accompanied with pessimism and investors' motivation to sell. On the flip side, the period of optimism with increased investor confidence to buy with an anticipation to earn excessive gains is referred as bull period (Sperandeo, 1990). The literature indicates that the underlying phenomenon behind extreme market regimes are macroeconomic changes. Moreover, this bull and bear period formation is a result of investors' expectations and their reaction to new piece of information. Therefore, it is concluded that these dichotomous market conditions are good points of concentration in examining robustness of the asset pricing models. Further, investigating the anomalies or systematic risk premia in different market conditions separately is contributory in understanding economic rationale of relevant risks. Moreover, it results in natural formation of two over-lapping periods in order to test the asset pricing modeluhis. In asset pricing literature, significant differences in explanatory power of asset pricing models are reported in two market regimes (Black 1972; Levy 1974; Chen 1982). Furthermore, Ang & Chen (2002) examine the downside risk factor after controlling for CAPM beta, size, value effects and report that downside correlation can better capture the asymmetric nature of risk.

On the basis findings from literature, a conditional relationship is proposed between beta and returns i.e. a positive relationship exists between beta and returns when $R_m > R_f$ (up market or bull market). On the other hand, a negative relationship is expected between beta and returns in down (bear) market, when $R_m < R_f$. This does not imply that a negative beta of stock in bear market; rather low beta stocks is expected to outperform high beta stock in down markets (Theriou et al. 2007).

In the bull and bear market conditions, the model's coefficients vary for portfolios with specific attributes like size, value, leverage, distress etc. To further verify the results, the dummy variable technique is used to form two non-overlapping bull-bear periods by stacking all the bull periods as one regime and all the bear periods as another regime. In the regression equation current study uses a dummy variable with a value of 1 for the bull and a value of 0 for the bear periods, respectively i.e.

D_t=1 if month t is a bull period

D_t=0 if month t is a bear period

$$
\begin{aligned}
R_{it} - R_{ft} &= \alpha + \beta_1 MKT_{it} + \beta_1^{'}(D * MKT_{it}) \\
&+ \beta_2 SMB_{it} + \beta_2^{'}(D * SMB_{it}) + \beta_3 HML_{it} \\
&+ \beta_3^{'}(D * HML_{it}) + \beta_4 QLTYFR_{it} + \beta_4^{'}(D * QLTYFR_{it}) \\
&+ \beta_5 OWNST_{it} + \beta_5^{'}(D * OWNST_{it}) + \beta_6 ILLIQ_{it} \\
&+ \beta_6^{'}(D * ILLIQ_{it}) + \varepsilon_{it}
\end{aligned}
$$

3.7 Style Investing

The current study also explores that common shifts in investment style causes commonality in mispricing. Barberis and Shleifer (2003) propose a model, where stocks co-move with two distinct market factors. First one is the market factor, which captures market wide cash flows and a style factor, which represents commonality in investor sentiment for various investment styles, such as value vs. growth stocks. They further argue that investors tend to shift their investments based on the past performance of style funds. Moreover, demand for different assets is determined by their relative sensitivity to style factor and past style performance.

Consequently, the styles with good performance becomes overpriced, and as a result yields low returns.

3.8 Two-Pass Regression Analysis

The approach involves two-step regressions: the first regression is time-series regression where portfolio returns are regressed on each factors, which gives an estimate of factor loadings or betas. In second pass, asset or portfolio returns are regressed cross-sectionally on estimated betas obtained in first pass regression. According to Black, Jensen and Scholes (1972) and Fama & Macbeth (1973), second pass regression inherently contains errors-in-variables (EIV) problem as explanatory variables are estimates of first pass regression. The problem can be mitigated by using diversified portfolio returns instead of using individual stocks so that residual errors average and betas estimated in such way are least affected by idiosyncratic risk (problem is fully eliminated when (N→ ∞).

The study of Fama and French (1992, 2014) is limited to the time-series regression only. This study employs two-pass regression technique to further examine the relationship between portfolio returns and risk factors. Therefore, our model is further extended by applying Fama & Macbeth regression (1973). Moreover, to overcome the cross correlation problem in regression residuals, Fama & MacBeth (1973) propose that in second pass regression, running regressions on month on month basis instead of taking average returns on their betas for entire sample period will allow betas to roll over time (rolling betas obtained in first pass). The betas obtained in such a way are used to explain next period stock returns. Where betas, excess returns, and residual variances (unique risks), are obtained from the first-pass regressions.

$$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{SMB,t}\hat{\beta}_{SMB} + \gamma_{HML,t}\hat{\beta}_{HML} + \gamma_{INSH,t}\hat{\beta}_{INSH} + \gamma_{QFR,t}\hat{\beta}_{QFR} + \gamma_{ILLIQ,t}\hat{\beta}_{ILLIQ} + \varepsilon_{it}$$

where

$R_{pt} - R_{ft}$ = the excess return on portfolio *"p"* at time *"t"*.

$\hat{\beta}_{mktit}$ = estimated factor loadings of market factor

$\hat{\beta}_{SMBit}$ = estimated factor loadings of size factor

$\hat{\beta}_{HMLit}$ = estimated factor loadings of value factor

$\hat{\beta}_{INSHit}$ = estimated factor loadings of ownership factor

$\hat{\beta}_{QFRit}$= estimated factor loadings of quality of financial reporting factor

$\hat{\beta}_{ILLIQit}$= estimated factor loadings of liquidity factor

The regression coefficients$\gamma_{mkt,t}$,$\gamma_{SMB,t}$, $\gamma_{HML,t}$, $\gamma_{INSH,t}$, $\gamma_{QFR,t}$ and, $\gamma_{ILLIQ,t}$ represent the risk premiums on the estimated factor loadings.

CHAPTER 4

RESULTS AND DISCUSSIONS

The chapter reports empirical results and theoretical discussion on key findings of the study.

4.1 Empirical Results and Discussion

4.1.1 Descriptive Statistics

Table 4.1 reports descriptive statistics of all portfolios sorted on the basis of size, book-to-market, institutional ownership, quality of financial reporting and, liquidity. The table reports time-series monthly averages of portfolio returns of size, value, INSH, QFR and. Liquidity sorted portfolios. Panel 1 reports average monthly returns and standard deviations for small size portfolios whereas same statistics for big size portfolios are reported in Panel 2 of the table. The average return of all sample companies for the study period is 0.46% and standard deviation of returns is 6 %. Similarly, average return for all small portfolios is .025% while

average return for the big portfolios is 0.64%. When mean returns of small and big portfolio are compared, it is evident that average return of the big firms are higher as compared to the small capitalization firms. The plausible reason may be the high representation of big companies in value-weighted KSE index, which performed well during the study period except few years of the crisis period. On average small size portfolios yield low returns whereas their risk-adjusted returns should be higher due to their perceived high risk profile. Further, standard deviation statistics indicate that average risk of both small and big portfolio is more or less same, despite of the fact that average return of big portfolio is higher as compared to the small firms.

Similarly, when descriptive statistics of high book-to-market and low book-to-market portfolios are compared, it is indicated that low book-to-market portfolios outperform high book-to-market portfolios in high average return terms. Moreover, high book-to-market portfolios possess high risk as compared to low book to market portfolios. Similarly, average returns for the portfolios with good financial reporting quality and illiquidity characteristics are higher. The results imply that firms with better reporting quality outperform the firms with bad reporting quality. Likewise, illiquidity is a trait of large capitalization firms which yield a higher return as compared to the small firms.

Table 4.1: Descriptive Statistics (All Portfolios)

Table 4.1 presents descriptive statistics for all the portfolios used in the analysis. All returns are expressed as percent per month for the study period June, 2002 to June, 2012. Panel 1 shows average returns, standard deviation, kurtosis, skewness and minimum and maximum reruns for small size portfolios. These small portfolios are further sorted on the basis of book-to-market ratio, institutional ownership, quality of financial reporting and liquidity of sample firms. Similarly, panel 2 represents average returns, standard deviation, kurtosis, skewness and minimum and maximum reruns for big size portfolios. These big portfolios are further sorted on the basis of book-to-market ratio, institutional ownership, quality of financial reporting and liquidity of sample firms

Portfolios	Mean	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
Panel 1: Average monthly returns and standard deviations for small size portfolios						
P	0.0042	0.0629	0.0437	-0.2700	-0.1633	0.1577
S	0.0027	0.0665	0.4623	-0.1199	-0.1853	0.1660
S/H	0.0040	0.0767	0.2588	-0.0122	-0.1994	0.1988
S/L	0.0015	0.0625	0.9291	-0.3268	-0.1837	0.1520
S/H/HO	0.0039	0.0819	-0.1450	-0.0685	-0.2121	0.1942
S/H/LO	0.0040	0.0811	1.0257	0.0196	-0.2610	0.2622

S/H/HO/GQFR	0.0073	0.0847	0.7021	0.2342	-0.2101	0.2826
S/H/HO/BQFR	-0.0006	0.0986	-0.0187	-0.2419	-0.2686	0.2604
S/H/HO/GQFR/LIQ	0.0099	0.1034	0.6064	0.2450	-0.2969	0.2952
S/H/HO/GQFR/ILLIQ	0.0041	0.1030	2.0164	0.2074	-0.3504	0.3712
S/H/HO/BQFR/LIQ	0.0099	0.1051	0.4504	-0.4769	-0.3012	0.2577
S/H/HO/BQFR/ILLIQ	-0.0100	0.1327	4.1981	-1.0989	-0.5887	0.3394
S/H/LO/GQFR	-0.0003	0.0916	3.7439	0.8161	-0.2526	0.4293
S/H/LO/BQFR	0.0078	0.0980	3.1489	-0.8493	-0.4500	0.2118
S/H/LO/GQFR/LIQ	-0.0008	0.1155	3.7347	0.8949	-0.2382	0.5669
S/H/LO/GQFR/ILLIQ	-0.0002	0.1128	2.0156	-0.1428	-0.4025	0.3300
S/H/LO/BQFR/LIQ	0.0061	0.1203	2.2543	-0.2818	-0.4860	0.3469
S/H/LO/BQFR/ILLIQ	0.0081	0.1040	2.3863	-0.2332	-0.4141	0.3268
S/L/HO	0.0011	0.0711	2.2192	-0.5931	-0.2909	0.1926
S/L/LO	0.0022	0.0662	0.8701	0.0150	-0.2009	0.1980
S/L/HO/GQFR	-0.0026	0.0928	14.5048	-2.1884	-0.6047	0.2362
S/L/HO/BQFR	0.0063	0.0775	0.6190	-0.0487	-0.2116	0.2157
S/L/HO/GQFR/LIQ	-0.0066	0.1050	11.6651	-1.6310	-0.6536	0.3107
S/L/HO/GQFR/ILLIQ	0.0015	0.1019	7.9666	-1.0967	-0.5559	0.2967
S/L/HO/BQFR/LIQ	0.0099	0.1036	0.2092	-0.2152	-0.2669	0.2556
S/L/HO/BQFR/ILLIQ	-0.0015	0.0920	1.1410	-0.2723	-0.2672	0.2586
S/L/LO/GQFR	0.0034	0.0782	1.7612	0.1714	-0.2741	0.2381
S/L/LO/BQFR	0.0011	0.0777	1.2329	-0.1241	-0.2275	0.2527
S/L/LO/GQFR/LIQ	0.0011	0.0959	1.9423	0.2925	-0.2405	0.3568
S/L/LO/GQFR/ILLIQ	0.0055	0.1061	9.3346	0.2737	-0.5116	0.5173
S/L/LO/BQFR/LIQ	0.0042	0.1090	1.5550	0.0235	-0.3200	0.3204
S/L/LO/BQFR/ILLIQ	-0.0028	0.0896	4.3631	0.0108	-0.3748	0.3732
Panel 1: Average monthly returns and standard deviations for Big size portfolios						
B	0.0057	0.0668	0.0513	-0.5179	-0.1810	0.1506
B/H	0.0055	0.0751	-0.4702	0.2286	-0.1780	0.1566
B/L	0.0065	0.0654	0.8182	-0.6866	-0.1941	0.1450
B/H/HO	0.0028	0.0786	0.6162	-0.4542	-0.2610	0.1695
B/H/LO	0.0090	0.0820	0.3044	0.2028	-0.1737	0.3029
B/L/HO	0.0069	0.0631	1.8648	-0.8586	-0.2549	0.1435
B/L/LO	0.0062	0.0829	3.2174	-0.7340	-0.3439	0.2375
B/H/HO/GQFR	0.0000	0.0717	0.2828	-0.1986	-0.2088	0.1634
B/H/HO/BQFR	0.0047	0.0979	1.8541	-0.3629	-0.3671	0.3254
B/H/HO/GQFR/LIQ	-0.0026	0.0936	1.3827	-0.6112	-0.3112	0.2202
B/H/HO/GQFR/ILLIQ	0.0031	0.0809	1.4606	-0.4778	-0.2807	0.1949
B/H/HO/BQFR/LIQ	0.0015	0.1267	5.4188	-0.3340	-0.5773	0.5329
B/H/HO/BQFR/ILLIQ	0.0069	0.0885	0.3959	-0.1366	-0.2213	0.2677
B/H/LO/GQFR	0.0099	0.1025	14.7114	2.1948	-0.2909	0.6797

B/H/LO/BQFR	0.0071	0.0905	-0.3723	-0.0279	-0.2133	0.2401
B/H/LO/GQFR/LIQ	0.0051	0.1034	2.1408	-0.1088	-0.3528	0.3728
B/H/LO/GQFR/ILLIQ	0.0164	0.1637	43.3405	4.9722	-0.5375	1.3954
B/H/LO/BQFR/LIQ	0.0060	0.1237	1.6086	0.0680	-0.3294	0.4867
B/H/LO/BQFR/ILLIQ	0.0091	0.0939	0.0743	-0.1511	-0.2594	0.2361
B/L/HO/GQFR	0.0052	0.0665	3.7875	-1.0094	-0.3198	0.1353
B/L/HO/BQFR	0.0098	0.0705	0.4925	-0.5608	-0.2180	0.1796
B/L/HO/GQFR/LIQ	0.0030	0.0720	0.7683	-0.5771	-0.2641	0.1405
B/L/HO/GQFR/ILLIQ	0.0081	0.0794	12.5136	-1.9597	-0.4973	0.1948
B/L/HO/BQFR/LIQ	0.0092	0.0949	4.0724	-0.6641	-0.4177	0.3378
B/L/HO/BQFR/ILLIQ	0.0112	0.0679	-0.2746	0.0005	-0.1374	0.1895
B/L/LO/GQFR	0.0044	0.1199	11.7835	-0.6819	-0.6274	0.5567
B/L/LO/BQFR	0.0086	0.0904	5.4545	-0.0113	-0.3569	0.4268
B/L/LO/GQFR/LIQ	0.0023	0.2248	21.1463	-1.0805	-1.3951	1.1646
B/L/LO/GQFR/ILLIQ	0.0080	0.0788	0.9634	-0.6019	-0.2644	0.1732
B/L/LO/BQFR/LIQ	0.0027	0.0895	3.9736	-1.0751	-0.4151	0.2388
B/L/LO/BQFR/ILLIQ	0.0156	0.1229	12.1895	1.4748	-0.3937	0.7372

4.2 Size Premium and Equity Market Returns

Table 4.2 reports average excess returns of the small and big capitalization portfolios and difference between their average excess returns. The results support the theory as it is clearly indicated that portfolio of the large capitalization firms outperform the portfolio of small capitalization firms for the study period. As, the small firms are perceived as riskier than large capitalization firms, in turn investors of the small firms demand higher risk adjusted returns. Moreover, t-stat. value indicates that there is no significant difference between returns of small and large capitalization portfolio.

Similarly, when average excess returns of small portfolio is compared with the market portfolio, it is evident form the results that small portfolio underperforms market portfolio. Further, statistically speaking, there is no substantial difference between the returns of small firm and market portfolio for the study period. The results reported in the table also indicate that portfolio of large capitalization firms underperforms market portfolio for the sample period. Likewise, t-stat. values show that there exists no significant difference between the average excess returns of market portfolio and large capitalization firms.

Table 4.2: Difference between Average Returns of Small, Big and, Market Portfolio

Table 4.2 provides the excess mean returns of small, big, average market returns, their differences and t-stat.

Time Period	Average Return Small	Average Return Big	Difference	*t-stat.*
2002-2012	-0.005	-0.002	-0.003	0.735
Time period	**Average Return Small**	**Average Return of Market**	**Difference**	***t-stat.***
2002-2012	-0.005	0.010	-0.014	0.142
Time period	**Average Return Big**	**Average Return of Market**	**Difference**	***t-stat.***
2002-2012	-0.002	0.010	-0.011	0.246

4.2.1 Regression Results for Market and Size Premium

Table 4.3 reports regression results of MKT and SMB factors for all size, value, ownership premium, financial reporting quality and liquidity sorted portfolios. The results clearly indicate that size premium is significantly and positively explain returns of all the portfolios except portfolio with high liquidity hence, it is examined that size premium is priced in equity market of Pakistan. Although, CAPM appears to be a valid model as market premium is significantly positively related to all the portfolio returns and intercept is not significantly different from zero but inclusion of size premium increases explanatory power of single factor CAPM by 6%. The results are in line with the original work of Banz (1981) and Fama & Frech (1992), who report that risk adjusted returns of small firms are higher than the large firms. Moreover, results support findings of Hassan & Javed (2011) who empirically investigate asset pricing mechanism in equity market of Pakistan and report significant size effect.

