PREDICTORS OF FIRM AND PORTFOLIO LEVEL RETURNS: EMPIRICAL EVIDENCE FROM PAKISTAN EQUITY MARKET

By

Habib Ur Rehman

NATIONAL UNIVERSITY OF MODERN LANGUAGES

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Submitted By: Habib Ur Rehman
Name of Student

Registration #: 510-PhD/MS/S14

Doctor of Philosophy
Degree Name in Full

Management Sciences
Name of Discipline

Dr. Faid Gul _____
Name of Research Supervisor

_____
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Dr. Faid Gul _____
Name of HOD(MS)

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I Habib Ur Rehman

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Registration # 510-PhD/MS/S14

Discipline: Management Sciences

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Predictors of firm and Portfolio Level Returns: An Empirical Evidence from Pakistan Equity Market

ABSTRACT

Model 1:The outcome of three factor model indicates that no size effect prevailing in Pakistan stock market. Our results show that momentum is significant predictors of stock returns in the Pakistan Stock Exchange. Model 2: The result indicates that size, trading volume, institutional ownership ratio and earnings growth rate have a lead-lag relationship. Further, outcomes show that size, trading volume, institutional ownership ratio and earnings growth rate have a long-run relationship as well short-run relationship. Model 3: Our results show that momentum and earnings growth rate is significant predictors of stock returns by the pre-financial crisis in the Pakistan Stock Exchange. On the other hand, post-financial crisis results show that momentum, earnings growth rate, institutional ownership ratio and trading volume are significant predictors of stock return in the Pakistan Stock Exchange. Furthermore, overall results show that both in pre and post-financial crisis momentum, earnings growth rate and size in the Pakistan Stock Exchange are the significant predictors of stocks return.

Asset Management firms, as well as investors, are recommended to consider the firm size and book to market equity ratio to forecast returns anticipation on all portfolios (S/L, S/M, S/H, B/H, B/M and B/H) in Pakistan stock exchange. On the other hand, including the fourth factor, momentum, can more improve their forecasting and predicting ability of future stock returns. If policymakers would decide to establish stock markets, they may not be able to sustain their viability if the institutions and companies are not adequate or compatible with the functioning of modern capital markets. This study factored into the regression equations company's specific

fundamentals as well. For that reason, the gap for five-factor, six-factor, and so on, models is open. Future studies may propose added factors to the current models or different factors to the current models, as per the situation may demand. The research outcomes have significant suggestions for Pakistani fund managers who effort to improve trading strategies that make available positive abnormal returns. Especially, this dissertation perceives that momentum-based trading strategies are extremely profitable even after risk variations.On the other hand, the portfolio manager viewpoint this study propose that they implement momentum-trading strategy in the Pakistan setting using it is the most profitable on a risk-adjusted basis. Moreover, this study recommends a particular four-factor model containing momentum factor must use by way of a benchmark for performance valuation.

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Habib Ur Rehman

DEDICATION

To my beloved parents;

To whom I owe my whole life.

To my brothers

With millions of thanks and gratitude

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

1.1.1 The origin of return predictability

In the finance literature, two different opinions can be identified regarding the origin of return predictability (Balvers *et al.*, 1990; Pesaran & Timmermann, 1995; Torous *et al.*, 2004). The first opinion considers expected returns are constant and suggests that any predictability is evidence of inefficiencies in the capital market; the second opinion though, argues that there are some predictable components in stock returns and they reflect time-varying expected returns.

The first opinion considers that in an efficient market, investors would bid up stock prices with predictably high returns and would, therefore, lower their return and remove any predictability at the new price (Samuelson, 1965). However, such price correction (arbitrage trading) is assumed to be impeded by market frictions. Hence, return predictability exists when market imperfections such as taxes, information and trading costs exist (Ferson, 2007).

The academics favouring the constant expected return approach essentially talked about rational agents, efficient markets, constant risk premium and no predictability of asset returns. Campbell *et al.*, (1997) provide a linear-present value relation for stock prices to understand the implications of the risk premium approach (constant expected return). They assume that the expected return is constant and equal to zero; expected dividends are also zero. Both conditions lead to implying that stock prices follow indeed a random walk and the best way to predict the price tomorrow is to observe the price today. Mehra & Prescott (1985) argue that the assumption for zero expected return is only applicable to daily or

weekly observations and prove that by allowing expected return to be greater than zero, prices will follow a sub-martingale. This process reveals that both the expected return is greater than zero and the deviation from the constant return is unpredictable.

LeRoy (1989) argues that abnormal return is a fair game and no active trading strategies based on available information, can generate a higher expected return than the constant "normal" return. Campbell & Shiller (1988) suggest that stocks that are not expected to pay dividends sometime in the future, they cannot have a positive price and expected return. If the dividend growth can be predicted then a predictable component in the future return of the stock price is present. These two make up the constant "normal" return, such that abnormal returns are still unpredictable.

1.1.2 Asset pricing models and return predictability

Any discussion related to stock prices behaviour should always start from Markowitz (1952, 1959). In his doctoral thesis "Portfolio Selection", Markowitz provides a strategy to retrieve the optimal portfolio. He states that the variance of return rates of securities acts as a risk level indicator, and through diversification, total risk exposure can be lowered while, without reducing expected return rate. Therefore, the correlation among assets seems to be the investor's primary concern when selecting the portfolio. When investors are fully aware of the co-movement among various risky assets, then diversification can spread risk. Among Markowitz's biggest contribution is the so-called "Markowitz Efficient Frontier".

1.1.3 Equity Return Predictability

The overall theme of this dissertation is the time-series predictability of equity returns in international financial markets. Equity return predictability is one of the most fundamental topics in financial economics and of paramount importance for researchers and practitioners alike. The behaviour of stock market prices has been at the forefront of

academic research since the beginning of financial economics as an academic discipline. For example, already the early work of Cowles (1933) investigates if professional financial advisors can forecast stock returns and concludes that they cannot. The question whether stock price changes are predictable is closely linked to the theory of efficient markets, first formulated in Fama (1965), which has become one of the most important if not the most important theories in finance up until today. The development of the efficient market hypothesis was originally motivated by the empirical observation that security prices appear to move completely random as predicted by the random walk model of Bachelier (1900), Samuelson (1965) and Mandelbrot (1966). Following the definition of Fama (1970), "A market in which prices always fully reflect available information is called efficient". The efficient market hypothesis states that future price changes of security are unpredictable as prices today already reflect the combined information and rational expectations of all market participants. The competition of rational investors for profitable investment opportunities drives security prices to their fundamental values so that the observed security price is always reasonably close to its fundamental value. Thus, in an efficient market, there is no risk-adjusted abnormal profit or "free lunch" to be made for investors, and active investors are not able to outperform the market over long periods. This prediction is confirmed by empirical studies such as Cowles (1933), Jensen (1968) and Fama & French (2010) who find that the average U.S. mutual fund cannot consistently outperform the market. Fama (1970) defines three forms of market efficiency concern to different information sets. First, the weak form of market efficiency states that future price changes cannot be predicted by the history of past prices. Second, the semi-strong form of market efficiency states that asset price changes are unpredictable by all publicly available information. Third, the strong form of market efficiency states that asset prices are unpredictable by all available information to market participants even by private