Table 4.3: Regression Results Two Factor Size Premium & Market Premium Based Model

P indicates portfolio of all sample companies in sample period. At the end of June of each year, all stocks are primarily sub-categorized into two groups, small and big companies using their respective market capitalizations. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of book-to-market ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

$$R_{pt} - R_{ft} = \alpha + \beta_{MTK} MKT + \beta_{SMB} SMB_t + \varepsilon_t$$

Portfolio	Intercept	MKT	SMB	Adj. R^2
P	-0.0086**	0.5670***		0.54
P	-0.0081**	0.6379***	0.3981***	0.60
S	-0.0081**	0.6390***	0.9000***	0.63
B	-0.0081**	0.6390***	-0.1000***	0.64
HBM	-0.0087*	0.7011***	0.6887	0.61
LBM	-0.0075**	0.5746***	0.5551***	0.55
HO	-0.0090**	0.6537***	0.3003***	0.59
LO	-0.0073*	0.6227***	0.4857***	0.54
BQFR	-0.0085**	0.7244***	0.2156**	0.66
GQFR	-0.0077*	0.5502***	0.5804***	0.48
ILLIQ	-0.0058	0.4853***	0.6048***	0.50
LIQ	-0.0103**	0.7878***	0.1934*	0.63

4.2.2 Two Pass regression results for Market and Size Premium

Table 4.4 reports two pass regression results for the two factors size premium & market premium based model. Two-pass regression analysis has been used, where the factor betas are estimated by time-series linear regression of portfolio return on a set of common factors. Then, factor risk prices are estimated by cross-sectional regression of mean returns on betas. The purpose is to evaluate the significance of the firm-specific risk premiums in explaining future returns. The results of the second-pass regression reveal that there is no relationship between risk premia associated with market and size factor and future portfolio returns.

Table 4.4: Two Pass Regression Results Two Factor Size Premium & Market Premium Based Model

The table indicates the two pass regression results for the portfolios used in two-factor model comprising MKT and SMB as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	Intercept	MKT	SMB	Adj. R^2

$$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{SMB,t}\hat{\beta}_{SMB} + \varepsilon_{it}$$

P	-0.0214	-0.0140	0.0546*	0.033
S	-0.0518*	-0.0044	0.0492	0.023
B	0.01492	-0.02499	0.06053*	0.029
HBM	-0.0372	-0.0183	0.0560	0.017
LBM	-0.0079	-0.0061	0.0519	0.039
HO	0.00664	-0.07761	0.12122***	0.084
LO	-0.0283	0.0066	0.0293	0.012
BQFR	-0.0086	-0.0093	0.0476	0.027
GQFR	-0.0346	-0.0387	0.0733**	0.041
ILLIQ	-0.0431**	0.0341	0.0297	0.021
LIQ	0.0307	-0.0703	0.0796**	0.040

4.3 Value Premium and Equity Market Returns

Table 4.5 reports average return of the high book-to-market and low book-to-market portfolios and difference between their average returns. Statistically speaking, there is no significant difference between the returns of high book-to-market (HBM hereafter) and low book-to-market (LBM hereafter) portfolios. Conversely, the mean returns of both portfolios support theory, it is clearly indicated that LMB outperforms HBM portfolio and more risk-adjusted returns are demanded for portfolios of high book-to-market stocks.

Moreover, when mean return of high book-to-market value and market returns are compared, statistically, no significant difference found between the returns of two portfolios. The results suggest that market portfolio outperforms HBM portfolio.

Furthermore, the t-stat. value for the mean return of LBM and average return of the market portfolio is statistically insignificant and show that there is no difference between excess returns of two portfolios but comparison of mean returns suggests that market portfolio outperforms portfolio of low book-to-market stocks.

Table 4.5 : Difference amongst Average Returns of High Book-to Market, Low Book-to-Market and Market Portfolio

Table 4.5 provides the excess mean returns of HBM, LBM, and the market portfolio, their return differences and t-stat.

Time Period	Average Return HBM	Average Return LBM	Difference	t-stat.
2002-2012	-0.004	-0.002	-0.002	0.849

Time period	Average Return HBM	Average Return of Market	Difference	t-stat
2002-2012	-0.004	0.010	-0.014	0.171
Time period	**Average Return LBM**	**Average Return of Market**	**Difference**	**t-stat**
2002-2012	-0.002	0.010	-0.012	0.204

4.3.1 Regression Results for Market and Value Premium

Table 4.6 reports regression results for MKT and HML factors for all size, value, institutional ownership, financial reporting quality and liquidity sorted portfolios. The results suggest that there is positive and significant relationship between value premium and size, institutional ownership, reporting quality and liquidity sorted portfolio returns but it is negative and insignificant for LBM (portfolio of low book to market ratio firms). The results clearly indicate that book-to-market factor is not priced for low book-to-market portfolios. Moreover, the market factor is significant for all the portfolios indicating validity of single factor model in explaining stock returns. It is also observed that explanatory power of the model increases by 4% when book-to-market factor is added to the single factor CAPM. The results provide empirical support to the Fama & French three-factor model (1992) and suggest that book-to-market is a priced factor and is positively related to the portfolio reruns for equity market of Pakistan.

Table 4.6: Regression Results Two Factor Value Premium & Market Premium Based Model

Table 4.6 reports the regression results for the two factor based model. Here, P indicates portfolio of all sample companies for the study period. At the end of June each year, all stocks are primarily sub-categorized into two groups, small and big companies using their respective market capitalizations. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of book-to-market ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	Intercept	MKT	HML	Adj. R^2
$R_{pt} - R_{ft} = \alpha + \beta_{mkt} MKT + \beta_{HML} HML + \varepsilon_t$				
P	-0.0086	0.5670***		0.54
P	-0.0079**	0.5574***	0.4141***	0.58
S	-0.0077*	0.4594***	0.8316***	0.51
B	-0.0080**	0.6568***	0.0009	0.63

HBM	-0.0078**	0.5571***	0.9171***	0.65
LBM	-0.0078**	0.5571***	-0.0829	0.56
HO	-0.0088**	0.5927***	0.3230***	0.59
LO	-0.0070*	0.5246***	0.4990***	0.52
BQFR	-0.0083**	0.6801***	0.2561**	0.66
GQFR	-0.0074*	0.4335***	0.5728***	0.43
ILLIQ	-0.0055	0.3647***	0.5522***	0.42
LIQ	-0.0101**	0.7470***	0.2751**	0.64

4.3.2 Two Pass regression results for Market and Value Premium

Table 4.7 reports two-pass regression results, by taking into the account market premium and value premium as risk factors. The statistics reported in the table clearly indicate that the model fails to explain the relationship between markets, value and, future portfolio returns during analysis period. The regression coefficients for above mentioned two risk factors (MKT and HML) are statistically insignificant as almost all the portfolios. It is also observed that the value premium is significant with small values for only three portfolios out of 11 portfolios namely, LBM, HO and LIQ. Furthermore, adj. R-square values for all the portfolios show weak explanatory power of the model and low goodness of fit for regression analysis. The insignificant coefficients lead the conclusion that the model fails to establish the relationship between market premium, value premium and future stock returns.

Table 4.7: Regression Results Two Factor Value Premium & Market Premium Based Model

The table indicates the two pass regression results for the portfolios used in two-factor model comprising MKT and HML as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**HML**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{HML,t}\hat{\beta}_{HML} + \varepsilon_{it}$				
P	-0.0185	-0.0101	0.0368*	0.026
S	-0.0484	0.0283	0.0304*	0.019
B	0.0217	-0.0450	0.0438	0.013
HBM	-0.0380	-0.0051	0.0332*	0.013
LBM	0.0020	-0.0108	0.0398**	0.033

HO	0.0247	-0.0962	0.0744***	0.075
LO	-0.0352	0.0279	0.0211	0.007
BQFR	-0.0011	-0.0233	0.0381*	0.017
GQFR	-0.0349	0.0169	0.0306*	0.025
ILLIQ	-0.0403**	0.0461	0.0280*	0.020
LIQ	0.0413	-0.0873	0.0456**	0.028

4.4 Ownership Premium and Equity Market Returns

Table 4.8 reports the comparison of average return of high-ownership and low-ownership (HO and LO hereafter) portfolios and difference between their average returns. The statistics reported in the table clearly indicate that there is no significant difference between returns of HO and LO portfolio.

Similarly, when the average mean returns of high ownership portfolio and market portfolio are compared, it is evident that there does not exist any statistical difference between returns of the high ownership and market portfolios. Moreover, HO portfolio fails to outperform market portfolio. Again, portfolio with low institutional ownership concentration under-performs the market portfolio. Therefore, it is concluded that the returns of both portfolios are not statistically different from each other.

Table 4.8: Difference between Average Returns of the High Institutional Ownership, Low Institutional Ownership and Market Portfolio

Time Period	Average Return HO	Average Return LO	Difference	t-stat
2002-2012	-0.003	-0.003	-0.001	0.921
Time period	**Average Return HO**	**Average Return of Market**	**Difference**	**t-stat**
2002-2012	-0.003	0.010	-0.013	0.171
Time period	**Average Return L O**	**Average Return of Market**	**Difference**	**t-stat**
2002-2012	-0.0026	0.0098	-0.0125	0.1988

4.4.1 Regression Results for Institutional Ownership Premium & Equity Market Returns

Table 4.9 indicates that there is significant relationship between ownership premium and portfolio. The results suggest that ownership premium exists in equity market of Pakistan and is a priced factor by investors. It is apparent from the results that when ownership factor is added to single factor model, it enhances explanatory factor of CAPM for all size, value, ownership, financial reporting quality and liquidity sorted portfolios. However, institutional ownership based two factor model's ability to explain portfolio returns is higher for big size, high institutional ownership, low book-to-market, bad reporting quality and high liquidity portfolios. The plausible reason may be that the institutional investors have more tendency to invest in large capitalization firms. Moreover, institutional investors have their representation in board of directors and they have better excess to corporate information. Further, being decisive corporate stakeholders, they may force management not to disclose much information to the minority shareholders. This is why, the returns of the companies with bad financial reporting quality are better explained by ownership premium factor than the portfolio of firms with good reporting quality.

4.9: Regression Results Two Factor Institutional Ownership Premium & Market Premium Based Model

Here, P indicates portfolio of all sample companies in sample period. At the end of June of each year, all stocks are primarily sub-categorized into two groups, small and big companies using their respective market capitalizations. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Boo-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**INSH**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha + \beta_{mkt} MKT + \beta_{INSH} INSH + \varepsilon_t$				
P	-0.0086	0.5670***		0.54

P	-0.0090**	0.5813***	-0.2234*	0.54
S	-0.0098*	0.5036***	-0.3888**	0.37
B	-0.0081**	0.6606***	-0.0584	0.64
HBM	-0.0100**	0.5997***	-0.3333**	0.47
LBM	-0.0078**	0.5625***	-0.1145	0.55
HO	-0.0090**	0.5825***	0.2762**	0.58
LO	-0.0090**	0.5825***	-0.7238***	0.57
BQFR	-0.0091**	0.6988***	-0.2001	0.66
GQFR	-0.0088*	0.4628***	-0.2504*	0.35
ILLIQ	-0.00697	0.3948***	-0.27018**	0.33
LIQ	-0.0108**	0.7647***	-0.1764	0.63

4.4.2 Regression Results for Institutional Ownership Premium & Equity Market Returns

Table 4.10 reveals two-pass regression results for the risk factors, market premium (MKT) and ownership premium (INSH). Again, the model fails to explain the relationship between market premium, ownership premium and, the future portfolio returns during the study period. Moreover, the coefficients for the above stated relationships are statistically Hence, in general, market premium and ownership don't explain future portfolio returns. Furthermore, the explanatory power of the model for all the portfolios is weak explanatory power of the model therefore, it is concluded that the two-factor model fails to set up the relationship between the market premium, ownership premium and future stock returns in second-pass regression.

Table 4.10: Two Pass Regression Results Two Factor Institutional Ownership Premium & Market Premium Based Model

Table indicates the two pass regression results for the portfolios used in two-factor model comprising MKT and SMB as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**INSH**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{INSH,t}\hat{\beta}_{INSH} + \varepsilon_{it}$				
P	-0.0066	-0.0266	-0.0433	0.016

S	-0.0283	0.0124	-0.0238	0.009
B	-0.0096	-0.0046	-0.0217	-0.014
HBM	-0.0266	0.0112	-0.0215	0.002
LBM	0.0063	-0.0403	-0.0375	0.000
HO	0.0350	-0.0518	-0.0613**	0.040
LO	-0.0316	0.0029	-0.0241	-0.006
BQFR	-0.0068	-0.0180	-0.0300	-0.019
GQFR	-0.0210	0.0082	-0.0244	0.027
ILLIQ	-0.0245	0.0211	-0.0188	0.011
LIQ	0.0087	-0.0380	-0.0396	-0.008

4.5 Quality of Financial Reporting and Equity Market Returns

Table 4.11 reports average returns of the market portfolio, portfolio of good financial reporting firms and portfolio of bad reporting quality firms. The results suggest that the portfolio of good financial reporting firms (GQFR hereafter) outperforms the portfolio of bad financial reporting firms (BQFR hereafter). It is evident from the results that market portfolio outperforms both GQFR and BQFR portfolios.

Table 4.11: Difference amongst average returns of Good Financial Reporting Quality, Bad Financial Reporting Quality and Market Portfolio

Time Period	Average Return BQFR	Average Return GQFR	Difference	t-stat.
2002-2012	-0.002	-0.004	0.002	0.816
Time period	**Average Return BQFR**	**Average Return of Market**	**Difference**	**t-stat.**
2002-2012	-0.002	0.010	-0.012	0.233
Time period	**Average Return GQFR**	**Average Return of Market**	**Difference**	**t-stat.**
2002-2012	-0.004	0.010	-0.014	0.146

4.5.1 Regression Results for Quality of Financial Reporting Premium & Equity Market Returns

Table 4.12 reports the regression results for quality of financial reporting, market premium and portfolio returns. The results clearly indicate that explanatory power of the model substantially increases with the inclusion of quality of financial reporting factor (QFR hereafter). It is noted that QFR premium is significant for all the portfolios except portfolio of large capitalization firms and the portfolio of firms with bad financial reporting quality. The findings suggests that QFR is not a priced factor for the bad reporting quality portfolios. On the flip side, the big size firms are perceived as less risky by investors as quality and timely information is available regarding such firms. Therefore, the results assert that the QFR factor does not explain the returns of big size firms.

Table 4.12: Regression Results Two Factor Qualityof Financial Reporting Premium & Market Premium Based Model

Note: P indicates portfolio of all sample companies in sample period. At the end of June of each year, all stocks are primarily sub-categorized into two groups, small and big companies using their respective market capitalizations. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Boo-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**QFR**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha + \beta_{MKT} MKT + \beta_{QFR} QFR + \varepsilon_t$				
P	-0.0086**	0.5670***		0.52
P	-0.0088**	0.6679***	-0.422***	0.58
S	-0.0095**	0.6500***	-0.716***	0.45
B	-0.0081**	0.6882***	-0.1312	0.64
HBM	-0.0097	0.7217	-0.5991	0.53
LBM	-0.0077**	0.6138***	-0.2451**	0.57
HO	-0.0095**	0.6944***	-0.3938**	0.60
LO	-0.0081**	0.6412***	-0.439**	0.50

BQFR	-0.0088**	0.6669***	0.0799	0.65
GQFR	-0.0088**	0.6669***	-0.920***	0.56
ILLIQ	-0.0068*	0.5159***	-0.578***	0.42
LIQ	-0.0107**	0.8186***	-0.2725**	0.64

4.5.2 Two Pass Regression Results for Quality of Financial Reporting Premium & Equity Market Returns

Table 4.13 reveals two-pass regression results for the market premium and quality of financial reporting premium for all the sub-sorted portfolios as dependent variables. The findings suggest that the two-factor model fails to explain the relationship between market premium, quality of financial reporting premium and, the future portfolio returns during the study period. It is worth mentioning that the factor loading of the market premium and QFR premium are statistically insignificant for all the portfolios in two-pass regression. Hence, it is concluded that the market premium and QFR premium don't explain the future portfolio returns. Moreover, the explanatory power of the model is very low for all the consequent portfolios. Thus, the two-factor model again fails here to establish the relationship between market premium, QFR premium and the future portfolio returns.

Table 4.13: Two Pass Regression Results Two Factor Quality of Financial Reporting

Note: Table indicates the two pass regression results for the portfolios used in two-factor model comprising MKT and SMB as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**QFR**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{QFR,t}\hat{\beta}_{QFR} + \varepsilon_{it}$				
P	-0.0448	0.0442	-0.0094	-0.011
S	-0.0547	0.0435	-0.0176	-0.004
B	-0.0394	0.0431	0.0030	-0.018
HBM	-0.0419	0.0369	-0.0032	-0.012
LBM	-0.0358	0.0388	-0.0083	-0.018
HO	-0.0205	0.0183	0.0122	-0.022
LO	-0.0374	0.0355	-0.0069	-0.008
BQFR	-0.0164	0.0143	-0.0380	-0.002
GQFR	-0.0442	0.0720	0.0181	-0.006

ILLIQ	-0.0554*	0.0727	-0.0113	0.005
LIQ	-0.0297	0.0176	-0.0131	-0.018

4.6 Liquidity Premium and Equity Market Returns

Table 4.14 reports the average return of liquid portfolios and illiquid portfolios and difference between their average returns. The statistics reported in the table show that there is no significant difference between the returns of liquid portfolios and illiquid portfolios .Furthermore, when we compare the average return of the liquid portfolio and the market portfolio, it is revealed that no significant difference exists between the average returns of above aforementioned portfolios.

Table 4.14: Difference amongst average returns of High Liquidty, Low Liquidity and Market portfolio

Time Period	Average Return ILLIQ	Average Return LIQ	Difference	t-stat.
2002-2012	-0.003	-0.003	0.000	0.972
Time period	**Average Return ILLIQ**	**Average Return of Market**	**Difference**	**t-stat**
2002-2012	-0.003	0.010	-0.013	1.138
Time period	**Average Return LIQ**	**Average Return of Market**	**Difference**	**t-stat**
2002-2012	-0.003	0.010	-0.013	0.214

4.6.1 Regression Results for Liquidity Premium & Equity Market Returns

The Table 4.15 reports the relationship between the market factor, liquidity factor (ILLIQ hereafter) and the portfolio returns. The results reveal that coefficient of liquidity factor is statistically significant for five portfolios out of total ten portfolios constructed on the basis of the size, book-to-market, ownership, quality of financial reporting and, the liquidity factors. It is observed that explanatory power of the model is substantially high for big size, bad quality of financial reporting firms ‘portfolio and liquid portfolio. One possible reason of this anomalous behaviour could be illiquidity trait of large capitalization firm due to their high

prices. Moreover, explanatory power of the model is high for liquid stocks as compared to the illiquid stocks. Therefore, it can be concluded that liquidity factor is a priced risk factor and returns of liquid stocks are different from returns of illiquid stocks.

Table 4.15: Regression Results Two Factor Liquidity Premium & Market Premium Based Model

Here, P indicates portfolio of all sample companies in sample period. At the end of June of each year, all stocks are primarily sub-categorized into two groups, small and big companies using their respective market capitalizations. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Boo-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-	Intercept	MKT	ILLIQ	Adj. R^2
$R_{pt} - R_{ft} = \alpha + \beta_{MKT} MKT + \beta_{ILLIQ} ILLIQ + \varepsilon_t$				
P	-0.0086**	0.5670***		0.54
P	-0.0084**	0.5482***	-0.0501	0.53
S	-0.0103**	0.5754***	0.2572*	0.35
B	-0.0066**	0.5227***	-0.3571***	0.67
HBM	-0.0099**	0.6140***	0.0948	0.45
LBM	-0.0069*	0.4823***	-0.1937*	0.56
HO	-0.0090**	0.5653***	-0.0929	0.56
LO	-0.0078***	0.5308***	-0.0143	0.45
BQFR	-0.0080**	0.6137***	-0.1924	0.66
GQFR	-0.0088*	0.4816***	0.0924	0.34
ILLIQ	-0.0084**	0.5467***	0.4502**	0.38
LIQ	-0.0084**	0.5467***	-0.5498***	0.69

4.6.2 Two Pass Regression Results for Liquidity Premium & Equity Market Returns

Table 4.16 reports the two-pass regression results for the market premium, liquidity premium and future portfolio returns. The statistically insignificant factor loadings for the market premium and liquidity premium clearly indicate model's failure in explaining future portfolio returns. Further, the market premium is found significant only for the portfolio of good financial reporting firms. Moreover, the weak explanatory power of the model reveal that the

model is unsuccessful to build the relationship between risk premia associated with the market premium and liquidity premium with future portfolio returns.

Table 4.16: Two Pass Regression Results Two Factor Liquidity Premium & Market

Table indicates the two pass regression results for the portfolios used in two-factor model comprising MKT and ILLIQ as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-portfolios	Intercept	MKT	ILLIQ	Adj. R^2
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{ILLIQ,t}\hat{\beta}_{ILLQ} + \varepsilon_{it}$				
P	-0.0685**	0.1100*	0.0066	0.026
S	-0.0725*	0.1094	-0.0080	0.006
B	-0.0334	0.0730	0.0304	0.024
HBM	-0.0805**	0.1123*	0.0025	0.022
LBM	-0.0464	0.0894	0.0147	0.021
HO	-0.0500	0.0779	0.0195	-0.002
LO	-0.0618**	0.0958	-0.0025	0.026
BQFR	-0.0561	0.0841	0.0083	0.011
GQFR	-0.0818**	0.1434**	0.0097	0.054
ILLIQ	-0.0588**	0.0899*	0.0020	0.017
LIQ	-0.0718	0.1289*	0.0127	0.0249

4.7 Fama & French Three Factor Model

Table 4.17: Correlation Matrix-Fama & French Three Factor Model

Note: Table shows correlation of factors from different sorts used in Fama & French three factor model. Here, MKT=Market Risk Premium, SMB=Size premium and HML=value Premium.

	MKT	SMB	HML
MKT	1		
SMB	-0.33	1	

HML	0.36	-0.07	1

Table 4.18: Regression Results Fama & French Three Factor Model

The results reported in the table 4.17 reveal that no significant correlation exists between the market, size and value factors. Therefore, the results allow the simultaneous use of mentioned factors as explanatory variables in the model.

4.7.1 Regression Results Fama & French Three-Factor Model

The regression results reported in table 4.18 reveal relationship between market, size and, value factors and returns of the portfolios sorted on various firm-specific characteristics such as, market capitalization and book-to-market ratio. The results indicate that the three-factor model successfully explains the returns of all subsequent portfolios. Moreover, the market factor is significant for all the portfolios, hence, providing empirical support to the validity of CAPM in equity market of Pakistan. Similarly, the size premium is significantly related to all the portfolio returns except big size portfolio, further sub-sorted on the basis of book-to-market ratio of the sample firms. Therefore, it can be concluded that the size factor do explain returns of the large capitalization firms. Furthermore, the value premium is positively and significantly related to all the portfolio returns except the size sorted portfolios with low book-to-market ratio. It is observed that value factor is more useful in explaining the returns of the portfolios with high book-to-market ratio. Moreover, the explanatory power of three-factor model is 7.4% higher than the conventional CAPM. Although, the explanatory power of the model varies across the portfolios or various investment styles. The findings suggest that portfolio managers/investor can device investment strategies based on these stylized portfolios.

Note: The table shows the Fama & French three model regression results. The regressions are estimated on average monthly portfolio returns, using variables updated annually at the end June of each year to explain returns of portfolios for the July through the following June. R_m-RFR is the value weighted return on the KSE-100 index minus one-month Treasury bill rate. At the end of each June, stocks are categorized to two size groups, using KSE market capitalization as break point. The size sorted portfolio are further assigned to two groups on the basis of their book-to-market equity. SMB is the average returns of resultant small portfolios minus average return of big portfolios. In similar way, HML is the average return of difference between high-book to market and low book-to-market stocks. The last column of the table shows value of Adjusted R^2 for each corresponding regression. P indicates average returns portfolio of all sample companies in sample period. S is the portfolio of small capitalization firms and B is the portfolio of large capitalization firms. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Book-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent Variable/Sub-	**Intercept**	**MKT**	**SMB**	**HML**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha + \beta_{mkt}MKT + \beta_{SMB}SMB + \beta_{HML}HML + \varepsilon_t$					
P	0.0120	3.2612***	-5.5412**	0.3301***	0.58
S	0.0162	3.8043*	-6.8289**	0.3701**	0.38
B	0.0082	2.7673**	-4.3514*	0.2949	0.66
S/H	0.0182	3.9947**	-7.1695**	0.8432***	0.49
S/L	0.0140	3.5735**	-6.4056**	-0.1114	0.27
B/H	0.0068	2.6004**	-4.0590*	0.8172***	0.71
B/L	0.0110	3.0216**	-4.8229*	-0.2282*	0.58

4.7.2 Two-Pass Regression Results Fama & French Three Factor Model

Table 4.19 reports two-pass regression results for Fama and French three-factor model (1992). Using two-pass regression methodology, the rolling betas are estimated by time-series linear regression (TSR hereafter). These estimated betas are then used in the cross-sectional regression (CSR hereafter) to investigate the association between current premiums with the future portfolio returns. The results suggest the failure of three-factor model in explaining future portfolio returns. Nevertheless, all the estimated factor loadings are found statistically insignificant for all three market, size and value factors. The weak explanatory power of the model suggest that no significant relationship exists between the risk premiums and the future portfolio returns for the equity market of Pakistan.

Table 4.19: Two-Pass Regression Results Fama & French Three Factor Model

Note: Table indicates the two pass regression results for the portfolios used in three-factor model comprising MKT, SMB, and HML as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Portfolios	Intercept	MKT	SMB	HML	Adj. R2
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{SMB,t}\hat{\beta}_{SMB} + \gamma_{HML,t}\hat{\beta}_{HML} + \varepsilon_{it}$					
P	-0.0261	0.0078	0.0033	0.0329	-0.010
S	-0.0327	0.0562	0.0277	-0.0156	-0.022
B	-0.0187	-0.0068	-0.0041	0.0562	0.009
S/H	-0.0164	-0.0027	-0.0017	0.0027	-0.029
S/L	-0.0408**	0.0620	0.0308	-0.0097	-0.014
B/H	-0.0775*	0.0306	0.0141	0.0684	0.023
B/L	-0.0044	-0.0089	-0.0052	0.0196	-0.002

4.8 Four-Factor Model

The four-factor model takes into the account institutional ownership (INSH) as a risk factor in multi-factor model. Following empirical results are reported here.

4.8.1 Correlation Matrix-Four Factor Model

The results reported in table suggest weak correlation between explanatory variables. Therefore, using these factors in regression analysis of four factor model is justified statsitically.

Table 4.20: Correlation Matrix-Four Factor Model

Table shows correlation of factors from different sorts used in ownership premium augmented Fama & French three factor model. Here, MKT=Market Risk Premium, SMB=Size premium, HML=value Premium and INSH=Ownership Premium.

	MKT	SMB	HML	INSH
MKT	1			
SMB	-0.33	1		

HML	0.36	-0.05	1	
INSH	0.06	0.02	0.06	1

4.8.2 Regression Results The Four-Factor Model

Table 4.21, reports the regression results for the four-factor model bases on the market, size, value, and the ownership premium factor and portfolio returns. The results indicate portfolios of the firms with large capitalization (B) yield more return as compared to the firms with small capitalization (S). The findings suggest a contradiction to the traditional size anomaly which asserts that companies with small capitalization are perceived more risky by investors due to their high exposure to the macro-economic shocks and hence more return is required by the investors investing in such companies. It is also observed that when we move towards more stylized portfolios of small capitalization and high and low book-to-market (S/H, S/L hereafter), value effect becomes dominant. It is also noticed that the average returns of high book-to-market portfolios are greater than the low book-to-market portfolios. Moreover, the portfolios of small size and low book-to-market firms yield negative average return. When these portfolios are further sorted on the basis of institutional ownership concentration of the sample firms, more stylized sub-portfolios are formed with high and low institutional ownership. The results indicate that the firms with low institutional ownership are perceived as more risky by investors. Hence, ownership premium is priced in the returns of equity market. It is also observed that returns of the portfolios with small capitalization, high book-to-market and high institutional ownership (S/H/HO henceforth) yield low returns as compared to the portfolios with small capitalization, high book-to-market and low institutional ownership portfolios (S/H/LO hereafter). On the flip side, the portfolios formed on the basis of small capitalization and low book-to-market ratio and institutional ownership (S/L/LO hereafter) outperform the low institutional ownership portfolios. The results specify that size effect is more dominant in portfolios of firm with small capitalization.

Quite the opposite, it is evident that value effect is more rampant in portfolios with large capitalization. When these large capitalization firms are further sorted on the basis of institutional holding, it is observed that portfolios of companies with low institutional ownership and large capitalization (B/H/LO and B/L/LO) earn more returns as compared to

the firms with high institutional holding (B/H/HO and B/L/HO). One possible explanation is the low trading frequency of institutional investors as they hold investments for longer period of time. As literature indicates institutional trading cost is positively associated with high trading frequency and negatively associated with the stock liquidity (Chordia & Tong, 2013). The empirical results show a positive and significant relationship for the market factor in explaining portfolio returns for all the sub-sorted portfolios on the basis of market capitalization, book-to-market ratio and institutional ownership.

The statistical representation of the results reveal some interesting facts. It is observed that when ownership premium is added as a fourth factor to the Fama and French-three factor model, the explanatory power of the model increases to 0.57. Therefore, it is concluded that the ownership premium exists and is priced by the investors in Pakistan's equity market. Moreover, when the all stock portfolio (P) is further segregated into the portfolio S and B i.e. small and big on the basis of market capitalization of the sample firms, the returns of the small size portfolio show a positive and significant relationship with risk factor MKT for single factor model.

The findings suggest strong presence of ownership premium when ownership factor is added to the standard Fama and French three-factor model (1992). Moreover, the findings of the study suggest a positive and significant relationship between ownership premium and return of all the sub-sorted portfolios. Hence, the results indicate usefulness of ownership factor in explaining stock returns in Pakistan's stock market. The findings are consistent with the previous studies of Sias & Titman, (2006); Starks, (2003); Gompers & Metrik, (2001); Zheng, (2009), who argue that institutional trading is positively correlated with subsequent stock returns. It is also concluded that institutional investors are informed traders and their investments in high institutional ownership portfolios gives an indication of information incorporation into the security prices. As, listed companies at Karachi Stock exchange have mixed ownership structure i.e. state owned companies, family ownership, foreign ownership and, institutional ownership etc. To further substantiate our hypothesized relationship between institutional ownership and stock returns, we argue that more institutional holding in a business firm ensures extensive monitoring by such informed investors as their presence is an indication of investors' expectations for better corporate governance mechanism rather than of insider trading. Ultimately, the presence of institutional investors bridges the information gap and helps to resolve the information asymmetry problem as they have

relative information advantage over retail investors. Thus, such companies are considered less risky as compared to the firms with low institutional ownership concentration. Hence, the investors of firms with low institutional holding will charge higher risk premium for investing in such companies. The literature in this domain also suggests that stock price synchronicity decreases with more domestic intuitional trading in the stocks of the firm as, it improves the flow of firm-specific information to the market (Kim et al. 2015). On the basis of above reported facts, it is concluded that the ownership factor, when added as a risk factor to Fama & French-three factor model, strengthens the explanatory power of the multi-factor model.

Table 4.21: Regression Results Four Factor Model

The table shows the ownership premium augmented Fama & French three model regression results. The regressions are estimated on monthly stock returns, using variables updated annually at the end June of each year to explain returns of portfolios for the July through the following June. Rm-RFR is the value weighted return on the KSE-100 index minus one-month Treasury bill rate. At the end of each June, stocks are categorized to two size groups, using KSE market capitalization as break point. The size sorted portfolio are further assigned to two groups on the basis of their book-to-market equity. SMB is the average returns of resultant small portfolios minus average return of big portfolios. In similar way, HML is the average return of difference between high-book to market and low book-to-market stocks. Likewise, INSH depicts difference in average of returns of high institutional ownership and low institutional ownership stocks. The last column of the table shows value of Adjusted R^2 for each corresponding regression. P indicates average returns portfolio of all sample companies in sample period. S is the portfolio of small capitalization firms and B is the portfolio of large capitalization firms. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Book-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively

Dependent Variable/Sub-	**Intercept**	**MKT**	**SMB**	**HML**	**INSH**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha + \beta_{MKT} MKT + \beta_{SMB} SMB + \beta_{HML} HML + \beta_{INSH} INSH + \varepsilon_t$						
P	-0.0103**	0.5813***	0.1376**	0.0120	0.4052***	0.57
S	-0.0105**	0.5978***	0.6546***	-0.0024	0.4169***	0.67
B	-0.0094**	0.5598***	-0.4098***	0.0673	0.4622***	0.75
S/H	-0.0072	0.6177***	0.5998***	0.5371***	0.4162***	0.72
S/L	-0.0139***	0.6095***	0.6663***	-0.5159	0.3925***	0.50
S/H/HO	-0.0089	0.6256***	0.4337***	0.3692***	0.9274***	0.53
S/H/LO	-0.0056	0.4405***	0.4104***	1.1585***	-0.0118	0.74
S/L/HO	-0.0130	0.6515***	1.1326***	-0.7020***	0.6329***	0.61

S/L/LO	-0.0110	0.5624***	0.2550***	-0.3846***	0.2102*	0.28
B/H	-0.0145	0.6571***	-0.1203*	0.2363**	0.3947**	0.68
B/L	-0.0097	0.5832***	-0.3921***	-0.4565***	0.4310***	0.81
B/H/HO	-0.0160	0.6981***	-0.2217**	0.1619*	0.7293**	0.70
B/H/LO	-0.0129	0.6161***	-0.0190	0.3107**	0.0601	0.54
B/L/HO	-0.0082	0.4116***	-0.5586	-0.1200*	0.9469	0.79
B/L/LO	-0.0113	0.7548***	-0.2256**	-0.7931***	-0.0850	0.73

4.8.3 Two-Pass Regression Results Four Factor Model

Table 4.22, shows two pass regression results for the four-factor model for all size, book-to-market and ownership sorted portfolios. The two-pass regression procedure has been used, where the factor betas are estimated by time-series linear regression of portfolio returns on a set of common factors. Then, the factor risk premiums are estimated by cross-sectional regression of mean returns on the factor loading estimated in time-series regression. The purpose is to evaluate the significance of the firm-specific factor in the second-stage ordinary least square (OLS). The results reveal that the four-factor model fails to explain relationship between market premium, size premium, value premium, ownership premium and, the future stock returns during testing period. The adj. R-square value also indicates weak explanatory power of the model. Hence, no significant relationship exists between risk premia associated with the factors and portfolio retunes. Moreover, all the coefficients for estimated factor loading are statistically insignificant except for few portfolios where we report significant size premiums. Therefore, it is concluded that the size effect is of little help in forecasting future portfolio returns.

Table 4.22: Two Pass Regression Results Four Factor Model

The table reports the two-pass regression results for the portfolios used in four-factor model comprising MKT, SMB, HML, and INSH as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Portfolios	Intercept	MKT	SMB	HML	INSH	Adj. R2
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{SMB,t}\hat{\beta}_{SMB} + \gamma_{HML,t}\hat{\beta}_{HML} + \gamma_{INSH,t}\hat{\beta}_{INSH} + \varepsilon_{it}$						
P	-0.0575	0.0798	0.0851**	-0.0124	-0.0515	0.037

S	-0.1283**	0.1301*	0.0626	0.0446	-0.0446	0.037
B	0.0112	0.0674	0.0948**	-0.0760	-0.0436	0.037
S/H	-0.0903	0.0644	0.1328**	-0.0122	-0.1062**	0.074
S/L	1.4E-05	9.3E-02*	-3.3E-02***	1.1E-01**	1.4E-02	0.028
B/H	-0.1266**	0.0814	0.1235**	0.1004**	0.0438	0.050
B/L	-0.1133*	0.1747	0.1786***	-0.1088	0.0570	0.115
S/H/HO	-0.0972	0.1555	0.0461	0.0428	-0.0642	-0.002
S/H/LO	-0.1667	0.0080	0.0158	0.1207	0.0248	-0.008
S/L/HO	0.0467	-0.0337	0.0215	0.1319***	0.0033	0.11
S/L/LO	0.0086	-0.0208	-0.0114	0.0104	0.0062	-0.055
B/H/HO	-0.0297	-0.0544	0.0395	0.0067	0.0662	-0.018
B/H/LO	-0.1182***	0.1313**	0.2316	0.0922	0.0349	0.070
B/L/HO	-0.0806	0.0958	0.1985***	-0.1329**	0.1406***	0.157
B/L/LO	-0.0979	0.1128	0.0764	-0.0196	-0.0108	0.01

4.9 Five Factor Model

The five-factor model takes into the account quality of financial reporting (QFR) factor in multi-factor model. Following empirical results are reported here.