information that is not publicly available. One issue when testing the efficient market hypothesis is the joint hypothesis problem emphasized in Fama (1970, 1991). The efficient market hypothesis is only testable in the context of a pre-specified asset pricing model that defines how investors determine expected returns in equilibrium. If a test rejects the hypothesis of market efficiency, it remains unclear whether the market is truly inefficient or if the pre-specified asset pricing model is incorrect. Grossman & Stiglitz (1980) point out that a market can never be fully efficient in practice when information costs are taken into account. In a fully efficient market, investors would have no incentive to gather and process new information to evaluate asset prices because all relevant information is already incorporated into prices. However, if no investor gathers information, the market cannot be efficient in the first place. Therefore, in the model of Grossman & Stiglitz (1980), investors need at least some degree of market inefficiency to be adequately compensated for the costs of gathering and processing new information. Already Fama (1970) notes that market frictions such as transaction costs, the costs of collecting and evaluating information and disagreement among investors on the implications of new information can potentially generate market inefficiencies. The classic notion of efficient markets and the random walk model for security prices were almost universally accepted by academic scholars up until the 1980s. However, in more recent years, a growing body of the academic literature started to challenge the notion of fully efficient markets. In practice, investors are each day confronted with a stream of firm-specific as well as macroeconomic information and have to constantly update their expectations. In this vein, a growing number of empirical studies finds that (at least some) investors overlook publicly available information relevant for equity prices and that new information, at least in some particular cases, is only gradually incorporated into equity prices.

Another empirical asset pricing anomaly which has been related to investor inattention and gradual information diffusion is the well-known post-earnings-announcement drift documented by Ball & Brown (1968) and Bernard & Thomas (1989, 1990). These studies find that the stock prices of firms which report higher (lower) earnings than previously expected continue to drift upwards (downwards) for days and months after the day of the official earnings announcement date. Bernard & Thomas (1989) argue that their findings point to the gradual incorporation of information into stock prices. In subsequent research, Hirshleifer, Lim & Teoh (2009) find that the post-earnings- announcement drift is stronger when a greater number of earnings announcements occur on the same day. They argue that investors are more distracted when they have to simultaneously allocate their attention to a larger number of earnings announcements, which increases post-announcement drift. Similarly, DellaVigna & Pollet (2009) find that the post-announcement drift is stronger for earnings announcements on Fridays, which the authors attribute to limited investor attention due to the upcoming weekend. Hong, Torous & Valkanov (2007) find that the returns of multiple U.S. industry portfolios predict the aggregate U.S. stock market. Following Merton (1987), the authors argue that investors do not have the resources to pay attention to all public news and, therefore, have to focus on a limited set of assets or a specific market segment. They develop a theoretical asset pricing model in which investors focus on different market segments and new information from one market segment reaches investors that specialize in another segment with a lag, leading to gradual information diffusion across the investing public.

Another empirical literature studies the gradual diffusion of information across economically linked firms. Cohen & Frazzini (2008) study return predictability between economically linked customer and supplier firms. They find that lagged stock returns of customer firms predict the returns of their respective supplier firms. In a similar vein,

Menzly & Ozbas (2010) study industry level input-output surveys which provide information about the goods and services traded between different industries. The study finds that the returns of economically linked industries predict each other. Cao, Chordia & Lim (2015) investigate firms that are economically linked due to strategic alliances or partnerships. They find that returns of firms in an alliance are predictable by lagged returns of the respective alliance partners. The authors conclude that their findings violate the semi-strong form of market efficiency. Barberis, Shleifer & Vishny (1998) and Hirshleifer & Subrahmanyam (1998) develop behavioural models for an investor under- and overreaction to new information due to psychological biases. Hong and Stein (1999), and the subsequent work of Hong, Torous & Valkanov (2007), develop asset pricing models with different investor types where prices underreact to new information in the short term because investors can only observe and process a subset of all publicly available information. Hong & Stein (2007) provide a comprehensive summary of the literature. Why are these predictable patterns not eliminated by rational arbitrageurs? The literature on behavioural finance argues that there are limits to arbitrage due to arbitrage risk and transaction impediments faced by rational arbitrageurs which can prevent arbitrageurs from exploiting these anomalies (e.g. DeLong, Shleifer, Summers & Waldmann (1990); Shleifer & Summers 1990 Shleifer & Vishny (1997).

In summary, the paradigm of efficient markets predicts that, due to the competition of investors, value-relevant information is quickly and correctly incorporated into asset prices. Even though the academic literature is far from reaching a definite conclusion on this topic, the efficient market hypothesis provides an important benchmark model. In today's modern information age, highly developed and liquid security markets are likely to be reasonably close to market efficiency. However, a recent and very active empirical literature documents a growing number of particular cases where future price changes are predictable

to some degree and explain these findings with violations of the efficient market hypothesis.

1.1.4 Size & Book to Market effects in Different Financial Markets

Traditional finance increasing interest to find out a better model to explain asset pricing. Financial markets are highly integrated and essential macroeconomic variables have stimulated interest in recent years. Litner (1965), Mossin (1966) and Sharpe (1963) three different studies conduct its popular Sharpe-Litner-Mossin (SLM) capital asset pricing model. CAPM is a single factor model assumes that stocks are easily traded in the markets and the influence of this stock in prices very low during trading. Fama &French (1992) published the most acknowledged studies in the literature, which compares several models comprising combinations of variables used in the literature; as a result, Fama and French developed a three-factor model. This model comprises two more variables firm size and book-to-market ratio adds to the market return of firms.

Several studies criticise Sharpe, Litner &Black CAPM model, for example, different variables used to predict returns similar book to market ratio effect (Stattman1980; Rosenberg, Reid & Lanstein 1985; Chan, Hamao & Lakonishok 1991), the size effect, earning price ratios effect, leverage effect and momentum effect (Banz1981; Basu 1983; Bhandari 1988; Carhart 1997). The number of more variables add recently to predict returns similarly Stochastic discount factor (SDF) (Adrian *et al*., 2014; Institutional owner-ship Gao &Zhang 2015; profitability and investment Fama & French 2015; the excess holdings of foreign investors Ceylan *et al*., 2015;pay-out yields Eaton & Paye 2017; dividend growth Sabbatucci 2015; and credit term structure Han, Subrahmanyam & Zhou 2017).Conventional finance a theoretical clarification for the size anomaly connecting it to fundamental valuation. An asset market value is the discounted value of its expected cash

flows, size will always be inversely related to returns measured by market value (Clubb & Naffi 2007; Berk 1995). The firms' market value in expected stock return was first explored by Banrz (1981) and successively considered in place of the size effect. Roll criticizes that risk measures are biased due to autocorrelation downward. Further, he argues that returns of small firms which are irregularly traded (Banz 1981). Barry & Brown (1984) claimed that size is partly associated with small and large firm's moreover perceived risk related to small firm's stock.

Merton (1987) extended that returns are a function of size in addition to the accessibility of information for that specific asset. Amihud & Mendelson (1989) tested the Merton model by using proxy bid-ask spread instead of information factor of an asset while the outcome of this study size factor shows an insignificant sign over the sample period. Stock returns predictability provide further evidence by Chan &Chen (1988).