4.9.1 Correlation Matrix-Five Factor Model

The results reported in table 4.23, indicate no correlation exist between market, size, value, ownership and, quality of financial reporting factors. However, a moderate negative correlation exists between market and quality of financial reporting factors. Therefore, vector inflation factor (VIF) is used to determine the tolerance level. Here, A VIF value of 1.38 > 5 asserts using of quality of financial reporting as an explanatory variable in our five-factor model.

Table 4.23 : Correlation Matrix-Five Factor Model

The table shows correlation of factors from different sorts used in ownership premium and quality of financial reporting augmented Fama & French factor model. Here, MKT=Market Risk Premium, SMB=Size premium, HML=Value Premium, INSH=Institutional ownership premium and, QFR=quality of financial reporting

premium.

	MKT	SMB	HML	INSH	QFR
MKT	1				
SMB	-0.31	1			
HML	0.37	-0.07	1		
INSH	0.08	-0.02	0.00	1	
QFR	-0.52	0.08	-0.29	-0.13	1

4.9.2 Regression Results Five Factor Model

Table 4.23 reports the regression results of five-factor model, where, market, size, value, ownership and, quality of financial reporting (QFR henceforth) factors are used to explain the portfolio returns. It is observed that when quality of financial reporting factor is added to the already tested ownership-based four-factor model in this study, the explanatory power of the newly suggested model is 63% for all stock portfolio (P), which is 10.5% percent greater than the four-factor model. Moreover, adj. R-square values of the five-factor model across the portfolios is higher as compared to the four-factor model. Another interesting observation here is that the ownership factor gets insignificant with negative coefficients for almost half of the portfolios when QFR is added as a fifth factor. Hence, five-factor model outperforms four-factor model in terms of quantifying risk. Further, the explanatory power of the model is higher for the majority of big size portfolios as compared to the small size portfolios. The adj. R-square value is 0.73 which is highest for the portfolio of big, high book-to-market and high institutional ownership firms (B/H/HO) whereas, it least explains the portfolio of small, low-book-to-market, low institutional ownership and, good quality of financial reporting firms.

Likewise, the coefficients of the market, size, value, ownership and, quality of financial reporting factors are statistically significant for majority of the portfolios. It is also worth mentioning that explanatory power of the model is comparatively higher for the portfolios with good financial reporting quality as compared to the portfolios with bad financial reporting quality. Moreover, QFR coefficients are statistically significant for the portfolios of

high institutional ownership. This finding is empirically supported by the study of Sloan (1996) who argue that institutions are sophisticated investors with more expertise to analyse and interpret the financial reports of the companies hence, they contribute more in transmitting firm-specific information into the stock prices.

On the basis of statistical results, the study reports a significant QFR premium in equity market of Pakistan. When the phenomenon is further investigated on theoretical and empirical grounds, it is argued that better financial reporting quality ensures better information environment for the market participants. The quality financial information provided by firms reduces information asymmetry. Thus, disclosure quality related to firm fundamentals help investors to make rational investment decisions. Whereas, poor or bad quality of financial reporting causes moral hazard and adverse selection at both spectrums.

As, the current study uses prediction power of cash flows from current period's cash flows and accrual components as proxy of financial reporting quality, the investors of the firm will be in a position to predict future cash flows more accurately. Moreover, the investors use future cash flows for the sake of security valuation. Ultimately, the stocks of the firms with better reporting quality will be fairly priced as compared to the firms with bad reporting quality. The results of the study suggest using QFR based multi-factor model as it helps in accelerating the process of fair price discovery. Given the results of the five-factor model, the study suggests that firms with bad financial reporting quality are considered as risky firms as compared to the firms with goof financial reporting quality. Hence, the findings suggest that quality of financial reporting is a systematic risk factor which is priced by the investors in equity market of Pakistan. The testing of the proposed model in a different market will authenticate the findings of the current study that QFR should be added to the multi-factor asset pricing models to enhance their explanatory powers.

Table 4.24: Regression Results Five Factor Model

The table shows the quality of financial reporting augmented Fama & French three factor model regression results. The regressions are estimated on monthly stock returns, using factors updated annually at the end of June, to explain returns of portfolios for the July through the following June. Rm-RFR is the value weighted return on the KSE-100 index minus one-month Treasury bill rate. At the end of each June, stocks are categorized to two size groups, using KSE market capitalization as break point. The size sorted portfolio are further assigned to two groups on the basis of their book-to-market equity. SMB is the average returns of resultant small portfolios minus average return of big portfolios. In similar way, HML is the average return of difference between high-book to market and low book-to-market stocks. Likewise, INSH depicts difference in average of returns of high institutional ownership and low institutional ownership stocks. Here, QFR is the average of return of good quality of financial reporting stocks minus average of the returns of the stocks with bad financial reporting quality. The last column of the table shows value of Adjusted R^2 for each corresponding regression. P indicates average returns portfolio of all sample companies in sample period. S is the portfolio of small capitalization firms and B is the portfolio of large capitalization firms. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Boo-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable/Sub-portfolios	**Intercept**	**MKT**	**SMB**	**HML**	**INSH**	**QFR**	**Adj. R^2**
$R_{pt} - R_{ft} = \alpha + \beta_{MKT}MKT + \beta_{SMB}SMB + \beta_{HML}HML + \beta_{INSH}INSH + \beta_{QFR}QFR + \varepsilon_t$							
P	-0.0079**	0.7001***	0.3825***	0.2350**	-0.0673	0.4540***	0.63
S	-0.0077**	0.6935***	0.8614***	0.2442**	-0.0791	0.4599***	0.66
B	-0.0081**	0.7091***	-0.0926	0.2298**	-0.0560	0.4516***	0.68
S/H	-0.0071*	0.7388***	0.8645***	0.6551***	-0.1650	0.5333***	0.68
S/L	-0.0083**	0.6469***	0.8652***	-0.1770	-0.0008	0.3709***	0.60
S/H/HO	-0.0067	0.7412***	0.8144***	0.6563***	0.2714	0.6241***	0.59
S/H/LO	-0.0078*	0.7415***	0.9476***	0.6711***	-0.6284***	0.4367	0.69
S/L/HO	-0.0080*	0.7226***	0.9005***	-0.2858**	0.4417***	0.6334***	0.55
S/L/LO	-0.0083*	0.5750***	0.8263***	-0.0828***	-0.4429	0.0862***	0.52
B/H	-0.0081***	0.6842***	-0.0914	0.7090***	0.1391	0.4630***	0.70
B/L	-0.0075**	0.7336***	-0.0999	-0.2555**	-0.2436*	0.4463***	0.63
B/H/HO	-0.0110***	0.7578***	-0.0123	0.4965***	0.4882***	0.2818**	0.73
B/H/LO	-0.0047	0.6170***	-0.1909	0.8980***	-0.2061	0.6020***	0.57
B/L/HO	-0.0053	0.6072***	-0.0734	0.0169	0.4768***	0.2648**	0.59
B/L/LO	-0.0098**	0.8663***	-0.1375	-0.5429***	-0.9811***	0.6058***	0.61
S/H/HO/GQFR	-0.0025	0.6134***	0.7845***	0.7845***	0.0000	0.6526***	0.44
S/H/HO/BQFR	-0.0115*	0.8591***	0.8672***	0.5423**	0.5826**	0.6265***	0.50
S/H/LO/GQFR	-0.0105**	0.7425***	0.9975***	0.7706***	-0.5052**	1.0786***	0.53
S/H/LO/BQFR	-0.0053	0.7717***	1.0565***	0.4922**	-0.7004***	-0.1988	0.61

S/L/HO/GQFR	-0.0095	0.8138***	1.1694***	-0.6240***	0.7892***	1.2593***	0.54
S/L/HO/BQFR	-0.0051	0.6266***	0.5902***	0.0138	0.1046	-0.0674	0.42
S/L/LO/GQFR	-0.0060	0.6566***	0.8587***	-0.0071	0.0428	0.5893**	0.38
S/L/LO/BQFR	-0.0103*	0.5171***	0.8398***	-0.1447	-0.8425***	-0.3561**	0.48
B/H/HO/GQFR	-0.0117***	0.6721***	0.0822	0.5092***	0.5828***	0.6554***	0.61
B/H/HO/BQFR	-0.0111**	0.8134***	-0.1330	0.5517***	0.4004**	-0.1045	0.68
B/H/LO/GQFR	-0.0031	0.5360***	-0.4130**	1.2459***	-0.4791*	1.1482***	0.45
B/H/LO/BQFR	-0.0069	0.6712***	0.0772	0.6229***	-0.0367	0.0608	0.48
B/L/HO/GQFR	-0.0067	0.6154***	-0.0518	0.1308	0.5206***	0.4355***	0.53
B/L/HO/BQFR	-0.0027	0.5870***	-0.1449	-0.0807	0.4908**	0.1266	0.48
B/L/LO/GQFR	-0.0108	0.9511***	-0.2637	-0.9822***	-1.4801***	1.7651***	0.51
B/L/LO/BQFR	-0.0079	0.7546***	0.0108	-0.1699	-0.5277**	-0.5032**	0.60

4.9.3 Two Pass Regression Results Five-Factor Model

The results of the table 4.25, clearly indicate that the five-factor model fails to explain the relationship between risk premia associated with the market, size, value, ownership and, quality of financial reporting factors and future portfolio returns. The regression coefficients for factor loadings associated with aforementioned factors are found statistically insignificant for almost all the portfolios. Only, the value risk factor is found significant for three portfolios out of total 32 portfolios. Hence, there is no association between risk premia and future portfolio returns in case of five-factor model. Furthermore, Adj. R^2 indicate the poor explanatory power of the model. Therefore, it is concluded that the five factor model doesn't succeed to develop a link between risk premia and future portfolio returns during the study period.

Table 4.25: Two Pass Regression Results Five Factor Model

Note: Table indicates the two pass regression results for the portfolios used in five-factor model comprising MKT, SMB, HML, INSH, and QDR as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Dependent	**Intercep**	**MKT**	**SMB**	**HML**	**INSH**	**QFR**
$R_{pt} - R_{ft} = \alpha_t + \gamma_{mkt,t}\hat{\beta}_{mkt} + \gamma_{SMB,t}\hat{\beta}_{SMB} + \gamma_{HML,t}\hat{\beta}_{HML} + \gamma_{INSH,t}\hat{\beta}_{INSH} +$						
P	0.0819	-0.1084	0.0411	-0.0491	0.0041	-0.0576
S	0.0640	-0.0897	0.0262	-0.0553	-0.0005	-0.0673
B	0.1301	-0.1518	0.0671	-0.0409	0.0113	-0.0411

S/H	0.2945**	-0.2369	0.0506	-0.1891**	0.0507	-0.0755*
S/L	-0.0251	0.0185	0.0115	-0.0038	-0.0412	-0.0301
S/H/HO	0.2627**	-0.0639	-0.0495	-0.2359**	0.0701	-0.0785**
S/H/LO	0.1492	-0.3213**	0.1402**	-0.0811*	0.0302	0.0229
S/L/HO	-0.0515	0.1701	-0.0307	-0.0168	-0.0751	-0.0407
S/L/LO	-0.0297	0.0271	0.0152	0.0014	0.0113	-0.0352
B/H	-0.0065	0.0454	0.0213	-0.0129	-0.0440	-0.0379
B/L	0.2708**	-0.3878**	0.0952*	-0.1623*	0.1093*	0.0089
B/H/HO	0.2300	-0.2958	0.1520**	-0.0039	-0.0267	-0.0299
B/H/LO	-0.0391	0.1292	-0.0434	-0.0410	0.0159	-0.0695
B/L/HO	0.1970**	-0.3034**	0.1345*	-0.1039	0.0024	0.0221
B/L/LO	0.1501	-0.1629	0.0475	-0.1070	0.0832	0.0291
S/H/HO/GQFR	0.0021	0.0704	-0.0314	-0.0050	-0.0227	-0.0367
S/H/HO/BQFR	0.0063	0.0197	0.0192	-0.0445	-0.0104	-0.0452
S/H/LO/GQFR	-0.0578	0.0222	0.0303	0.0077	0.0045	-0.0041
S/H/LO/BQFR	-0.0160	-0.1032	0.0797	-0.0199	-0.0369	0.0203
S/L/HO/GQFR	-0.0796	0.1567	-0.0043	0.0032	-0.0534	-0.0022
S/L/HO/BQFR	-0.0014	-0.0406	0.0368	0.0117	-0.0261	0.0138
S/L/LO/GQFR	0.0726	0.0277	-0.0908	0.0316	-0.0322	-0.0428
S/L/LO/BQFR	-0.0459	0.0860	-0.0064	-0.0049	0.0253	-0.0426
B/H/HO/GQFR	0.0776	-0.1707	0.1629**	-0.0091	0.0014	0.0274
B/H/HO/BQFR	0.1221	-0.1223	-0.0133	0.0788*	-0.2233	-0.1117
B/H/LO/GQFR	-0.0292	0.2709*	-0.1161	-0.0018	-0.0529	-0.1966
B/H/LO/BQFR	-0.0538	0.0709	0.0531	0.0066	-0.0049	0.0134
B/L/HO/GQFR	0.0799	-0.1055	0.0291	-0.0341	0.0143	-0.0447
B/L/HO/BQFR	0.1818**	-0.2848	0.1203	-0.2298	0.0120	-0.0476
B/L/LO/GQFR	0.0048	0.2280	-0.0376	-0.1197	0.0826	-0.0974
B/L/LO/BQFR	0.1946	-0.2787	0.0250	-0.0911	0.1666**	-0.1077

4.10 Six-Factor Model

The six-factor model takes into the account liquidity (ILLIQ) factor in multi-factor asset model. Following empirical results are reported here.

4.10.1 Correlation Matrix-Fama & French Three Factor Model

The results reported in table 4.26, gives no indication of correlation among all the explanatory variables except market and liquidity factor, which signifies a moderate positive correlation. Again, VIF technique is employed to test the tolerance level. A VIF value of 1.44 > 5 allows using market and liquidity factors simultaneously in the regression model.

Table 4.26: Correlation Matrix-Fama & French Three Factor Model

Note: Table shows correlation of factors from different sorts used in ownership premium, quality of financial reporting and, liquidity augmented Fama & French factor model. Here, MKT=Market Risk Premium, SMB=Size premium, HML=Value Premium, INSH=Institutional ownership premium, QFR=quality of financial reporting premium and, ILLIQ=Liquidity Premium.

	MKT	SMB	HML	INSH	QFR	ILLIQ
MKT	1					
SMB	-0.31	1				
HML	0.29	-0.00	1			
INSH	0.19	0.00	0.04	1		
QFR	-0.52	0.08	-0.16	-0.25	1	
ILLIQ	0.55	-0.40	0.07	0.03	-0.30	1

4.10.2 Regression Results Six-Factor Model

The results of the liquidity based six-factor are summarized in table 4.27. The six factor model uses liquidity factor as an explanatory variable over and above the factors tested in four and five factor models. The results clearly reveal that six-factor models dominates all other multi-factor models tested in current studies in terms of superior explanatory power and risk quantification. It is also observed that the explanatory power of six-factor model is less volatile and consistent when compared to the three-, four and, five-factor models. Moreover, the coefficients of the market, size, value, ownership, QFR and, liquidity factors are found

statistically significant for most of the portfolios. It is also noticed that the adj. R-square values across the portfolios are higher when compared with three-, four-, and, five-factor models. The greater explanatory power of the model and significant coefficients of the liquidity factor (ILLIQ henceforth) strongly suggest that liquidity is a priced risk factor and investors demand compensation for bearing liquidity risk. The findings are empirically supported from the study of Amihud and Mendelson (1988) who suggest that firms with more market liquidity have less cost of capital and increased firm value. It is further argued that liquidity improved information content of the market. The results of the study are in line with the findings of Fama & French (1998) who use liquidity as priced risk factor in the multi-factor asset pricing model. They report liquidity as risk factor which is priced by the investors. The results are also supported by the findings of Hassan & Javed (2011) who report presence of significant liquidity factor in equity market of Pakistan. Hence, the findings of the study support the pricing of liquidity risk in equity market of Pakistan.