Fama & French (1992) examine a cross-section of average returns combine roles of market beta with several firm-specific variables in US stock. The outcomes of the results book to market ratio and size show the main role to explain average returns. Fama & French (1993) explored three factor model used two firm-specific variables (size factor, SMB, Book to market factor HML) and one market-specific variable (excess market return). Fama & French (1992, 1995 and 1996) accepted three factor model and rejected the validity of CAPM and claimed that the factors such as size and book to market ratio of are the significant part of asset pricing within the framework of efficient markets. On the other hand, they accept that it is challenging to explore economic cause for size and book to market as risk factors in asset pricing. The application of three factor model in various stock markets like Pakistan, US, Istanbul stock market (Arshanapalli, Coggin, & Doukas 1998; Ceylan *et al.,* 2015; Hassan & Javed, 2012).

Some researchers argue that the explanatory power of the size and book to market effect. But Lakonishok, Shleifer & Vishny (1994) asserted that the irrational behaviour of investors who exaggerate the firm's past performances makes the characteristics of the firm and increase the prices of the stock as compared to their actual prices. The reversal is picked up when prices finally return to their fair value. It is not compulsory that high book to market portfolio riskier rather than a low book to market ratio. Their empiric evidence is that book-to-market portfolios are not so much riskier over low book-to-market portfolios. The other problem is that Daniel & Titman (1997) used the left- and right-hand side to construct portfolios. They indicate that normal returns fluctuate with that book-to-market ratio holding those HML betas consistent with normal returns but on the other hand HML beta holding those book-to-market ratios are abnormal returns. Furthermore, McQueen *et al*. (1996) claimed that stock returns about large firms lead those of small firms.

The traditional finance literature essential verified that some stocks lead other stocks in returns to insufficient numerous contexts. The large and small firms inside the same industry, between customer-supplier links firms from more aggressively, trades stocks, starting with high to low institutional ownership stocks. (Gao, Moulton & Ng, 2015). Furthermore, on it, some other hypotheses for asset pricing recommend that riskier asset possessions ought to provide higher returns.

These variables regularly incorporate returns-based variables capturing cross sectional differences in size, furthermore, accounting book to market value (Fama & French, 1993), momentum (Jegadeesh & Titman, 1993, 2001), earnings momentum (Ball & Brown, 1968), institutional ownership (Chughtai & Hassan,2016), idiosyncratic volatility, cash-flow-to-price ratios and short-term reversal (Elias, Kirlys & Topyan, 2017), intraday return predictability (Narayan, Kumar, Sharma & Sunila, 2016) dividend yield (Guidolin,

Macmillan & Wohar, 2013). However, prevailing theories have left unsolved some research try to find out but it's still answerable, cross-sectional patterns in stock returns, which would well regard called anomalies. The combination from claiming such additional variables inside a broadened CAPM based frame is subject with discussion.

The supporters contend on the effect about investor welfare emerging from these requiring compensatory premiums on a chance to be attributed will these underlying components (Liu, 2006). In contrast, authors. for example, Lakonishok *et al*. (1994), Daniel & Titman (1997) and Daniel *et al*. (2001) shows that such estimating anomalies connected with these elements need support to identify with inefficiencies. These inefficiencies are introduced as it were that business sectors combine data under value prices. Despite this controversy, there is an overall consensus about the emphasis after claiming added variables within a multifactor model. This multifactor model is linked through an inter-temporal asset pricing estimating model (ICAPM) for Merton (1973) alternately the arbitrage pricing model adjustment about Ross (1976).

However, the statement persists that if equities priced with these components would be better priced utilizing nearby local, domestic or international market (Karolyi & Stutz, 2003). While Lakonishok *et al*. (1994) explain that investors overreact to past (good or bad) information about data furthermore drive stock prices faraway starting with their fundamental values. In the same way, Dissanaike (2002) contends that those small-firm impact may be just as evidence about investor overreaction too gives evidence to the UK that small size firms need aid as well the individuals for generally negative stock price implementation in as long as. Hong *et al*. (2000) described especially suggestion with size impact towards short-run momentum in stock returns. They build their justification on the GID (Gradual Information Dispersion) model formed by Hong & stein (1999). These

researchers developed a model, which explains the market anomalies which later on examines the behavioural biases for investors. The conceptual model of these researchers' study shows that it is the self-attribution bias and over-confidence bias of the investors which drive the market prices far from their intrinsic values. Berk (1995, 1997) explains an alternate theoretical reason for the connection of expected return and size. Berk contends that size may be regularly inversely associated with required returns, meanwhile stocks through normal returns similarly take high discount rates which thus logically reason to low market values.

1.1.5 Momentum Influence Different Financial Markets

One of the most well-documented regularities in the financial markets is that investors tend to hold on to their losing stocks too long and sell their winners too soon. Shefrin & Statman (1985) label this the disposition effect, which has been observed in both experimental markets and financial markets e.g. stock, futures, option, real-estate) and appears to influence investor behaviours in many countries. Herding and Feedback Trading have the potential to explain some of financial phenomena, such as momentum in stock prices. Theoretically, momentum portfolios should only have negative risks (and negative expected returns) when the price of risk increases during the portfolio formation period. Thus, it is possible to avoid these portfolios given a price of risk proxy. Jegadeesh & Titman (2011) provide an extensive review of theories of momentum based on irrational agents, including the ones based on frictions, and summarize part of the theoretical literature. Another strand consists of models that empirically "explain" momentum based on its multiple covariances with several factors. These factor models are not directly obtained from equilibrium conditions and only address stocks. Thus, they are relatively silent about the economic channel behind the momentum premium and its risks (especially

its negative market risk exposure). Examples of empirically driven factors that seem to span momentum in stock returns are given in Carhart (1997) or Hou *et al*. (2015).

Besides,(Avramov & Chordia 2006, Liu & Zhang 2008) provide examples of macroeconomic factors that seem to covary with momentum, although Griffin *et al*., (2003) find no such evidence in international markets. The closest literature to the present paper is the one on rational economic theories of momentum. So far, the literature has focused only on stocks and on explaining the positive average return on momentum portfolios. The models are silent about their negative CAPM betas and most other features of the return distribution, for example. These theories are fundamentally grounded on the same idea: Realized returns are a measure of expected returns. Examples of these models are Conrad & Kaul (1998), Berk *et al*., (1999), and Johnson (2002). Conrad & Kaul (1998) assume constant differences in expected returns among the stocks over time. This is reflected by realized returns (in the portfolio formation period) and continues in the evaluation period. In Berk *et al*., (1999), asset turnover generates variation in expected returns under the assumption that the firm's risk changes over time as the firm takes on different projects.

The different facets from claiming stock predictability may be viewed as a repetitive topic in the financial economies literature descriptive explanation. Because of its close connection with market efficiency theory, it needs to move specific theoretical investment. Market efficiency associates variation for stock returns. It is greatly achieved that stock returns came to frequently make predicted by certain firm-level return predictors. For example, size, momentum and book-to-market ratios. Utilizing those portfolio techniques and additionally those cross-sectional regressions method, experts need regularly revealed that stock returns and firm-level predictors are significantly associated with each other. An extensive accessible literature from claiming that open for return predictability utilizing

capital asset pricing model a single factor model, Fama & French (1993) and Godfrey(2018).

Further, Carhart (1997) expanded the Fama &French (1992) model finally examining including a fourth variable momentum. Jegadeesh & Titman (2001) and Griffin (2003) stated the presence of claiming the momentum phenomenon in different countries around the planet. Jegadeesh & Titman (2001), and Chui, Titman, & Wei (2000) stated that cross-sectional momentum over both U.S and the non-US stock market because of deindustrialization, innovation settled, government lodging. Several articles argued that momentum effect 3 to 12-month horizons. The thing that makes these impacts maybe even now a matter of debate; a few papers bring contended that each impact is the effect of mispricing. With the end aim mispricing to persist, it must a chance to be that costs limit arbitrageurs on their debates during keeping market efficient (Barberis & Thaler 2003; De Long *et al*., 1990; Pontiff 2006; Scholes 1972; Shiller 1984; Shleifer & Vishny 1997).

However, these models are still missing forecast returns over different financial markets and times (Fama & french 2010; 2012; 2015). That empirical evidence recommends that returns essential support certainly incompletely predictable (Binsbergen & Koijen 2010; Campbell & Shiller 1988; Cochrane, 2007; Fama & French 1988). This need persuaded a theoretical literature works that incorporate the long run fluctuating returns complete equilibrium models (Bansal & Yaron 2004; Campbell & Cochrane 1999). Moreover, Jagadeesh & Titman (1993, 2001) determined about price-based momentum application estimate in yielding strong demonstration of the cross-section for stock returns. There is an emerging literature on the predictability about stock returns dependent upon that information held settled alongside past returns. The true debate started when Fama & French (1996) accepted about not explaining the momentum returns by their three factor

model. This resulted in several theories removing from those conventional finance stake asset pricing models as a more reasonable context to discover promising clarification for momentum returns. Researcher trigger to behaviour finance model to explain momentum returns. The main works in this context diverse kinds of an agent in the markets whose leads to stock price overreaction as a result to end long term reversal (Barberis *et al*., 1998; Daniel *et al*., 1998; Hong & Stein 1999). Instead, some researcher argues that the presence of disposition investor holds on loser stock, as a result, longer than winner stocks. Furthermore, imperfect elastic demand function causes a price under-reaction to public information (Grinblatt & Han 2005; Muga & Santamaria 2009)**.**

1.1.6 Firm and Market Level Return Predictors

Traditional finance revealed many cross-sectional relations try to explain but still need to more explore predetermined variables and future stock returns. Previous their accurate insights, these relations need aid related to the degree that they give acceptable insights to predict the future. If those normal association proceeds outside a study's new sample may be an open question, to find out the solution for which is analyse on the reason cross-sectional withdraw predictability, to begin with, first place (Mclean & Pontiff, 2016). In literature widely studied stock return predictability. Both theories capital asset pricing model and arbitrage-pricing model, tie return predictability patterns to unresolved significant economical meaningful risk factors (Chen et al., 2014). Some researcher argues that above-stated theories are not an effective way to explain return predictability such as momentum, reversal (Campbell & Vuolteenaho 2004; Watkins 2006; Hong & Stein 2000). It is well established that predictors (such as size, momentum and book to market ratio) of market-level returns can predict the stock returns. (Malkiel 2003; Cakici & Topyan 2013). Utilizing that portfolio strategy and besides those cross-sectional regressions method, analysts have frequently all the discovered statistically critical associates between stock

returns too firm-level predictors (Baker & Wurgler 2006; Vuolteenaho 2002).To obtain meaningful return prediction researcher use portfolio method and equal-weighted average returns quintile portfolios arranged based on the predictor. The firm or market level return predictors on stock returns researcher use cross-sectional regression analysis and get desire outcomes Jagadeesh & Titman's (1993) study for the United States, further studies, such as (Chan *et al*., 2000; Fama & French 1998; Grundy & Martin 2001; Pincus *et al*., 2007; Rouwenhorst 1998, 1999; Titman *et al*., 2004; Wang &Wu 2011), revealed that anomalies recognized in the U.S. financial markets similarly occur outside the U.S in numerous financial markets.

Financial markets related examination doesn't yet completely see all the short-horizon return predictability. This issue needs been contemplated eventually perusing (Jegadeesh 1990). Furthermore, Subrahmanyam(2005) examine the effect that past return consistency needs looking into future stock returns, and finds that that impact is large. Researcher claim that positively reliable stocks the individuals that bring certain returns to no less than seven trading days throughout as far back as two weeks acquire low-level future returns over other stocks; negatively reliable stocks need higher future returns (Watkins 2006). This impact holds the point when regulating for that extent of previous returns, firm size, and share turnover. Those consistency impacts might be brought about toward "overreaction" on the only part of institutional investors since those impact best happens for securities for over average levels from claiming institutional ownership (Watkins 2006).

An individual's stock returns about firms for more trading volumes lead the firms with increasingly lesser trading volumes (Chordia &Swaminathan 2000; Fargher & Weigand 1998). Ravichandran & Bose (2012) and Tripathy (2010) examined the empiric association among trading volume and stock returns in the U.S and Indian stock markets. A larger institutional ownership ratio drive responds faster toward company information than stock

returns of firms by a lesser institutional ownership ratio (IOR) (Badrinath *et al*. 1995; Sias & Starks (1997). In literature researcher use different methods to check the relationship amid stock returns also deviations in ownership by institutional investors (Sias *et al*., 2006; Watkins 2006; Ye 2012). The outcome shows that ior was a substantial connection by stock return. A researcher uses different variables to measure stock returns. As a result, previous literature associating to the reaction speed of stock prices takes absorbed on info as well as firm size, trading volume (TV), and IOR. Additionally, the previous works take described that announcements of earnings are significant real-time info for investors. Additionally, several occasions in real deviations in most corporation's stock prices and TV are affected by earnings and revenue announcement. Moreover, previous literature shows that earnings announcement has information content effects. Moreover, the earnings announcement influence the volatility of stock prices and TV of stocks DeFond *et al*. 2007; Landsman *et al*., 2011). All the things considered, besting of author "knowledge", developing the relationship between earnings growth rate and stock returns for non-financial firms are not available in previous literature. A large body of literature available stock returns is behaving differently in the pre and post-financial crisis (Cakici & Topyan 2013; Chen, Lin, Ma & Zheng 2013; Kumar &Lee 2006; Gao, Moulton &Ng 2016).

1.1.7 Factors behind the financial crisis

The financial crisis was primarily caused by deregulation in the financial industry. That permitted banks to engage in hedge fund trading with derivatives. Banks then demanded more mortgages to support the profitable sale of these derivatives. That created the financial crisis that led to the Great Recession. The 2007 financial crisis is the breakdown of trust that occurred between banks the year before the 2008 financial crisis. It was caused by the subprime mortgage crisis, which itself was caused by the unregulated use of derivatives. Despite these efforts, the financial crisis still led to the Great Recession. By the

fall of 2008, the decline in the value just of subprime mortgage-backed bonds-- which lost up to 80% of their value in the market--meant that Fannie Mae, Freddie Mac, Lehman, Merrill Lynch, Citigroup, Bank of America, Washington Mutual and Wachovia were in a state of peril.