Table 4.27 : Regression Results Six Factor Model

The table shows the liquidity augmented Fama & French three model regression results. The regressions are estimated on monthly stock returns, using variables updated annually at the end June, to explain returns of portfolios for the July through the following June. Rm-RFR is the value weighted return on the KSE-100 index minus one-month Treasury bill rate. At the end of each June, stocks are categorized to two size groups, using KSE market capitalization as break point. The size sorted portfolio are further assigned to two groups on the basis of their book-to-market equity. Here, SMB is the average returns of resultant small portfolios minus average return of big portfolios. In similar way, HML is the average return of difference between high-book to market and low book-to-market stocks. Likewise, INSH depicts difference in average of returns of high institutional ownership and low institutional ownership stocks. Here, QFR is the average of return of good quality of financial reporting stocks minus average of the returns of the stocks with bad financial reporting quality. ILLIQ is the liquidity premium assessed using returns difference between portfolios with high market liquidity ratio and low market liquidity ratio. The last column of the table shows value of Adj. R-square for each corresponding regression. P indicates average returns portfolio of all sample companies in sample period. S is the portfolio of small capitalization firms and B is the portfolio of large capitalization firms. Other portfolios are formed in the same way, HBM and LBM are the portfolios formed on the basis of Book-to-Market Ratio of the firms. Similarly, HO and LO indicate portfolios of the firms with high institutional ownership concentration and low institutional ownership concentration. Further, BQFR and GQFR are the portfolios of firms formulated on the basis of financial reporting quality. ILLIQ and LIQ depicts portfolios with high liquidity and low liquidity firms. . ***, **, * indicates significance at 1%, 5%, and 10% level, respectively

Dependent	**Intercept**	**MKT**	**SMB**	**HML**	**INSH**	**QFR**	**ILLIQ**	**Adj.**
$R_{pt} - R_{ft} = \alpha + \beta_{MKT} MKT + \beta_{SMB} SMB + \beta_{HML} HML + \beta_{INSH} INSH + \beta_{QFR} QFR + \beta_{ILLIQ} ILLIQ + \varepsilon_t$								
P	-0.0064*	0.6422**	0.4152***	0.2973**	0.1423	0.4820***	-0.1988*	0.66
S	-0.0059*	0.6407**	0.8824***	0.3064**	0.1207	-0.4890***	-0.1815*	0.69
B	-0.0069**	0.6452**	-0.0480	0.2924**	0.1639	-0.4781***	-0.2192**	0.71
S/H	-0.0050	0.6785**	0.8734***	0.6957**	0.0641	-0.5253***	-0.2267**	0.71
S/L	-0.0069*	0.6034**	0.8978***	-	0.1677	-0.4376	-0.1311***	0.61
S/H/HO	-0.0050	0.6819**	0.7975***	0.6630**	0.5210**	-0.6467***	-0.1843	0.64
S/H/LO	-0.0051	0.6786**	0.9836***	0.7455**	-	-0.3958***	-0.2806	0.71
S/L/HO	-0.0067	0.6418**	0.8998***	-0.0273	0.6009**	-0.7318***	-0.1192	0.56
S/L/LO	-0.0066	0.5652**	0.8962***	-0.1746	-0.2609	-0.1247	-0.1572	0.52
B/H	-0.0072*	0.6356**	-0.0908	0.7350**	0.3193**	-0.4252***	-0.1379	0.73
B/L	-0.0059	0.6535**	-0.0108	-0.1540	0.0202	-0.5388***	-0.3019**	0.64
B/H/HO	-0.0091**	0.6523**	0.0461	0.4909**	0.6745**	-	-0.3721***	0.78
B/H/LO	-0.0048	0.6204**	-0.2400**	0.9518**	-0.0393	-0.4940***	0.0710	0.60
B/L/HO	-0.0045	0.5444**	-0.0356	0.0667	0.6358**	-	-0.1641	0.62
B/L/LO	-0.0072	0.7704**	0.0039	-	-	-0.7323***).4348***		0.58
S/H/HO/GQF	-0.0008	0.5783**	0.7733***	0.6679**	0.3221	-0.6696***	-0.1867	0.44
S/H/HO/BQF	-0.0100	0.7775**	0.8407***	0.6687**	0.7488**	-0.6499***	-0.1699	0.54
S/H/HO/GQF	0.0052	0.4512**	0.8584***	0.9571**	0.6707**	-0.9009***	-0.9767***	0.49

S/H/HO/GQF	-0.0070	0.6875**	0.7225***	0.3885	-0.0509	-0.4383	0.5332**	0.24
S/H/HO/BQF	-0.0005	0.7316**	0.5351***	0.6030**	0.5520**	-0.3386	-0.6339***	0.55
S/H/HO/BQF	-0.0177*	0.7760**	1.2364***	0.8251**	1.0170**	-	0.2511	0.36
S/H/LO/GQF	-0.0059	0.5483**	1.1024***	1.0217**	-0.2965	-1.0462***	-0.6942***	0.66
S/H/LO/BQF	-0.0039	0.8026**	1.0402***	0.4725**	-	0.2290	0.0298	0.61
S/H/LO/GQF/	-0.0058	0.6043**	1.1727***	0.6586**	-0.0696	-1.0313***	-1.1605***	0.46
S/H/LO/GQF/	-0.0067	0.5320**	1.0508***	1.3963**	-0.5546*	-1.0928***	-0.2049	0.46
S/H/LO/BQF/	-0.0053	0.8553**	1.0938***	0.4328*	-	0.1998	-0.4058*	0.49
S/H/LO/BQF/I	-0.0048	0.7740**	0.7942***	0.4016*	-0.3508	0.2044	0.4927**	0.38
S/L/HO/GQF	-0.0095	0.7529**	1.1048***	-0.2248	0.9354**	-1.3725***	0.1139	0.51
S/L/HO/BQF	-0.0026	0.5223**	0.6625***	0.1273	0.2777	-0.0199	-0.3700**	0.45
S/L/HO/GQF	-0.0141*	0.8321**	0.9914***	-0.2263	1.1187**	-1.6397***	0.0629	0.44
S/L/HO/GQF	-0.0046	0.6591**	1.2528***	-0.1927	0.8993**	-1.0566***	0.1761	0.41
S/L/HO/BQF	0.0003	0.6017**	0.5464**	0.3474	0.2877	-0.1200	-0.6194**	0.38
S/L/HO/BQF	-0.0092	0.4750**	0.8975***	-0.1590	0.4026	0.0764	-0.1894	0.28
S/L/LO/GQFR	-0.0047	0.6504**	0.9404***	-0.2787*	0.2047	-0.6504***	-0.1977	0.42
S/L/LO/BQFR	-0.0081	0.4908**	0.9088***	-0.0718	-	0.3384*	-0.1742	0.45
S/L/LO/GQFR	-0.0042	0.5690**	1.2720***	-0.0717	0.4669*	-	-0.6051***	0.43
S/L/LO/GQFR	-0.0053	0.7169**	0.6195***	-0.4846*	-0.1059	-	0.2089	0.14
S/L/LO/BQFR	-0.0010	0.3571**	1.2251***	0.2452	-0.5544*	0.1941	-0.9499***	0.36
S/L/LO/BQFR	-0.0161**	0.6201**	0.6012***	-0.3710*	-	0.5397**	0.6180**	0.33
B/H/HO/GQF	-0.0110***	0.6064**	0.0747	0.5565**	0.7555**	-0.6632***	-0.1417	0.65
B/H/HO/GQF	-0.0145**	0.5850**	-0.1137	0.6231**	0.6748**	-0.1756	-0.5859***	0.67
B/H/HO/GQF	-0.0070	0.6202**	0.2685*	0.4963**	0.8423**	-1.1189***	0.3023*	0.41
B/H/HO/BQF	-0.0079	0.66266*	0.00119**	0.4822**	0.5973**	0.0492	-0.6301***	0.73
B/H/HO/BQF	-0.0120*	0.8025**	-0.0197	0.3167	0.7291**	0.0848	-0.946***	0.67
B/H/HO/BQF	-0.0047	0.5119**	0.0202	0.6595**	0.4648**	0.0652	-0.2804	0.51
B/H/LO/GQF	-0.0053	0.6557**	-0.5415***	1.1352**	-0.2262	-0.9610***	0.4573**	0.45
B/H/LO/GQF	-0.0036	0.4126**	-0.03693	0.93881**	0.66776*	-0.6416***	-0.8491***	0.47
B/H/LO/GQF	-0.0056	0.9137**	-1.063***	1.377***	-1.123**	-1.285***	1.775***	
B/H/LO/BQF	-0.0051	0.5757**	0.0845	0.8576**	0.0501	-0.0192	-0.2443	0.53
B/H/LO/BQF	-0.0067	0.5864**	0.0418	1.1606**	0.0158	0.4068	-0.7060***	0.59
B/H/LO/BQF	-0.0031	0.5847**	0.1143	0.5896**	0.0159	-0.4375*	0.2418	0.21
B/L/HO/GQF	-0.0056	0.5434**	0.011121	0.0911	0.7071**	-0.4952***	-0.2512**	0.57
B/L/HO	-0.0082*	0.5617**	0.0438	0.0660	0.5438**	-0.2747*	-0.3897***	0.60
B/L/HO/GQF	-0.0023	0.5205**	-0.0372	0.0718	0.8739**	-	-0.1206	0.33
B/L/HO	-0.0025	0.5398**	-0.1412	0.0623	0.6205**	-0.1768	-0.0374	0.50
B/L/HO	-0.0031	0.5508**	-0.2804*	0.2101	0.7885**	-0.2305	-0.3491*	0.45
B/L/HO	-0.0012	0.5202**	-0.0395	-0.0923	0.4148**	-0.1085	0.2796*	0.29
B/L/LO/GQF	-0.0071	0.7663**	-0.0325	-	-	-	-0.7608***	0.51
B/L/LO	-0.0115	0.9728**	-0.5812*	-	-	-	-1.915***	0.56
B/L/LO	-0.0018	0.6044**	0.4500***	0.1275	0.2501	-1.0545***	0.3469*	0.28

B/L/LO	-0.0063	0.7446**	0.0635	-0.2104	-0.0353	0.3934**	-0.1085	0.57
B/L/LO	-0.0119***	0.7690**	0.1213	-0.1359	-0.1924	0.3763**	-0.3735***	0.73
B/L/LO	0.0002	0.7269**	-0.0180	-0.2830	0.1380	0.4218	0.1677	0.24

4.9.2 Two-Pass Regression Results Six Factor Model

The results reported in the table below suggest that the six-factor model fails to explain the relationship between factor loadings associated with the market, size, value, ownership, QFR and, liquidity factor and future portfolio returns during testing period. It is also observed that nevertheless all coefficients for associated risk premia are statistically insignificant. Moreover, weak explanatory power of the model suggest failure of the six factor model developing a link between risk premiums and future portfolio returns under analysis period.

Table 4.28 : Two Pass Regression Results Six Factor Model

The table reports the two pass regression results for the portfolios used in six-factor model comprising MKT, SMB, HML,INSH, QFR and, ILLIQ as explanatory factors in first regression. . ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

$$R_{pit} - R_{ft} = \alpha + \gamma_{mkt}\hat{\beta}_{mktit} + \gamma_{SMB}\hat{\beta}_{SMBit} + \gamma_{HML}\hat{\beta}_{HMLit} + \gamma_{INSH}\hat{\beta}_{INSHit} + \gamma_{QFR}\hat{\beta}_{QFRit} + \gamma_{ILLIQ}\hat{\beta}_{ILLIQit} + \varepsilon_{it}$$

Dependent Variable	**Intercept**	**MKT**	**SMB**	**HML**	**INSH**	**QFR**	**ILLIQ**	**Adj.**
P	0.1205	-0.1955	0.0780	-0.0513	-0.0185	-0.0346	-0.0398	0.025
S	0.0911	-0.1578	0.0525	-0.0920	-0.0085	-0.0587	-0.0109	0.0110
B	0.1955	-0.2640	0.1358	0.0030	-0.0279	0.0000	-0.0903	0.038
S/H	0.1491	-0.3763	0.1064*	-0.0008	-0.0185	0.0775	-	-0.004
S/L	-0.0628	-0.0121	0.0642	-0.0361	-0.0222	-0.0027	0.0346	-0.007
S/H/HO	0.1791	-0.1103	-0.0047	-0.1196	0.0017	-0.0462	0.0024	0.008
S/H/LO	0.2227*	-	0.0874	-0.0666	0.0015	0.0664	-	0.058
S/L/HO	-0.1207	0.1715	0.0389	0.0111	-0.0520	0.0152	0.0709	0.026
S/L/LO	-0.0237	0.0179	0.0284	-0.0081	0.0494	-0.0771	-0.0116	-0.053
B/H	0.1407	-0.0978	0.0225	-0.0723	-0.0648	-0.0766	0.0312	0.042
B/L	0.2754**	-	0.1811*	-0.0560	0.0353	0.0726*	-	0.039
B/H/HO	0.2193*	-0.1094	0.2367*	0.0498	-	-0.0476	-0.0618	0.124
B/H/LO	0.1097	-0.0006	-0.0541	-	0.0603	-	0.1700*	0.118
B/L/HO	0.2426**	-	0.1295	-0.0146	-0.0689	-0.0026	-	0.060
B/L/LO	0.1773	-0.2629	0.0701	-0.0815	0.0847	0.0706	-0.0349	0.004
S/H/HO/GQFR	-0.0179	0.1094	-0.0527	0.0452	0.0053	-0.0745	0.0236	0.008

S/H/HO/BQFR	0.0728	-0.1304	0.0443	-0.0668	0.0292	-0.0237	0.0997	0.111
S/H/HO/GQFR/LIQ	0.0636	0.0419	-0.0026	0.0100	-0.0481	-0.0168	-0.0359	0.006
S/H/HO/GQFR/ILLIQ	-0.0653	0.0583	-0.0173	0.0560	0.0128	-0.0314	-0.0199	-0.016
S/H/HO/BQFR/LIQ	-0.1342	0.1115	0.0474	0.0986	-0.0315	-0.0680	0.0050	0.034
S/H/HO/BQFR/ILLIQ	0.0425	-0.0903	0.0261	-0.0007	-0.0029	-0.0309	0.0720*	0.010
S/H/LO/GQFR	-0.0710	0.0711	0.0215	0.0212	-0.0001	-0.0148	-0.0047	-0.047
S/H/LO/BQFR	0.0816	-0.1539	0.0487	-0.0603	-0.0560	0.0261	-0.0768	0.026
S/H/LO/GQF/LIQ	-0.0806	0.0533	-0.0623	-0.0021	-0.0353	-0.0037	0.1112	-0.013
S/H/LO/GQF/ILLIQ	-0.0161	0.1420	-0.0324	0.0175	0.0441	-0.0318	0.0168	-0.041
S/H/LO/BQF/LIQ	0.2068	-0.2019	0.1021	-0.1673	-0.0489	0.0685	-	0.070
S/H/LO/BQF/ILLIQ	-0.0660	-0.3755	0.0585	0.0054	-	0.0138	-0.0042	0.042
S/L/HO/GQFR	-0.1575	0.2144	0.0258	0.0354	-0.0316	0.0314	0.0821	0.005
S/L/HO/BQFR	-0.0155	0.0456	-0.0893	0.0814*	-0.0428	-0.1167	0.1168	0.0376
S/L/HO/GQFR/LIQ	-0.1677	0.1229	0.0461	0.1008	0.0755	-0.0129	-0.0443	0.031
S/L/HO/GQFR/ILLIQ	0.0292	0.2199	-0.0399	0.0159	-0.1731	0.0762	0.1153	0.022
S/L/HO/BQFR/LIQ	0.0803	-0.1590	-0.0027	0.0103	-0.0037	-0.0040	0.0218	0.056
S/L/HO/BQFR/ILLIQ	-0.0455	0.0647	0.0179	0.0429	0.0295	0.0143	0.0048	-0.008
S/L/LO/GQFR	0.0255	-0.0286	0.0038	0.0054	0.0089	-0.0190	0.0274	-0.059
S/L/LO/BQFR	-0.0358	0.0521	0.0003	0.0524	-0.0090	-0.0291	-0.0105	-0.041
S/L/LO/GQFR/LIQ	0.0432	-0.0568	-0.0346	-0.0146	-0.0093	0.0179	0.0384	-0.048
S/L/LO/GQFR/ILLIQ	-0.0717	0.0247	0.0419	-0.0695	0.0481	-0.0701	-	0.009
S/L/LO/BQFR/LIQ	-0.0033	0.0798	-0.0053	0.0391	0.0383	-0.0171	0.0005	-0.052
S/L/LO/BQFR/ILLIQ	-0.0452	0.0648	-0.0597	0.0195	-0.0452	-0.0485	0.0568	-0.030
B/H/HO/GQFR	0.0724	-0.1737	0.1863*	-0.0358	0.0260	0.0281	-0.0511	0.084
B/H/HO/GQFR/LIQ	-0.1550	0.1748	0.0360	0.0781	-0.0557	-0.0601	0.1319	0.016
B/H/HO/GQFR/ILLIQ	0.0461	-0.0599	0.1102*	-	0.0013	-0.0368	-0.0219	0.045
B/H/HO/BQFR	0.3150*	-0.3833	0.0550	0.0713	-	-0.0439	0.0337	0.116
B/H/HO/BQFR/LIQ	0.2276	-	0.1891*	-	-0.0463	0.3441*	0.2528*	0.176
B/H/HO/BQFR/ILLIQ	-0.0616	0.1653	-0.0351	0.0473	-	-0.0303	-0.0178	0.062
B/H/LO/GQFR	-0.0431	0.1873	-0.0674	0.0903	-0.0532	-0.1909	0.2237*	0.251
B/H/LO/GQFR/LIQ	0.0397	-0.0013	0.0778	0.0461	0.0323	-	-0.0104	0.051
B/H/LO/GQFR/ILLIQ	0.3412**	-0.2052	-	-0.0183	-0.0765	-	0.2177*	0.208
B/H/LO/BQFR	-0.0431	0.0553	0.0317	0.0182	0.0332	-0.0285	-0.0305	-0.013
B/H/LO/BQFR/LIQ	-0.0276	-0.0599	0.1003*	0.0752*	0.0898*	-0.0579	-0.0402	0.044
B/H/LO/BQFR/ILLIQ	-0.0377	0.0222	0.0543	-0.0032	-0.0615	-0.0070	-0.0218	0.048
B/L/HO/GQFR	0.0984	-0.0339	-0.0554	0.0224	0.0123	-0.1462	-0.0534	0.059
B/L/HO /GQFR/LIQ	0.1135	-0.1267	0.2248*	0.0263	-0.0487	0.0039	-0.0615	0.157
B/L/HO	-0.0502	0.2226*	-	0.0977	0.0247	-	0.0623	0.103
B/L/HO /BQFR	0.3377**	-	0.2453*	-0.1435	-0.0696	0.0541	-	0.095
B/L/HO /BQFR/LIQ	0.2187	-0.2286	0.0537	-0.1388	-0.0155	0.0365	-0.1121	-
B/L/HO	0.0310	-0.0200	0.1945*	0.0324	-0.0426	-0.0374	-	0.066
B/L/LO/GQFR	-0.0041	0.1199	-0.0177	-0.0538	0.0919	-0.0121	0.0571	0.068

B/L/LO /GQFR/LIQ	-0.0994	0.4056*	-0.0920	0.0163	0.1577*	-0.0228	0.1536*	0.103
B/L/LO /GQFR/ILLIQ	-0.0907	0.2849	0.0235	0.0634	-0.0324	-0.0497	0.0508	-0.016
B/L/LO/BQFR	0.1308	-0.2685	0.1042	-0.0254	0.1719*	-0.0304	-0.0413	0.040
B/L/LO/BQFR/LIQ	0.1507	-0.0781	0.3033	0.1480*	-0.0878	0.1975*	-0.0622	0.074
B/L/LO /BQFR/ILLIQ	0.1768	-0.3076*	0.0828	-	0.0653	-0.0074	0.0321	0.050

4.10 Second Pass Cross-Sectional Regression (CSR)

The cross-sectional regression consists of two steps to estimate the parameters. Firstly, asset betas are determined by regressing asset returns against proposed risk factors. At second step, estimated factor loadings are used as explanatory variables and are regressed against asset returns for a fixed time period to estimate factor risk premiums.

$$R_{it} - R_f = \lambda_{0t} + \lambda_{MKT}\hat{\beta}_{MKT} + \lambda_{2SMB}\hat{\beta}_{SMB} + \lambda_{HML}\hat{\beta}_{HML} + \lambda_{INSH}\hat{\beta}_{INSH} + + \lambda_{QFR}\hat{\beta}_{QFR} + \lambda_{ILLIQ}\hat{\beta}_{ILLIQ} + \eta_{ti}$$

Where,

R_{it} = Return of the portfolio for the fixed time period t

$\hat{\beta}_i$ = estimated factor loadings /betas

λ_i = risk premiums associated with the risk factors

Table 4.29 Six Factor Model Second Pass Cross-Sectional Regression Results

The table provides the second stage two-pass regression statistics of six-factor model using size-liquidity sorted portfolios. The table provides the regression coefficients, t-stat. Adj. R-square value.