They sold too many bad mortgages to keep the supply of derivatives flowing. That was the underlying cause of the recession. This financial catastrophe quickly spilled out of the confines of the housing scene and spread throughout the banking industry, bringing down financial behemoths with it.

But Oct. 14, 2008, was the beginning of the end of the financial crisis. On September 17, 2008, the crisis created a run on money market funds. Companies park excess cash there to earn interest on it overnight. Banks then use those funds to make short-term loans. During the run, companies moved a record $144.5 billion out of their money market accounts into even safer Treasury bonds.

1.2 Scope of the study

Furthermore, following set objectives to achieve the desire output. Firstly, to analyse earnings growth cause different price correction speed in portfolio returns. Secondly, to analyse earnings growth have lead / lag relationship with portfolios returns. The number of studies shows that lead lag influence is slow information flow, its effect economically associated firms and industries. The previous studies argue that cross-section relationship between large and small stocks. Furthermore, past literature shows that cross-section relationship is asymmetric. As a result, small stock portfolios returns tend to be associated with lag value returns of large portfolios. On the other hand, large portfolio returns are not to be correlated with lag returns of small portfolios.

Generally speaking, stock returns proceeding about stocks analytically lead or lag those of other stocks, a very good chance to apply portfolio strategy which allows the lead lag

relationship can simply provide positive expected returns. Investors prospective announcement of earning are very important because its help to take effective decision. Further, move to next model of our study provides a pre and post financial crisis comparison which adds new insight to the already known relations of firm and market level predictors and stock returns. Hearn *et al., (2010)* examine cross-sectional study four Asian countries including India, Pakistan, Bangladesh and Srilanka. But some constrained in terms of sample and including number of predictor variables. In the literature two different views about stock return predictability. First school of thought argues that firms in focussed industries earn higher returns due to high competition industries have high barriers to isolating from external competition. Second school of thought argues that high return associated with high risk as a result high entry and exit barriers. Moreover, researcher claim that no difference risk adjusted returns across different industries and geographical limits.

Mostly literature debate, degree of return predictability and return predictors vary with respect to time and market, while different securities use in past literature like equity, debt and derivative securities. However, issue is still prevailing these models are still lacking predicts return across different markets and times (Fama & French, 2010; Fama & French 2012; Fama & French 2015).

Our first contribution to the literature this study approach with pre and post financial crisis in Pakistan equity market by using pooling framework in Model 3. In this model, variables include size, trading volume, institutional ownership ratio, book-to-market ratio, earnings growth rate and momentum. Model 3 applied panel regression technique to analyse the variables.

Second contributions of this study slightly change in construct and try to distinct from previous studies. The portfolio construction of earnings growth rate, institutional

ownership ratio, trading volume and size divide on three groups big, medium and low. The study used the quarterly earnings growth rate as proxy (net income after tax) the investment portfolio grouping criterion based on the studies of (DeFond et al. 2007; Landsman et al. 2011; Fama& French 1992; Carhart1997). Further, divide into two groups 170 firm large cap (market capitalization) and 170 companies in small cap (market capitalization).Next step, to take large cap 170 firms further divide into three groups according to Carhart (1997) and Fama& French (1992) assign weights Higher Earnings, 30% Medium Earnings 40% Small Earnings 30 %.According to above large cap classification into nine groups 51 HSHE,HSME and HSSE firms, 68 MSHE,MSME and MSSE firms and 51 SSHE,SSME and SSSE firms. Next step, to small cap 170 firms further divide into three groups according to DeFond et al. (2007) and Landsman et al. (2011), Fama & French (1993) and Carhart (1997) assign weights HSHE, HSME and HSSE, 30% MSHE, MSME and MSSE 40% SSHE, SSME and SSSE 30 %.According to above small cap classification into three groups 51 HSHE, HSME and HSSE firms, 68 MSHE, MSME and MSSE firms and 51 SSHE, SSME and SSSE firms. After that, take average for nine portfolios and get one value for each nine portfolios. Further, take the difference between higher earnings minus small earnings to get HMSE value the above procedure use to subsequent whole quarters. Since quarterly data are used for this study therefore, the final sample comprises of 62 observations are from the July 1999 to December 2007 period and from the July 2009 to December 2015 period.

Third contribution to the literature arises from this study coming up with whether earnings growth rate, institutional ownership ratio, trading volume and size have lead-lag relationship with portfolios returns and price adjustment in portfolio returns in Pakistan equity market.

The first model (Model 1) of this study provides detailed discussion about four factors model and variables comprising this model are market premium (R_m-R_f), SMB, HML and Momentum. Model 2 construct portfolios, which is analysed by means of regression analysis technique to get the desired output.

This dissertation chapter reveals three folds of the study. The Second model (Model 2) provides the detailed discussion about earnings growth rate and variables, which include SIZE, TV, IOR and EGR. This model constructs portfolios, which are analysed through unit root test, vector autoregressive model, granger causality, error correction model and impulse response.

Thirdly, this dissertation discusses Model 3, which is based on pre and post financial crisis. In this model, variables include size, trading volume, institutional ownership ratio, book-to-market ratio, earnings growth rate and momentum. Model 3 applied panel regression technique to analyse the variables.

1.3 Research Problem

Researchers use different approaches to predict return for different financial markets. e.g.Sharp(1964)Capital Asset Pricing Model, Ross (1976) Arbitrage Price Model, Fama & French three factor Model (1992), Carhart (1997) Four Factor Model. Stochastic discount factor (SDF) (Adrian *et al*., 2014; Institutional owner-ship Gao &Zhang 2015; profitability and investment Fama & French 2015; the excess holdings of foreign investors Ceylan *et al*., 2015;pay-out yields Eaton & Paye 2017; dividend growth Sabbatucci 2015; and credit term structure Han, Subrahmanyam & Zhou 2017). Traditional finance revealed a cross-sectional relation try to explain but still need to more explore predetermined variables and future stock returns.

Relationship between stock returns and return predictors are visible in many markets around the world (Fama & French 2017; Grundy, Martin 2001; Pincus et al.2007; Titman et al 2004; and Wang &Wu,2011). Announcements of earnings are important real-time information for investors. Usually, changes in most corporations stock prices and trading volumes are affected by earning announcements. A large body of literature is available for return predictability using a capital asset pricing model, a single factor model, and Fama & French(1992) three factor model. But these models are still lacking incorrectly predicting returns across different financial markets and times(Fama &French 2010,2012,2015,2016). Therefore, further research is needed in this area in Pakistan.

Market efficiency theory past stock prices move towards random walk or non-random walk. So this conflicting argument some researchers argue that past prices have lead-lag relationship Chen et al (2014), Ravichandran& Bose(2012) and Tripathy (2010). But the issue is that these lead-lag relationships are not accurately predicted returns.Researchers try to predict firm and market-level portfolio return predictor(Chen& Lee 2013;Fama & French 1992;Chui,Titman and Wei 2010; Chen et al 2013;Cakici& Topyan 2014).But the issue is that which one is better to return predictors.