	Coefficients	***t-Stat***	***P-value***	***F-stat***	***F-Sig.***	***Adj. R^2***
β (MKT)	0.0053	1.4901	0.1413	3.4385	0.0685	0.037
β (SMB)	-0.0037	-2.9523	0.0045	15.676	0.0001	0.1914
β (HML)	0.0013	0.9615	0.3401	1.4048	0.2405	0.0064
β (INSH)	-0.0006	-0.6673	0.5070	0.6449	0.4250	-0.0057
β (QFR)	-0.0014	-1.1921	0.2378	2.1182	0.1506	0.0177
β (ILLIQ)	0.0008	0.5279	0.5994	0.5685	0.4537	-0.0070

To check the explanatory power of the each factor individually, we run the two variable regression, considering each underlying factor. The estimated coefficient, F-stat. and Adjusted R sq are reported in table 4.10. It is clear from the table, the estimated coefficient for SMB is negative and statistically significant. The negative coefficient of SMB is consistent with the theory. It should also be noted that only SMB factor explains 19% variation in cross-sectional returns. It is also worth mentioning that none of the other factor appear statistically significant.

The cross sectional regression results affirm robustness of time series regression. The results pertaining to accuracy of the six factors model does not seem conclusive. Estimated intercept is statistically significant and only SMB factor found significant in explaining relationship between portfolio returns and risk premia. Model offers a very low coefficient of determination and F-significance also negates over all model fitness. Therefore, it is concluded that estimated betas fail to explain risk premiums associated with five factors out of set of six factors in proposed model.

4.11 Testing the model in bull and bear markets

Table 4.11.1 Regression Results of Six Factor Model with Bull and Bear Dummy

The results reported in table 4.30 show that only the MKT and QFR factor is consistently significant in explaining both stock and portfolio returns during the bull and bear market periods in modified model. A possible explanation of high different risk premiums charged by investors in bull and bear market could be higher demand for quality information by investors in period of market downturn. Moreover, SMB, HML, QFR and ILLIQ are significant in most the portfolios but in bull periods. It is also observed that R^2 values are nevertheless consistence in actual six factor model and modified model. This implies explanatory power of the factor model does not change based on market conditions. Reason is dummy variable does not bring new information. Rather, it splits information into two different market conditions. Insignificant coefficients for majority of factors negate economic explanation of underlying risk premia. The results suggest that parameters of the model do not depend on bull and bear market.

Table 4.30: Regression Results of Six Factor Model with Bull and Bear Dummy

$$R_{it} - R_{ft} = \alpha + \beta_1 MKT_{it} + \beta_1'(D * MKT_{it}) + \beta_2 SMB_{it} + \beta_2'(D * SMB_{it}) + \beta_3 HML_{it} + \beta_3'(D * HML_{it}) + \beta_4 QLTYFR_{it}$$

Dependent Variable	Intercept	D_t	MKT	D_t* MKT	SMB	D_t* SMB	HML	D_t* HML	INSH	D_t* INSH	QFR	D_t* QFR	ILLIQ	D_t* ILLIQ	Adj. R^2
P	0.00	0.00	0.61**	0.04	0.27*	0.20	0.21	0.05	0.22	-0.19	0.7	-0.68**	0.23	0.08	0.68
S	0.00	0.00	0.60**	0.04	0.73**	0.21	0.21	0.06	0.23	-0.23	0.8	-0.70**	0.21	0.09	0.74
B	0.00	0.00	0.61**	0.04	-0.18	0.19	0.21	0.05	0.21	-0.14	0.7	-0.65**	0.25	0.08	0.75

S/H	0.00	0.01	0.63	0.02	0.67	0.31	0.59	0.09	0.23	-0.32	0.9	-0.74	0.35	-0.05	0.72
S/L	0.00	0.00	0.57**	0.07	0.79**	0.13	-0.17	0.01	0.21	-0.14	0.6	-0.62**	0.10	0.19	0.63
S/H/HO	0.00	0.01	0.54**	0.17	0.76**	0.10	0.96**	-0.47	0.66**	-0.35	1.2	-1.16***	0.67	-0.41	0.65
S/H/LO	-0.01	0.01	0.74**	-0.15	0.64**	0.46**	0.22	0.70**	-0.34	-0.12	0.4	-0.28	-	0.38	0.73
S/L/HO	0.00	0.00	0.70**	-0.06	0.85**	-0.02	-0.28	0.21	0.46	0.10	0.8	-0.55*	-	0.76**	0.61
S/L/LO	0.01	-0.01	0.44**	0.19	0.74**	0.27	-0.07	-0.22	-0.05	-0.36	0.5	-0.73**	0.51	-0.34	0.54
B/H	0.00	-0.01	0.63**	0.02	-0.25*	0.24	0.66**	0.00	0.31	-0.04	0.7	-0.63**	0.10	0.18	0.77
B/L	0.00	0.01	0.58**	0.07	-0.13	0.16	-0.23	0.06	0.14	-0.26	0.8	-0.70**	0.42	-0.04	0.66
B/H/HO	0.00	-0.01	0.64**	0.03	-0.06	0.12	0.27	0.28	0.69**	-0.02	0.4	-0.24	0.38	0.00	0.80
B/H/LO	0.00	-0.01	0.64**	0.01	-0.45	0.32	1.04**	-0.31	-0.08	-0.08	0.9	-1.07***	-	0.45	0.69
B/L/HO	0.00	0.01	0.46**	0.09	-0.25*	0.31*	-0.05	0.10	0.81**	-0.33	0.6	-0.68**	0.26	-0.02	0.65
B/L/LO	-0.01	0.01	0.72**	0.03	-0.01	0.00	-0.43	0.03	-0.55	-0.18	1.0	-0.73*	0.57	-0.04	0.58
S/H/HO/GQFR	0.01	0.00	0.39**	0.26	0.59**	0.39	1.07**	-0.60	0.81**	-0.78	1.2	-0.90**	0.87	-0.78*	0.47
S/H/HO/BQFR	-0.02	0.02	0.71**	0.07	0.93**	-0.16	0.80**	-0.27	0.58	0.01	1.3	-1.42***	0.36	0.09	0.59
S/H/HO/GQFR/LI	0.02	-0.01	0.41**	0.05	1.25**	-0.46	1.77**	-1.09**	0.78*	-0.28	1.6	-1.08**	1.83	-0.90*	0.50
S/H/HO/GQFR/IL	0.00	0.00	0.38	0.44	-0.06	1.30***	0.36	-0.11	0.84	-1.32**	0.9	-0.76	-	-0.55	0.31
S/H/HO/BQFR/LI	0.01	0.00	0.63**	0.14	0.45	0.26	1.07**	-0.69	0.19	0.42	0.9	-0.99	1.17	-0.49	0.56
S/H/HO/BQFR/IL	-0.04**	0.04*	0.79**	-0.10	1.41**	-0.43	0.53	0.30	0.98	-0.28	1.6	-1.92**	-	0.71	0.44
S/H/LO/GQFR	-0.01	0.01	0.38**	0.24	0.61**	0.66**	0.41	0.75**	-0.14	-0.21	0.8	0.08	0.44	0.27	0.67
S/H/LO/BQFR	0.00	0.01	1.06**	-0.48**	0.99**	0.03	0.15	0.49	-0.54	0.03*	0.0	-0.62	-	0.40	0.59
S/H/LO/GQF/LIQ	-0.01	0.02	0.68**	-0.15	0.39	1.04**	-0.41	1.27**	-0.04	-0.08	1.0	-0.52	0.24	1.28**	0.51
S/H/LO/GQF/ILLI	0.00	0.00	0.07	0.70**	0.84**	0.30	1.22**	0.23	-0.25	-0.39	0.7	0.73	0.65	-0.77	0.47
S/H/LO/BQF/LIQ	0.00	0.01	1.02**	-0.27	1.02**	0.03	0.23	0.17	-0.63	0.01	-	-0.14	-	0.93	0.47
S/H/LO/BQF/ILLI	0.00	0.01	1.09**	-0.62**	0.97**	-0.29	0.07	0.64	-0.45	0.13	0.4	-1.05*	-	-0.13	0.38
S/L/HO/GQFR	-0.01	0.01	0.77**	-0.04	1.27**	-0.33	-0.19	-0.16	0.81**	-0.04	1.9	-1.34***	-	0.47	0.58
S/L/HO/BQFR	0.01	-0.01	0.59**	-0.03	0.36	0.36	-0.34	0.47	0.13	0.24	-	0.29	-	0.98*	0.46
S/L/HO/GQFR/LI	-0.03**	0.03*	0.95**	-0.26	1.26**	-0.50	-0.18	-0.15	0.68	0.36	2.1	-1.45***	-	0.75	0.53
S/L/HO/GQFR/IL	0.01	-0.01	0.59**	0.16	1.29**	-0.11	-0.21	-0.13	0.93*	-0.23	1.6	-1.29**	-	0.18	0.45
S/L/HO/BQFR/LI	0.02	-0.02	0.94**	-0.44	0.22	0.32	-0.48	0.92*	0.31	-0.05	-	-0.34	-	1.72***	0.43
S/L/HO/BQFR/ILL	0.00	-0.02	0.23	0.48*	0.50	0.60	-0.20	-0.13	-0.06	0.72	-	0.88	-	0.38	0.30
S/L/LO/GQFR	0.01	-0.02	0.67**	0.00	1.09**	-0.30	-0.58*	0.45	0.18	0.00	1.0	-0.75*	0.47	-0.29	0.43
S/L/LO/BQFR	0.00	0.00	0.28*	0.31*	0.51**	0.75***	0.44	-0.86**	-0.32	-0.60	0.0	-0.66*	0.54	-0.32	0.52
S/L/LO/GQFR/LI	0.01	-0.01	0.44**	0.21	1.78	-0.81	0.15	-0.26	0.48	-0.10	0.8	-0.40	1.14	-0.61	0.42

S/L/LO/GQFR/ILL	0.02	-0.02	0.89**	-0.25	0.41	0.24	-	1.15*	-0.11	0.02	1.3	-1.16*	-	0.04	0.16
S/L/LO/BQFR/LIQ	0.00	0.01	-0.06	0.66**	0.40	1.38***	0.68	-0.95*	-0.14	-0.78	0.2	-0.96*	1.14	0.03	0.47
S/L/LO/BQFR/ILL	0.00	-0.01	0.61	-0.04	0.61**	0.14	0.20	-0.76	-0.51	-0.48	-	-0.46	-	-0.69	0.33
B/H/HO/GQFR	-0.01	0.00	0.53**	0.09	-0.01	0.10	0.41*	0.16	0.90**	-0.25	0.8	-0.33	0.21	-0.04	0.64
B/H/HO/GQFR/LI	0.00	-0.01	0.61**	-0.07	-0.30	0.29	0.40	0.32	0.88**	-0.26	0.4	-0.32	0.70	-0.18	0.67
B/H/HO/GQFR/IL	-0.01	0.01	0.46**	0.24	0.27	-0.08	0.43	0.01	0.93**	-0.24	1.2	-0.40	-	0.11	0.41
B/H/HO/BQFR	0.01	-0.02	0.74**	-0.08	-0.18	0.23	0.16	0.40	0.43	0.30	-	0.03	0.39	0.29	0.72
B/H/HO/BQFR/LI	0.01	-0.02	1.06**	-0.37	-0.36	0.49	-0.29	0.85*	0.35	0.72	-	0.45	0.43	0.50	0.69
B/H/HO/BQFR/IL	0.01	-0.01	0.41**	0.19	0.01	-0.03	0.61*	-0.02	0.51	-0.13	0.1	-0.47	0.35	0.03	0.50
B/H/LO/GQFR	0.01	-0.01	1.01**	-0.51**	-	0.63	1.49**	-0.72	-0.87	0.83	1.3	-0.90	-	1.27	0.52
B/H/LO/GQFR/LI	0.01	0.00	0.20	0.32	-0.24	0.32	0.99**	-0.17	1.30**	-0.97*	0.9	-0.54	1.16	-0.33	0.46
B/H/LO/GQFR/IL	0.01	-0.01	1.82**	-1.33***	-	0.91	2.00**	-1.21*	-	2.63***	1.7	-1.28	-	2.86***	0.53
B/H/LO/BQFR	0.00	0.00	0.26*	0.51**	0.07	-0.04	0.76**	0.01	0.47	-0.79*	0.5	-1.20***	0.69	-0.34	0.63
B/H/LO/BQFR/LI	0.01	-0.01	0.39**	0.33	-0.27	0.44	0.88**	0.22	0.89*	-1.40**	0.2	-1.44**	1.02	-0.20	0.63
B/H/LO/BQFR/IL	-0.01	0.01	0.14	0.72**	0.41	-0.56	0.64	-0.16	0.05	-0.29	0.8	-0.98*	0.36	-0.51	0.33
B/L/HO/GQFR	0.00	0.00	0.50**	0.03	-0.30*	0.46**	-0.17	0.30	0.97**	-0.40	0.6	-0.41	0.24	0.04	0.58
B/L/HO	-0.01	0.01	0.54**	0.00	-0.20	0.37	-0.08	0.17	0.12	0.63*	0.1	0.19	0.19	0.24	0.64
B/L/HO	0.01	0.00	0.46**	0.05	-0.40*	0.53*	-0.26	0.37	1.83**	-1.43***	1.2	-1.03**	0.29	-0.13	0.40
B/L/HO /BQFR	-0.01	0.02	0.40**	0.15	-0.27	0.19	0.08	-0.08	0.74**	-0.30	0.6	-0.88**	0.27	-0.14	0.53
B/L/HO	0.00	0.01	0.41**	0.16	-0.49*	0.36	0.28	-0.16	1.19**	-0.72	1.0	-1.41***	0.85	-0.43	0.49
B/L/HO	-0.01	0.0	0.40**	0.12	-0.05	-0.04	-0.12	0.00	0.30	0.05	0.1	-0.37	-	0.15	0.30
B/L/LO/GQFR	-0.01	0.02	0.58**	0.25	-0.01	-0.10	-0.68	0.05	-	-0.26	2.2	-0.86	0.98	-0.09	0.52
B/L/LO	-0.02	0.02	0.63	0.49	-0.22	-0.61	-1.18	-0.28	-2.85**,	-0.20	3.5	-1.42	2.71	-0.73	0.56
B/L/LO	-0.01	0.02	0.53**	0.09	0.20	0.28	-0.18	0.28	0.53	-0.49	0.9	-0.17	-	0.62	0.27
B/L/LO /BQFR	0.00	0.00	0.80**	-0.13	-0.05	0.18	-0.29	0.10	0.02	-0.13	0.0	-0.83*	0.24	-0.06	0.56
B/L/LO	-0.01	0.01	0.81**	-0.09	0.04	0.09	-0.34	0.24	-0.49*	0.37	-	-0.52	0.23	0.30	0.73
B/L/LO	0.02	-0.01	0.80**	-0.16	-0.13	0.24	-0.25	-0.03	0.53	-0.62	0.3	-1.17	0.24	-0.42	0.21

Note: ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

Table 4.11 represents the results of the regression models when six factor model is extended to include dummies for the Bull/Bear months. Purpose is to determine whether the coefficients are significantly different from each other in bull and bear markets.

4.12 Testing Non-Linearity Assumption for Six Factor Model

The literature in asset pricing takes into account a linear relationship risk factors and asset returns (Merton, 1987). This study tests the linearity assumption by regressing portfolio returns with estimated risk premia and their squared values (non-linear risk factor). The results reported in table 4.12 suggest a linear relationship between portfolio returns and risk factors.

Table 4.31: Testing non-Linearity

Dependent Variable	**MKT**		**SMB**		**HML**		**INSH**		**QFR**		**ILLIQ**	
$R_{pit} - R_{ft} = \alpha + \gamma_{mkt}\beta_{1it} + \delta_{mkt}\beta_{1it}^2 + \gamma_{SMB}\beta_{1it} + \delta_{SMB}\beta_{2it}^2 + \gamma_{HML}\beta_{3it} + \delta_{HML}\beta_{3it}^2 + \gamma_{INSH}\beta_{4it} + \delta_{INSH}\beta_{5it}^2 + \gamma_{QFR}\beta_{5it} + \delta_{QFR}\beta_{5it}^2 + \gamma_{ILLIQ}\beta_{6it} + \delta_{ILLIQ}\beta_{6it}^2 + \varepsilon_{it}$												
	β_1	β_1^2	β_2	β_2^2	β_3	β_3^2	β_4	β_4^2	β_5	β_5^2	β_6	β_6^2
P	-0.4976	0.4544	0.0511	-0.0528	0.0270	-0.0081	-0.0461	-0.1235	0.1684	0.2313	0.0514	-0.0890
S	-0.2697	0.2977	0.1049	-0.0609	-0.0617	0.0540	-0.0491	-0.1460	0.1715*	0.2500*	0.0332	-0.0486
B	-0.5520	0.4368	0.0154	-0.0413	0.0553	-0.0284	-0.0436	-0.1018	0.1655*	0.2125	0.0703	-0.1299
S/H	-0.6814	0.5951	0.0754	-0.0385	-0.0893	0.0421	-0.0535	-0.1690	0.1952*	0.2721	0.0535	-0.1139
S/L	-0.0807	0.1494	0.0679	-0.0157	-0.0073	0.0552	-0.0439	-0.1231	0.1482*	0.2286	0.0139	0.0133
S/H/HO	-0.2251	0.2040	0.1276**	-0.1196*	-0.4894	0.2280	-0.0444	-0.22834*	0.2147*	0.3141*	0.0360	-0.0864
S/H/LO	-0.4102	0.3596	0.0352	0.0148	0.0220	-0.0055	-0.0653	-0.1145	0.1788*	0.2361	0.0734	-0.1448
S/L/HO	-0.1115	0.2022	0.0699	-0.0362	0.0204	0.0014	-0.0722*	-0.1652*	0.2400**	0.4103**	0.0044	0.0409
S/L/LO	-0.1789	0.2144	-0.0136	0.0486	-0.0155	0.0509	-0.0118	-0.0724	0.0528	0.0371	0.0261	-0.0257
B/H	0.0144	0.0336	0.1723	0.1063	0.0860	-0.0308	-0.0460	-0.1751*	0.2621**	0.3645**	0.0723	-0.1393
B/L	2.2945	-1.9989	-0.0514	-0.0690	0.0202	-0.0141	-0.0404	-0.0268	0.0716	0.0641	0.0675	-0.1205

B/H/HO	-1.3891	0.8729	0.1455	0.1144	0.0712	-0.0269	-0.0416	-0.1083	0.1661	0.2018	0.0848	-0.1672
B/H/LO	-0.0529	0.0898	-0.1659	-0.3086	0.0085	0.0026	-0.0467	-0.2354**	0.3542***	0.5180***	0.0622	-0.1210
B/L/HO	-1.0496	0.8579	0.2756**	0.2724**	0.0687	-0.0234	-0.0942	0.0588	0.0589	0.0790	-0.3455	0.2557
B/L/LO	6.0190	-4.9791	-0.0514	-0.0418	0.0059	-0.0032	0.0051	-0.0078	-0.0138	-0.0094	0.0457	-0.0333
S/H/HO/GQFR	-0.1722	0.1989	0.0099	0.0114	-0.0785	0.0405	-0.0455	0.0286	0.1232	0.2586	-0.1012*	0.0882
S/H/HO/BQFR	0.0249	-0.0081	0.1188**	-0.0939**	-0.1049	0.0505	-0.3713**	0.1911**	0.0521	0.0519	-0.1147**	0.1149
S/H/HO/GQFR/LIQ	0.0523	-0.0117	0.1300*	-0.1539	-0.1625	0.0881	-0.1351	0.1270	0.0229	-0.0251	-0.4362**	0.2222
S/H/HO/GQFR/ILLIQ	-0.5177	0.6106	-0.0380	0.0168	-0.4138	0.2434	-0.0026	0.0006	0.0970	0.1643	-0.0443	-0.0133
S/H/HO/BQFR/LIQ	-0.3137	0.1956	0.0317	0.0342	-0.0439	0.0417	-0.0383	0.0182	0.0611	0.0546	-0.4401	0.1791
S/H/HO/BQFR/ILLIQ	-0.0355	0.0652	0.2703**	-0.1017	-0.0816	0.0471	-0.1589	0.0673	0.0020	0.0445	0.0083	0.0368
S/H/LO/GQFR	0.0962	-0.0511	0.0921	-0.0379	0.0847	-0.0262	-0.0165	0.0166	-0.0386	0.0909	-0.0267	0.0209
S/H/LO/BQFR	0.1013	-0.0945	-0.0258	0.0669	-0.4347*	0.2171*	-0.0444	-0.0373	-0.0031	0.0160	-0.0501	0.0382
S/H/LO/GQF/LIQ	-0.2126	0.1816	0.0213	0.0161	0.0170	-0.0034	-0.0271	0.0048	0.0279	0.0574	0.0582	-0.0160
S/H/LO/GQF/ILLIQ	0.1281	-0.0846	-0.0548	0.0457	0.2611	-0.0763	0.0921	0.0643	-0.1128*	0.1154*	-0.0122	0.0400
S/H/LO/BQF/LIQ	-0.0408	0.0393	0.0069	0.0376	0.5385*	-0.2426*	-0.0060	0.0729	0.1232	0.0759	-0.1508*	0.0832*
S/H/LO/BQF/ILLIQ	0.0907	-0.1372	0.0671	0.0071	-0.1148	0.0665	-0.0518	-0.0012	0.0183	-0.0017	-0.0213	0.0137
S/L/HO/GQFR	-0.0024	0.0754	0.0938	-0.0563	0.0182	0.0079	-0.4487	0.2852	-0.0649*	0.0522*	0.0275	0.0453
S/L/HO/BQFR	-0.5089	0.4459	0.0864**	-0.0869*	0.0808	-0.0525	-0.1386**	0.0930**	0.0211	0.0185	0.1452	-0.0811
S/L/HO/GQFR/LIQ	-0.0261	0.0939	0.0676*	-0.0484	0.0350*	0.0185	-0.2344	0.1825	-0.0865**	0.0550**	0.0185	0.0549
S/L/HO/GQFR/ILLIQ	0.0069	0.0814	0.0845	-0.0349	0.0104	0.0079	0.1631	-0.1045	-0.0653**	0.0744**	0.0142	0.0245
S/L/HO/BQFR/LIQ	-1.3274*	0.8601*	0.0558**	-0.0344	0.1319	-0.0600	-0.0933	0.0514	-0.0261	-0.0019	-0.1455	0.0732
S/L/HO/BQFR/ILLIQ	-0.1650	0.3535	0.0849	-0.0473	0.0164	0.0590	-0.1484*	0.1435**	-0.0571	-0.0309	0.1144	-0.1490
S/L/LO/GQFR	-0.1266	0.1452	1.1450**	-1.2251**	-0.0056	-0.0268	0.0495	-0.0219	-0.010	0.070	-0.0513	0.0850
S/L/LO/BQFR	0.1552	-0.1146	-0.0118	0.0260	-0.1206	0.2531	-0.0252	-0.0103	-0.1812	-0.0863	0.0680	-0.1321

S/L/LO/GQFR/LIQ	-0.0645	0.0776	0.1808	-0.1430	0.0007	0.0493	0.0019	-0.0225	0.0023	-0.0278	-0.0308	0.0364
S/L/LO/GQFR/ILLIQ	-0.2371	0.2639	0.436429**	-0.69223**	-0.0697*	-0.1224**	0.0157	0.0175	0.0177	-0.2239*	-0.0818	0.1653
S/L/LO/BQFR/LIQ	-0.0208	0.0518	-0.0718	0.0569	-0.0310	0.0391	0.0449	0.0667	-0.0265	-0.0017	0.0396	-0.0154
S/L/LO/BQFR/ILLIQ	0.2852	-0.3701	-0.0167	0.0499	-0.0218	0.0800	-0.0386	-0.0194	-0.0265	-0.0017	-0.0143	0.0183
B/H/HO/GQFR	-0.1984	0.1609	0.0973	0.0198	0.1144	-0.0536	-0.0274	0.0225	0.0657	0.0682	-0.0143	0.0183
B/H/HO/GQFR/LIQ	-0.0412	0.0475	0.1154	0.0846	0.2396**	-0.0912*	-0.0533	0.0317	-0.1152	-0.0577	-0.1734	0.0892
B/H/HO/GQFR/ILLIQ	-0.0672	0.1236	0.1510***	-0.3018**	-0.0428	0.0340	-0.0188	0.0177	-0.0160	0.0551	-0.0123	0.0465
B/H/HO/BQFR	-2.4619	1.3793	0.0331	0.0154	0.0166	0.0026	0.1162	-0.0972	-0.6572**	-0.2762**	-0.3203	0.1386
B/H/HO/BQFR/LIQ	0.1447	-0.0972	0.0013	0.0030	-0.0288	0.0185	0.1852	-0.1029	-0.1048	-0.0328	0.1977	-0.0578
B/H/HO/BQFR/ILLIQ	0.1670	-0.0688	0.1032	0.0754	0.0275	0.0036	-0.3114*	0.1880	0.0459	0.0399	-0.2161*	0.1268**
B/H/LO/GQFR	-2.2325*	2.1862***	-0.2573	-0.3945*	0.7259*	-0.3711	-0.0016	-0.0665	-0.2329	-0.7224	-0.3634	0.2891
B/H/LO/GQFR/LIQ	-0.4222	0.3594	0.0005	-0.0179	-0.2147	0.0920	0.0444	-0.0415*	-0.0915	-0.0501	-0.3507	0.1453
B/H/LO/GQFR/ILLIQ	-3.6889*	4.6160***	0.3142**	0.7097***	0.5097	-0.2356	-0.0660	0.0132	0.1302	-0.0234	-0.0009	-0.0468

Note: ***, **, * indicates significance at 1%, 5%, and 10% level respectively.

4.13 Comparison of Adj. R^2 for Three, Four, Five and, Six Factor Regression Models

To examine the explanatory power of the estimated asset pricing models, we compare the adj. R-square. Specifically, table 4.13 reports the estimated R-squares for the three-, four-, five-, and, six- factor models for each portfolio. From viewing the table, we observe some fascinating patterns in explanatory powers of multi-factor models across portfolios. The explanatory powers of the each underlying model declines as we move from simplest to complex investment style based on size factor. For instance, the explanatory power of three-factor model for all stocks portfolio "P" is about 58% which dropped to 31% for portfolio "S/H/HO/GQFR/LIQ". One can observe from the table that this pattern holds for four-, five-, and, six- factor models. Yet, the explanatory power of six-factor models is significantly high at both end of the spectrum. In particular, the value of adj. R-square of six-factor model is 0.66 which is about 14% higher than the three-factor model for the same underlying portfolio. In case of "S/H/HO/GQFR/LIQ", the explanatory power of six-factor model has declined to 46%, yet it remains 58% higher than the explanatory power of three-factor model. The estimated values of adj. R square provide evidence that three-factor model performs worse, whereas, the six-factor model outperforms the other three multi-factor models. It is also worth noting that the explanatory power of six-factor model is less volatile as compared to the other multi-factor models across different portfolios exhibiting various investment styles.

When we compare multi-models for investment styles based on size sorted portfolios, the estimated adj. R-square values clearly indicate that explanatory power of all multi-factor models for big size portfolios is higher than that of small size portfolios. Comparing explanatory of the models across big size investment style portfolios, we observe the same patterns as that of small size based portfolios. For instance, the explanatory power of three-factor model for all big stock portfolio "B" is 71% which declines to 24% (66% decline) in case of portfolio "B/L/LO/BQFR/ILLIQ". However, explanatory power of six-factor model is slightly higher for portfolio "B" as well as for "B/L/LO/BQFR/ILLIQ", as compared to the three-factor model.

Similar to the case of small size portfolios, for big size portfolios, the six factor model out-performs other multi-factor models. The visual representations of these patterns are presented in Figures 4.1 to 4.3. Specifically, it can be observed from Figure 4.1 that there is clear difference in the explanatory powers of the estimated models across small and bid size based investment strategies. Further, it can also be observed that the explanatory power of all the multi-factor models varies across the sub-sorted portfolios. Figures 4.2 and 4.3 provides a clear cut indication of the dominance of six-factor model over other multi-factor models for both small and big size based investment styles.

Table 4.32: Comparison of Adj. R^2 of Factor Models

Table indicates the R-square statistics for three, four, five and, six factor models, respectively. On the left hand side are the excess returns of 63 portfolios sorted on the basis of size, book-to-market, institutional ownership concentration, quality of financial reporting and, liquidity.

Dependent Variable/Sub-portfolios	**3FF** **Adj. R^2**	**4FF** **Adj. R^2**	**5FF** **Adj. R^2**	**6FF** **Adj. R^2**
P	0.58	0.57	0.63	0.66
S	0.38	0.67	0.66	0.69
S/H	0.49	0.72	0.68	0.71
S/L	0.27	0.50	0.60	0.61
S/H/HO	0.57	0.53	0.59	0.64
S/H/LO	0.66	0.74	0.69	0.71
S/L/HO	0.44	0.61	0.55	0.56
S/L/LO	0.50	0.28	0.52	0.52
S/H/HO/GQFR	0.42	0.42	0.44	0.44
S/H/HO/BQFR	0.47	0.49	0.50	0.54
S/H/LO/GQFR	0.40	0.44	0.53	0.36
S/H/LO/BQFR	0.58	0.61	0.61	0.66
S/L/HO/GQFR	0.27	0.33	0.54	0.51
S/L/HO/BQFR	0.41	0.41	0.42	0.45
S/L/LO/GQFR	0.34	0.34	0.38	0.42
S/L/LO/BQFR	0.40	0.47	0.48	0.45
S/H/HO/GQFR/LIQ	0.31	0.32	0.36	0.49
S/H/HO/GQFR/ILLIQ	0.26	0.25	0.23	0.24
S/H/HO/BQFR/LIQ	0.50	0.49	0.49	0.55
S/H/HO/BQFR/ILLIQ	0.28	0.31	0.31	0.36
S/H/LO/GQFR/LIQ	0.27	0.28	0.33	0.46
S/H/LO/GQFR/ILLIQ	0.28	0.32	0.37	0.46
S/H/LO/BQFR/LIQ	0.44	0.46	0.47	0.49

S/H/LO/BQFR/ILLIQ	0.38	0.38	0.33	0.38
S/L/HO/GQFR/LIQ	0.19	0.25	0.44	0.44
S/L/HO/GQFR/ILLIQ	0.26	0.32	0.42	0.41
S/L/HO/BQFR/LIQ	0.33	0.33	0.32	0.38
S/L/HO/BQFR/ILLIQ	0.24	0.26	0.26	0.28
S/L/LO/GQFR/LIQ	0.33	0.34	0.35	0.43
S/L/LO/GQFR/ILLIQ	0.10	0.10	0.11	0.14
S/L/LO/BQFR/LIQ	0.27	0.31	0.29	0.36
S/L/LO/BQFR/ILLIQ	0.20	0.25	0.26	0.33
S/H/HO/GQFR/LIQ	0.31	0.32	0.36	0.49
B	0.66	0.75	0.68	0.71
B/H	0.71	0.68	0.70	0.73
B/L	0.58	0.81	0.63	0.64
B/H/HO	0.71	0.70	0.73	0.78
B/H/LO	0.55	0.54	0.57	0.60
B/L/HO	0.54	0.79	0.59	0.62
B/L/LO	0.42	0.73	0.61	0.58
B/H/HO/GQFR	0.52	0.55	0.61	0.65
B/H/HO/BQFR	0.67	0.68	0.68	0.73
B/H/LO/GQFR	0.35	0.37	0.45	0.45
B/H/LO/BQFR	0.50	0.49	0.48	0.53
B/L/HO/GQFR	0.45	0.48	0.53	0.57
B/L/HO/BQFR	0.45	0.48	0.48	0.33
B/L/LO/GQFR	0.13	0.23	0.51	0.51
B/L/LO/BQFR	0.54	0.56	0.61	0.57
B/H/HO/GQFR/LIQ	0.61	0.62	0.62	0.67
B/H/HO/GQFR/ILLIQ	0.16	0.20	0.33	0.41
B/H/HO/BQFR/LIQ	0.60	0.61	0.61	0.67
B/H/HO/BQFR/ILLIQ	0.48	0.49	0.48	0.51
B/H/LO/GQFR/LIQ	0.36	0.36	0.37	0.47
B/H/LO/GQFR/ILLIQ	0.15	0.20	0.27	0.53
B/H/LO/BQFR/LIQ	0.50	0.49	0.49	0.59
B/H/LO/BQFR/ILLIQ	0.18	0.18	0.17	0.21
B/L/HO/GQFR/LIQ	0.53	0.54	0.54	0.60
B/L/HO/GQFR/ILLIQ	0.20	0.23	0.29	0.33
B/L/HO/BQFR/LIQ	0.72	0.42	0.41	0.45
B/L/HO/BQFR/ILLIQ	0.25	0.28	0.28	0.29
B/L/LO/GQFR/LIQ	0.17	0.32	0.50	0.56
B/L/LO/GQFR/ILLIQ	0.10	0.09	0.23	0.28
B/L/LO/BQFR/LIQ	0.69	0.69	0.71	0.73
B/L/LO/BQFR/ILLIQ	0.22	0.24	0.26	0.24

Figure 4.1: Explanatory power of asset pricing models: A comparison across different investment styles (portfolios)