1.4 Research Gap

Our contribution to the literature is threefold; first, this study contributes four factors model (Hanif & Bhatti 2010; Ibrahim *et.al*., 2012) that is few studies used in Pakistan equity market examined three factors model in Pakistani equity market (Abbas *et.al* 2014; Hassan & Javed 2011; Mirza & Shahid 2008). The validity of three-factor model in Pakistan's stock market, and find that this model explains more variations in return as compare to CAPM (Ali Raza *et.al.,* 2011; Qamar *et.al*, 2013;Muneer *et al*., 2017;). This study may be helpful for investors in an investment effective model to measure risk and

expected a return in the decision by efficiently measuring the expected returns on stock market of Pakistan.

. Further this dissertation to check the validity of four factor model in Pakistan stock exchange listed companies; there are very few studies available in Pakistani stock market in this context. The fact that the momentum effect did not disappear may suggest that the factors involved in its creation are an indispensable part of the market, and this seems to undermine the commonly accepted hypothesis about the efficiency of capital markets Merlo & Konarzewski (2015). The stake-holders keep watch for the "flavour of the day," when new products, divisions or concepts capture the public's imagination, forcing analysts to throw away calculations and re-compute profit estimates. Biotech's and small to midsize technology firms create a generous supply of these stocks. Positive momentum can be the result of increasing revenue, earnings or sales. Positive momentum can also be influenced by a reduction in a company's debt obligations and an increase in its projected cash flow. Momentum investing seeks to take advantage of market volatility by taking short-term positions in stocks going up and selling them as soon as they show signs of going down. The investor then moves the capital to new positions. In this case, the market volatility is like waves in the ocean, and a momentum investor is sailing up the crest of one, only to jump to the next wave before the first wave crashes down again. A momentum investor looks to take advantage of investor herding by leading the pack in and being the first one to take the money and run. Momentum investing can turn into large profits for the trader who has the right personality, can handle the risks involved, and can dedicate themselves to sticking to the strategy. The key to momentum investing is being able to capitalize on volatile market trends. Momentum investors look for stocks to invest in that are on their way up and then sell them before the prices start to go back down. For such investors, being ahead of the pack is a way to maximize return on investment

(ROI).Momentum investing can work, but it may not be practical for all investors. As an individual investor, practicing momentum investing will most likely lead to overall portfolio losses. When you purchase a rising stock or sell a falling stock, you will be reacting to older news professionals at the head of the momentum investing funds.

Second contribution in literature is making by taking concepts a certain if returns on specific stocks analytically lead or lag relationship, then they can produce positive expected returns (Lo & Mackinaly, 1990). The asymmetry in the cross-correlation between returns on large and small stocks is due to transaction cost, and shows that speed of price adjustment in large stocks is superior to small stock Mech (1993).We argue that stock prices may predict investment because they reflect firm's fundamentals and convey to managers useful information. Our analysis is motivating by the ongoing debate on the role played by financial analysts. Theoretically, security analysts play two important roles in capital markets. First, analysts gather and disseminate firm-specific information. This informational role can help mitigate information asymmetries between market participants and affect firm's valuation. Second, analysts can also monitor the management by scrutinizing financial statements and raising questions when they interact with firms' managers.

This dissertation offers a return predictability that is no study available in Pakistani equity market (Cakici & Topyan, 2013; Chen & Lee, 2013; Chen *et al*., 2013; Chui, Titman & Wei 2010; Fama & French, 1992).We construct portfolios according to (Chen *et al*., 2014; Chordia & Swaminathan 2000; DeFond *et al*., 2007; Fama & French 1996; Jegadeesh & Livnat 2006a, 2006b; Karmakar 2010; Landsman *et al*., 2011). To assign according to type (large, medium, and small) of dissimilar firms' SIZE, TV, IOR and EGR

are divided into a nine (3x3) set portfolio, separately. After that VAR methodology, apply to estimate the outcomes.

Third, contribution in literature we apply our methodology to pooling the data and we estimate overall, pre and post financial crisis by using fixed and random effect models. No Study could found that used these variables such as SIZE, BMR, MOM, EGR, IOR and TV by using pre and post financial crisis. Further, lag of the dependent variable is taking that convert the model from static to dynamic. “Corporate finance researchers acknowledge at least two potential sources of endogeneity: unobservable heterogeneity and simultaneity. However, one source of endogeneity that is often ignored (explicitly or implicitly) arises from the possibility that current values of variables are a function of past (Wintoki, Linck & Netter, 2012). This study Generalised Method of Moment to explain this issue because independent variables in this study are more likely to be correlated with each other. This contribution may be world wide gap for the academic and practitioners to take effective decision making.

1.5 Research Questions

1) Does three factor model is a better predictor of portfolio returns in Pakistan equity market?
2) Does four factor model is a better predictor of portfolio returns in Pakistan equity market?
3) Does size, trading volume, institutional ownership ratio and earnings growth rate cause different price correction speed in portfolio return?
4) Does size, trading volume, institutional ownership ratio and earnings growth rate have lead -lag relationship with portfolios return?
5) Do firm and market level variables significantly predict firm stock returns?
6) Whether firm or market level variables are better predictors of firm stock returns?

1.6 Research Objectives

Constructed on the whilom research questions of the study, the pursuit research objectives are established for this dissertation:

1) To analyse three factor models is a significant predictor of portfolio returns in Pakistan equity market.
2) To analyse four factor models is a significant predictor of portfolio returns in Pakistan equity market.
3) To analyse size, trading volume, institutional ownership ratio and earnings growth rate cause different price correction speed in portfolio returns
4) To analyse size, trading volume, institutional ownership ratio and earnings growth rate have lead / lag relationship with portfolios returns
5) To analyse firm and market level variables significantly predict firm stock returns
6) To analyse firm or market level variables are better predictors of firm stock returns.

1.7 Significance of the study

The existence of well-functioning capital markets is essential to the mobilization of resources both internally and externally. Some analysts (Zang & Kim2007) equate stock markets in developing countries with casinos. According to this view, high stock market liquidity may retard economic growth because investors are in the market for short-term gains only. However, recent evidence (Humpe & McMillan 2009) suggests that stock markets can help to accelerate economic growth. Therefore, governments in many developing countries, including those in Pakistan have been making efforts to create a stable macroeconomic environment for private investors in order to take advantage of the boom in international stock prices. One way they have tried to achieve this is to formulate and implement sound macroeconomic policies that would improve the operations of their stock markets which they hope would act as mobilization centers for capital. Evidently, such policies will require foreknowledge about the impact of changes in economic factors on the returns of listed

companies. Therefore, the issue of whether stock markets reflect economic fundamentals or speculative bubbles is an important one because of the potential role these markets may have on the allocation of capital and on the policy issue of whether governments in developing countries should encourage their development.