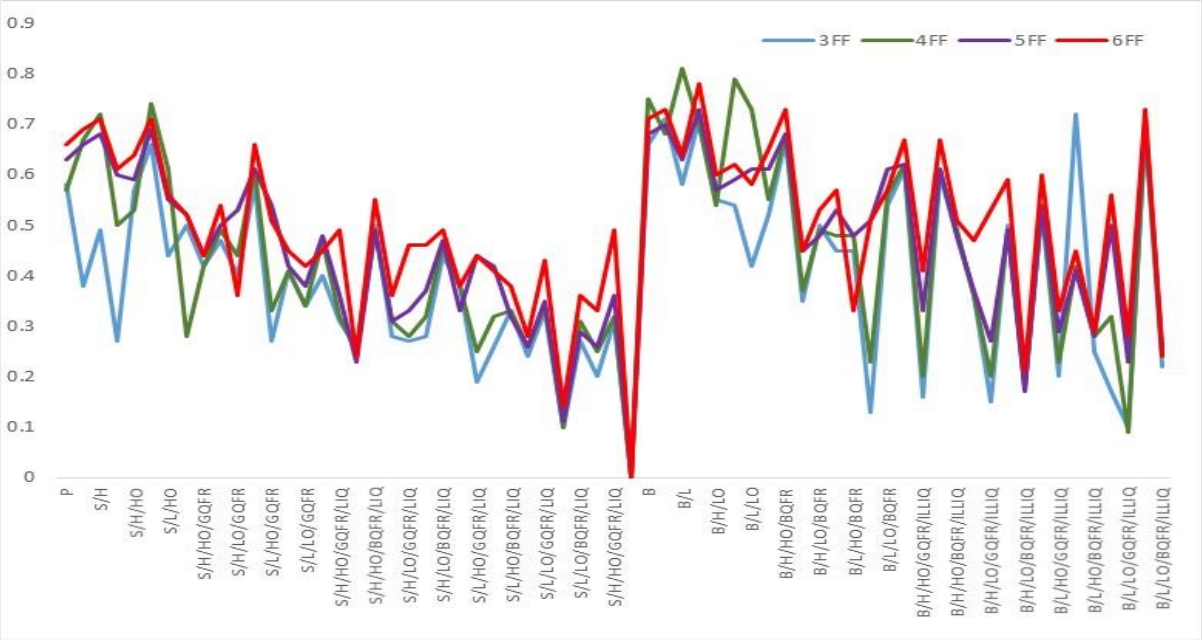


Figure 4.2: Explanatory power: A comparison of multi-factor models for small-size portfolios

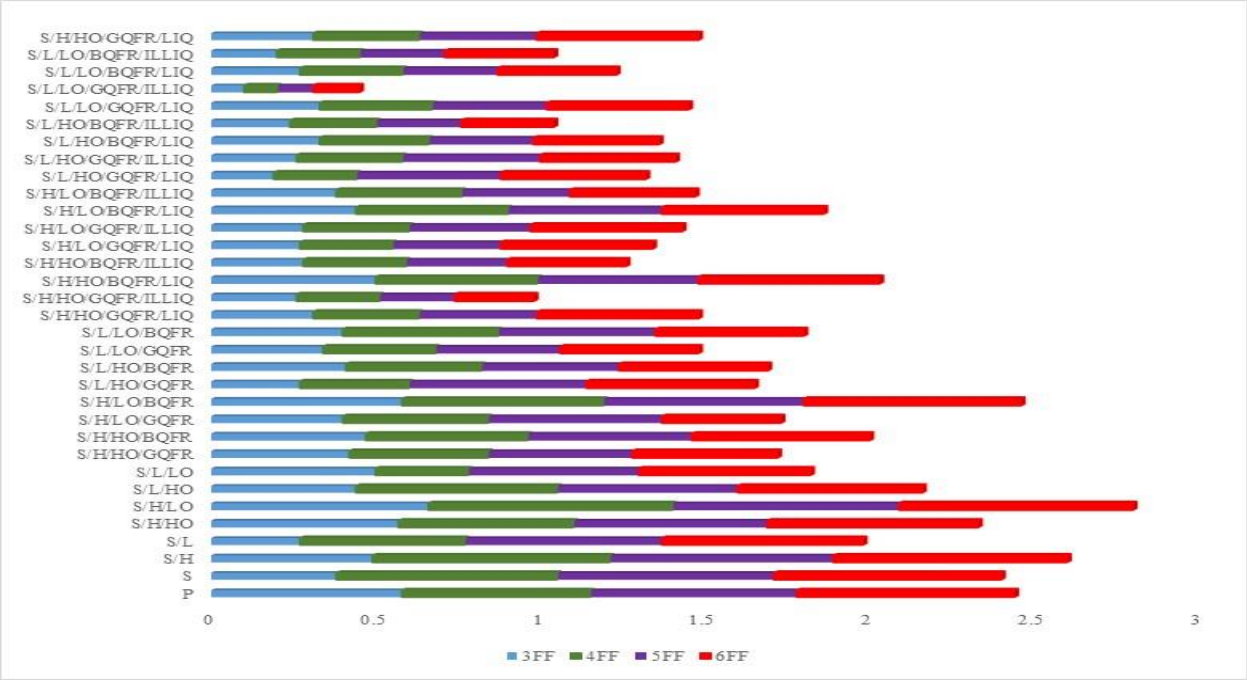
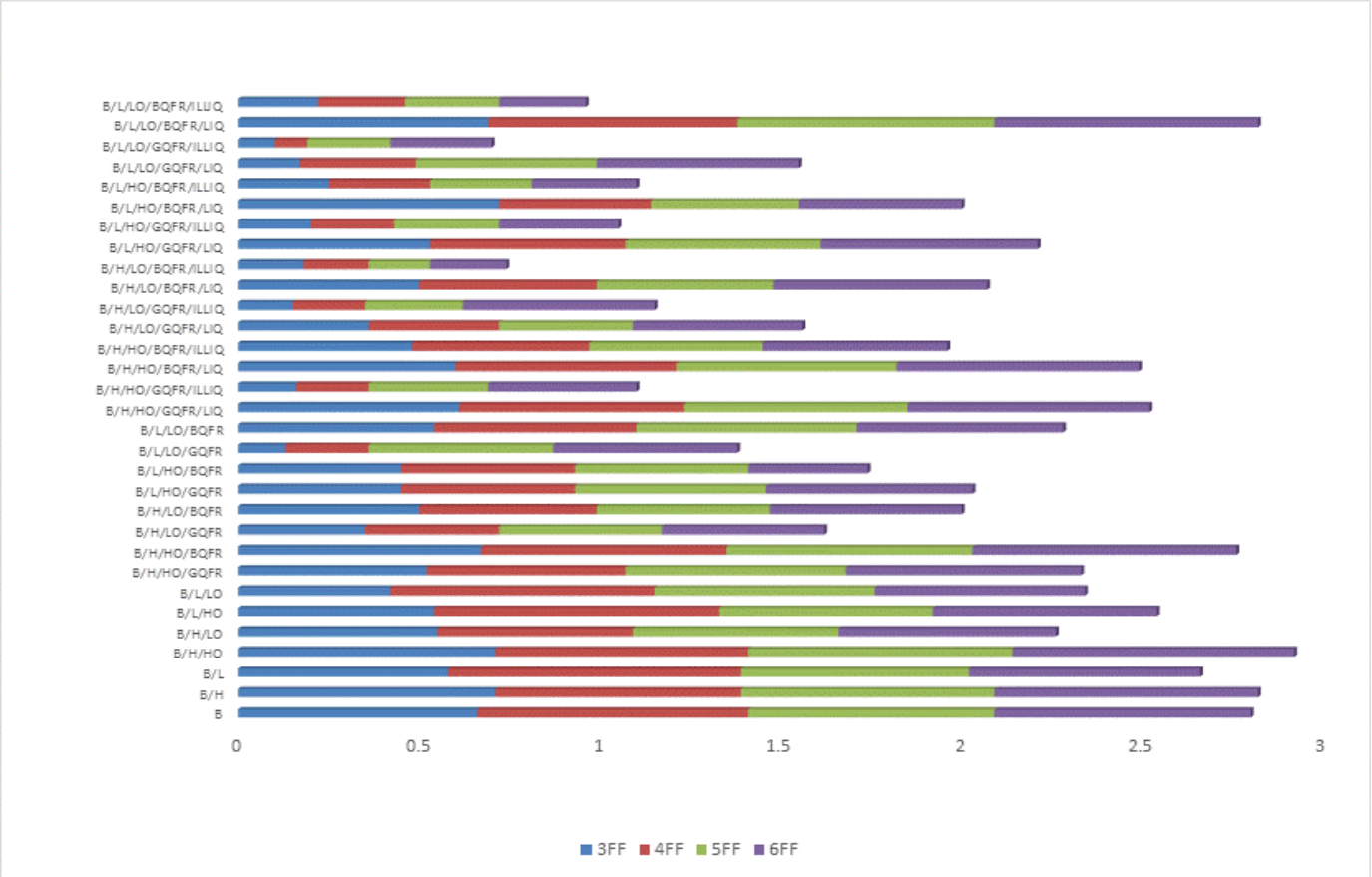


Figure 4.3: Explanatory power: A comparison of multi-factor models for big-size portfolios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B/L/LO/BQFR/LIQ
B/L/LO/GQFR/ILLIQ
B/L/LO/GQFR/LIQ
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CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The literature in asset pricing and financial markets domain regarding variation in the stock returns and trading behaviours does not provide an accurate description of cross-sectional differences in prices. Thus, it is needed to revisit theoretical strands of asset pricing in order to give more coherent explanation of priced risk factors. Moreover, composition of economy, microstructures of stock market, heterogeneity of traders i.e., individual vs. intuitional investors, quality of fundamental information available to investors are market-specific factors. This particular study takes into the account these factors with an aim to give more rational explanation of asset pricing theory. This study investigates the asset pricing dynamics of Pakistan's equity market by using a dataset of 189 non-financial firms listed at Karachi stock exchange for the period June 2002 to June 2012. The core purpose of this dissertation is to assess ability of market beta, size, book-to-market ratio, institutional ownership concentration, financial reporting quality, and, liquidity as priced risk factors to explain cross-sectional return variations in stocks listed at Karachi Stock Exchange.

From empirical results, the findings affirm the existence of market premium, size effect, value effect, ownership premium, quality of financial reporting premium and liquidity premium in equity market of Pakistan. By augmenting Fama and French three factor model with suggested asset pricing factors in this study a significant relationship has been found amongst portfolio returns and priced risk factor. Thus, ownership structure of firms, quality of financial reporting are proposed as new risk factors that help in explaining cross-sectional return differences in equity market of Pakistan. Furthermore, economic characteristics of risk factors have been tested by using a dummy for bull and bear economic regimes. The findings of the study suggest consistent behaviour of all risk factors across extreme market regimes. Theory of market

microstructure suggests that stock returns depend on liquidity risk in addition to transaction cost. This study indicated liquidity and important factor is asset pricing. Moreover, using stylized portfolios give an insight about an important area of asset pricing which deals with interaction of these suggested factors.

The significance of proposed asset pricing model is tested at first instance by adding each factor individually in conventional CAPM. Then, the explanatory power of these factors is re-examined in Fama & French three factor framework. Furthermore, ownership, quality of financial reporting and, liquidity factors are added in the three factor model which resulted constitution of the four-, five-, and, six- factor models, respectively. The empirical findings reveal that when market, size, value, ownership, quality of financial reporting and, liquidity factor are added to the conventional CAPM (single factor model), explanatory power of the model significantly increases and suggest presence of these anomalies as priced risk factors in equity market of Pakistan. When size factor is added to CAPM, the explanatory power of the model instantly increases by 6%. The results support study of Banz (1981) which suggests that small firms earn 0.4% higher risk adjusted returns as compared to the big capitalization firms. Banz further explains this anomalous behaviour due to uncertainty about returns of small firms and their more exposure to macro-economic shocks. The findings of the study support Chen (1991) who examine the size effect in context of underlying systematic risk faced by small size firms. The results are also consistent with the study of Hassan & Javed (2011) who find substantial return differences between the returns of small and large capitalization firm in equity market of Pakistan.

Similarly, when value factor is added to single factor model, explanatory power of the model slightly increased by 3%, whereas, R^2 value gradually increases within sub portfolios. The results are consistence with Fama & French (1992, 1993) and Hassan & Javed (2011) who claim book-to-market as proxy of sensitivity and common risk factor which captures common variation that helps to explain cross sectional return differences. In same way, inclusion of INSH results in little increase in R^2 value, but increase in explanatory power of the model soared by 10% for Big size portfolio. When financial reporting quality as firm specific priced risk factor is added to the single factor CAPM, R^2 value rises up to 63% as compared to 54% R^2 of market (MKT) as

standalone systematic risk factor. Similarly, addition of liquidity factor (ILLIQ) in single factor model results in drop in R^2 value for portfolio P comprising all sample companies. Then it dramatically increased by 12% for portfolio of big companies.

When three factor model (3FF) is used to affirm findings of studies by Javed (2010) and Hasan & Javed (2011) on equity market of Pakistan, empirical findings show consistency with aforementioned studies as explanatory power of three factor model is 4% higher than single factor CAPM. The results of the study also show conformity with Fama & French (1992) study conducted on US stock market that employ multivariate sorts on size and book-to-market betas and form portfolios on the basis of size and value sort stocks. Our results are in line with the study of Berk (1995) who explicitly asserts that size and book-to-market factors should be specified in every asset pricing model.

The study also employs two-pass regression methodology, where monthly excess returns are regressed on risk premia obtained in first-pass regression. Our findings suggest that none of proposed factors found significant in explaining relationship between future stock returns and risk premia.

The study suggests that relationship between expected average return and the prescribed risk factors is monotonically increasing as we go into more stylized portfolios. This pattern persists independently within the sub-portfolios formed on the basis of size, book-to-market, institutional ownership, quality of financial reporting and, liquidity. This study interlinks the different strands of existing literature on asset pricing. Primarily, this study adds to the vast body of knowledge on the relationship between institutional ownership and stock return and pin points another asset pricing anomaly that prevails in equity market of Pakistan. Most importantly, spread between the average returns of high institutional ownership and low institutional ownership portfolios is not accounted for by Fama and French three factor model (1992). Since all portfolios are formed on the basis of past information hence, it can be that institutional ownership concentration is well-built predictor of future returns. The study also reports that cross sectional return differences cannot be not explained with risk factors prescribed by traditional asset pricing models. Here, element of the interest remained firm specific characteristics of the firm with special focus on ownership structure that is deep rooted in explaining cross sectional return differences.

The growing stake of intuitional investors in Pakistan's equity market has given rise to considerable attention by researchers regarding clientele effect due to presence of such informed and expert investors in market. The empirical results of this study reveal that as we head towards more and more stylized portfolios, their common traits exhibit same risk behaviour. When portfolios were sub-categorized on the basis of institutional ownership concentration, results of this study are found in line with the findings of Gompers & Metrick (2001), which show that institutional investors like to invest in large and more liquid stocks. The key findings of this thesis also support Falkenstein (1996) argument about inclination of institutional investors to invest in liquid stocks about which lots of information is available in market.

This study also investigates the stability of risk parameters during bull and bear economic cycles. Similar to the study conducted by Fabozzi & Francis (1977), six factor model is further extended by including a dummy variable for both bull and bear periods. By incorporating a dummy based on different market conditions one can get a better economic rationale of asset pricing anomalies. However, results of this study are consistent with work of Fabozzi & Francis (1977) who reports that betas of the model are not significantly different for bull and bear market conditions.

The study also tests robustness of the model using Time series Regression (TSR) and Cross-sectional Regression approaches. It is concluded that estimated betas failed to explain risk premiums for all the suggested factors in study except size.

In words of Fama (1991):

"One cannot expect any particular asset pricing model to completely describe reality; an asset pricing model is a success if it improves our understanding of security market returns".

By this standard, proposed asset pricing model in this study is a success. These words suggest that the thrust for finding an appropriate asset-pricing model remains to perceive what exactly is going inside the black-box.

5.2 Implications of the study

The findings and conclusions presented in this thesis not only contribute to the existing academic literature, but also have broader practical implications for investors and corporate managers as it is important for them to understand relationship between risk and return to avoid losses from irrational decision making. The study suggests a profound size and value effect exists in equity market of Pakistan.

Another implication of the study is from perspective of market regulators. The corporate governance factors such as institutional ownership and quality of financial reporting factors are imperative considerations of investors while making investment decisions. The study may help market regulators in devising their policies in such a way that investors can make optimal decisions in investment environment where corporate governance mechanism is strong enough to safeguard their interests. Moreover, investors, corporate managers and regulators should take into account strategic interaction between suggested risk factors and stock returns. This study gives new insight into the explanatory power of Fama & French three-factor model, and how these factors affect stock returns as a core.

This study has several implications for investors and researchers and opens new avenues to study asset pricing dynamics of Pakistan's stock Market. This study supports the well documented finding that institutional investors are well informed and they outperform retail investors. The findings of the study provide a new perspective to existing body of literature from both empirical and theoretical standpoint.

In this particular study, factor models are tested using various style based portfolios as dependent variables. This idea of using style based portfolio is closely related to the Barberis and Shleifers' (2003) framework of classifying portfolios according to different investment styles. It is concluded that the risk factors affect returns of portfolios with different investments styles. The study has implications for professional money managers as they can evaluate their performance relative to the benchmark specific to their investment style. Moreover, market, size and, value as priced risk factors give new rationalization of multifactor asset pricing for equity market of Pakistan. The results are in line with the study of Attiyah & Javed (2010), Hasan & Javed (2011)

who found significant presence of size and value effect, and their pricing in equity market of Pakistan. Further, the empirical results of this study allow us to infer that institutional ownership trading and quality of financial reporting provided by business corporations to their investors directly affect stock returns.

5.3 Directions for the Future Research

The findings of the study open avenues for further research in area of asset pricing. Other market based and firm-specific variables such as firm's distress level, free cash flows can provide further insight into asset pricing dynamics of Pakistan's equity market. This study only documents systematic and robust effect of asset pricing anomalies.

The results of the study suggest that measuring risk with established asset pricing factors is not sufficient. Besides differences in corporate governance structure, composition of economy, set of regulations and their enforcements casts doubt about generalizibilty of asset pricing factors. More and more empirical work is needed to identify country and economy specific risk proxies. There is also need to identify common risk factors which may be applied to explain equity returns universally.

One of the key challenges faced by asset pricing paradigm of modern finance is measuring proxies of systematic risk factors. This study has implications for market regulator, academicians and investors. There has always been a debate in asset pricing literature over which factors to be used as priced factors in determining asset returns. This study is an attempt to examine ability of several commonly proposed factors to predict stock returns of stocks listed at Karachi Stock Exchange.

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