Hence, current study also investigate whether firm or market level variables (SIZE, BMR, MOM, EGR, IOR, and TV) are better predictors of firm stock returns? The results obtained in this study could serve as a guiding tool for stock brokers, financial analysts, and portfolio and fund managers in advising and managing their clients' resources in Pakistan. This study could thus offer an opportunity for Pakistan policy makers to formulate and implement regulatory reforms in order to successfully develop and improve stock markets keeping in mind an approximate mix of significant market and firm variables. With the appropriate economic and country-specific reforms, the appropriate authorities might be able to exploit the full potential of stock market which may further help to attract the potential investors.

Firstly, (Model 1) outcome of this study supportive for worldwide fund managers who effort to improve trading strategies to help investor offer additional normal returns. Further, outcome of this study suitable for momentum trading strategies are extremely profitable even after risk change. The results of this study may be beneficiary for portfolio managers because they implement momentum-trading strategy in Pakistan, as it may be most profitable on risk-adjusted basis. This study may be helpful for academic because for the assessment of performance the momentum factor can used as standard.

Secondly, (Model 2) results of this study supportive particularly for academic and especially for investor who take effective decision-making. The earnings information and stock returns prediction affects in Pakistan stock market those who invest on the stock exchange, individual investor and professional managers. The outcome of the study may be helpful to regulators, performance evaluation to take effective decisions. The outcome of research may be

useful to investor and portfolio manager to establish effective rules for returns prediction. Portfolio level investment will lead to a capital structure of firms in Pakistan by improving the managerial incentives and firm's value. When portfolio investment will rise, it will lead improvement in Pakistan economy as it will improve opportunities of employment, business sector performance, per capita income, GDP growth, exchange rate stabilization, and balance of payment improvement etc. Portfolio investment flows will also increase foreign reserves in Pakistan with a positive impact on stabilization of exchange rate. This study on factors SIZE, IOR, EGR and TV affecting the portfolio investment in Pakistan is very important especially because of a very high market risk and geopolitical situation of Pakistan.

Finally, (Model 3) of this study may be helpful for financial crisis as per favours the part of asset prices in the behaviour of financial strategy. Actually our monetary analysis might be useful in difficult times. Specifically, broad monetary and credit aggregates are taking into account developments also beneficial in determining a policy of "leaning against the wind". In summary this methodology might be helpful in the direction of prevent another financial crisis.

1.8 Limitations of the Study

This dissertation has several limitations, first of all due to time limit this study constrained in term of sample size, time frames and geographical scope. The data range and time period increase, outcomes can be better. On the other hand, the outcome may be more improved adding a number of variables. Further, limitation of this dissertation is associated to uncontrolled factors as well as extraneous variables, those types of issues beyond the control. Generally speaking, another limitation of this dissertation has an influence even after controlling the study design and statistical techniques meanwhile, some factors such as strong regional applications, as well specific population, and incremental findings.

1.9 Organization of the Thesis

The rest of the thesis is arranged into four chapters.

Chapter 2 contains the literature on three and four factor models with special focus on four factor model. These models are discussed with a view to establish a link between variables under consideration and stock return predictability. The study is intended to develop a conceptual model in which these factors (market beta, size, book to market ratio and momentum) have been used as potential predictors of stock returns. The earnings growth rate can be a potential predictor of such behaviour. In addition, discuss four variables related to earnings model in literature chapter to predict returns. These framework variables include in earnings growth rate, institutional ownership ratio, size and trading volume. In the same way, literature on size, trading volume, institutional ownership ratio, earnings growth rate, and momentum stocks are predict stock returns. The important discussion about the model to explain theoretical justification for pre and post financial crisis helps the return prediction. However, the focus in chapter 2 is on the factors that results in returns in financial markets. In the last, the hypothesis have been added which have to be tested empirically after the data collection from the secondary sources.

Chapter – 3 discusses the methodology adopted in the study based and the description of the data. The background of the population and sample has also been discussed in the chapter. It also contains a detailed discussion about the sources of the data and computation of variables. The tools to be used for statistically testing the data have also been discussed in the chapter.

Chapter 4 contains the results and findings of the study. Empirical tests such as fixed and random effect regression have also been provided in the chapter. After that unit root test, after that use VAR model, Granger Causality, Variance Decomposition, Error Correction Model. Discussion on results and analysis and have been compared with the past studies conducted on the same topic. Research implications of the study have also

been discussed this chapter. The findings of the study have been discussed in the context of the traditional theories of finance. The real life implications and the relevance of the study have also been discussed in this chapter.

Chapter 5 contains the conclusion of the study and future research directions for researchers. The future research recommendations are either in the area of traditional finance in Pakistan which is to be explored or based on the limitations of this study. At the end of the report, a complete list of the references has been added. The future researchers have been recommended to make appropriate changes for making the result more reliable and valid. The Regression, VAR, Fixed and Random effect, Generalised Method of Movement results are produced by using “EVIEWS 8” (statistical software).

CHAPTER 2

Literature Review

2.1. Introduction

This chapter offers the synthesis of past studies after going through in-depth and thorough research work done on the subject matter. This chapter also presents the synthesis of finance literature on the topic under consideration for the theoretical and conceptual framework. It enables to understand the undertaken research and better comprehend this study. For the said purpose, the firm-specific predictors and portfolio level returns are explored to collect empirical evidence from the equity markets. This literature provides a gateway to this study for attaining its objectives which are to assess the earnings growth reasons for price speed adjustment of portfolio returns, to assess the earnings growth reasons for lead-lag relationship of portfolio returns, to assess the four-factor models, to assess the effectiveness of returns predictability by four-factor models, to assess firm specific and market level variables' predictability for stock returns. In order to meet these objectives, plenty of literature studies are reviewed to critically assess the methodologies used in various stock markets for exploring the same field of study to identify the suitable approach for exploring the research questions. This establishes the significance of the topic under consideration to ascertain a place where there is a possibility to make a new contribution.

2.1.1 Supporting Theories

To give an account of the amount of goods market profit people have wanted to know the market since the existence of stock market. Investor might be better idea about the stock if he knows how the stock will perform in future. In the first palace we can predict future is trying to explain the past. Random Walk Theory explains that stock prices may or may not predict future returns. Asset pricing model has turned into more popular in

last fifty years. Capital Asset Pricing Model has been especially popular in traditional finance better known as the CAPM.

The market efficiency hypothesis assumes that investors are rational, utility-maximizes not prone to any psychological biases. Kahneman & Tversky's (1979) theory of choice, prospect theory together with Thalers (1980) mental accounting framework, is perhaps the leading explanation for the disposition effect. Proponents of behavioural finance believe that stock prices reflect the beliefs and decisions of both rational and irrational investors (Hirshleifer, 2001). Thus, inefficiencies in the financial markets are caused by psychological biases. Behavioural finance suggests that rational investors can earn excess returns exploiting the inefficiencies created by irrational investors. Herding and Feedback Trading have the potential to explain a number of financial phenomena, such as, momentum in stock prices.

A number of textbooks in traditional finance explained this model much detail. A long-time beta uses to analyse cross-sectional changes of stock returns in addition CAPM has prevailed a great model for long time of finance literature. Generally speaking, any behaviour deviate from theory is called anomaly. For the period many anomalies have been appeared in traditional finance. All other traditional finance models and CAPM are trying to explain stock returns which are a consistently a hot issue in the last fifty years. In literature several studies have conducted to empirically test the CAPM validity. Equally important question in asset pricing how to predict stock returns. Traditional finance literature this phenomenon has been extensively studied by researcher across the globe. In the first palace answer this question CAPM and APT, equally are not predicting patterns to economic risk factors Charteris et al., (2018). Moreover, Sharpe (1964) and Litner (1965)

extended single factor model further extension valuation factors claiming that its increase power to give an account of the upright with bit across part of amount of stock returns.

2.1.2 Asset ricing models and return predictability

Any discussion related to stock prices behaviour should always start from Markowitz (1952, 1959). In his doctoral thesis “Portfolio Selection”, Markowitz provides a strategy to retrieve the optimal portfolio. He states that the variance of return rates of securities acts as a risk level indicator, and through diversification, total risk exposure can be lowered while, without reducing expected return rate. Therefore, the correlation among assets seem to be investor’s primary concern when selecting the portfolio. When investors are fully aware about the co-movement among various risky assets, then diversification can spread risk. Among Markowitz’s biggest contribution is the so called “Markowitz Efficient Frontier”.

2.1.3 Equity Return Predictability

The overall theme of this dissertation is the time-series predictability of equity returns in international financial markets. Equity return predictability is one of the most fundamental topics in financial economics and of paramount importance for researchers and practitioners alike. The behaviour of stock market prices has been at the forefront of academic research since the beginning of financial economics as an academic discipline. For example, already the early work of Cowles (1933) investigates if professional financial advisors can forecast stock returns and concludes that they cannot. The question whether stock price changes are predictable is closely linked to the theory of efficient markets, first formulated in Fama (1965), which has become one of the most important if not the most important theories in finance up until today. The development of the efficient market hypothesis was originally motivated by the empirical observation that security prices appear to move completely random as predicted by the random walk model of Bachelier (1900), Samuelson (1965) and Mandelbrot (1966). Following the definition of Fama

(1970), “A market in which prices always fully reflect available information is called efficient”. The efficient market hypothesis states that future price changes of a security are unpredictable as prices today already reflect the combined information and rational expectations of all market participants. The competition of rational investors for profitable investment opportunities drives security prices to their fundamental values so that the observed security price is always reasonably close to its fundamental value. Thus, in an efficient market, there is no risk-adjusted abnormal profit or “free lunch” to be made for investors, and active investors are not able to outperform the market over long periods. Empirical studies such as Cowles (1933), Jensen (1968), Fama, and French (2010) who find that the average U.S. mutual fund cannot consistently outperform the market confirm this prediction. Fama (1970) defines three forms of market efficiency with respect to different information sets. First, the weak form of market efficiency states that future price changes cannot be predicted by the history of past prices. Second, the semi-strong form of market efficiency states that asset price changes are unpredictable by all publicly available information. Third, the strong form of market efficiency states that asset prices are unpredictable by all available information to market participants even by private information that is not publicly available. One issue when testing the efficient market hypothesis is the joint hypothesis problem emphasized in Fama (1970, 1991). The efficient market hypothesis is only testable in the context of a pre-specified asset pricing model that defines how investors determine expected returns in equilibrium. If a test rejects the hypothesis of market efficiency, it remains unclear whether the market is truly inefficient or if the pre-specified asset pricing model is incorrect. Grossman & Stiglitz (1980) point out that a market can never be fully efficient in practice when information costs are taken into account. In a fully efficient market, investors would have no incentive to gather and process new information in order to evaluate asset prices because all relevant information

is already incorporated into prices. However, if no investor gathers information, the market cannot be efficient in the first place. Therefore, in the model of Grossman & Stiglitz (1980), investors need at least some degree of market inefficiency to be adequately compensated for the costs of gathering and processing new information. Already Fama (1970) notes that market frictions such as transaction costs, the costs of collecting and evaluating information and disagreement among investors on the implications of new information can potentially generate market inefficiencies. The classic notion of efficient markets and the random walk model for security prices were almost universally accepted by academic scholars up until the 1980s. However, in more recent years, a growing body of the academic literature started to challenge the notion of fully efficient markets. In practice, investors are each day confronted with a stream of firm-specific as well as macroeconomic information and have to constantly update their expectations. In this vein, a growing number of empirical studies finds that (at least some) investors overlook publicly available information relevant for equity prices and that new information, at least in some particular cases, is only gradually incorporated into equity prices.

Another empirical asset pricing anomaly which has been related to investor inattention and gradual information diffusion is the well-known post-earnings-announcement drift documented by Ball and Brown (1968) and Bernard & Thomas (1989, 1990). These studies find that the stock prices of firms which report higher (lower) earnings than previously expected continue to drift upwards (downwards) for days and months after the day of the official earnings announcement date. Bernard & Thomas (1989) argue that their findings point to the gradual incorporation of information into stock prices. In subsequent research, Hirshleifer, Lim & Teoh (2009) find that the post-earnings-announcement drift is stronger when a greater number of earnings announcements occur at the same day. They argue that investors are more distracted when they have to

simultaneously allocate their attention to a larger number of earnings announcements, which increases post-announcement drift. Similarly, DellaVigna & Pollet (2009) find that the post-announcement drift is stronger for earnings announcements on Fridays, which the authors attribute to limited investor attention due to the upcoming weekend. Hong, Torous and Valkanov (2007) find that the returns of multiple U.S. industry portfolios predict the aggregate U.S. stock market. Following Merton (1987), the authors argue that investors do not have the resources to pay attention to all public news and, therefore, have to focus on a limited set of assets or a specific market segment. They develop a theoretical asset pricing model in which investors focus on different market segments and new information from one market segment reaches investors that specialize in another segment with a lag, leading to gradual information diffusion across the investing public.

Another empirical literature studies the gradual diffusion of information across economically linked firms. Cohen & Frazzini (2008) study return predictability between economically linked customer and supplier firms. They find that lagged stock returns of customer firms predict the returns of their respective supplier firms. Cao, Chordia & Lin (2016) investigate firms that are economically linked due to strategic alliances or partnerships. They find that returns of firms in an alliance are predictable by lagged returns of the respective alliance partners. The authors conclude that their findings violate the semi-strong form of market efficiency. Cohen & Lou (2012) find that the returns of pure-play firms, which operate in a single industry, can forecast the returns of conglomerate firms that operate in multiple industries. The study argues that conglomerate firms are more difficult to price and, thus, in the presence of information processing constraints, investors require more time to incorporate industry-wide information into the prices of conglomerates. Numerous theoretical asset pricing models have been developed in order to model gradual information diffusion in financial markets. Barberis, Shleifer & Vishny

(1998) and Hirshleifer & Subrahmanyam (1998) develop behavioural models for investor under- and overreaction to new information due to psychological biases. Hong & Stein (1999), and the subsequent work of Hong, Torous & Valkanov (2007), develop asset pricing models with different investor types where prices underreact to new information in the short term because investors can only observe and process a subset of all publicly available information. Peng & Xiong (2006) develop a theoretical asset pricing model that models investor's learning process about fundamentals in the presence of limited attention, which results in price under reaction. Hong & Stein (2007) provide a comprehensive summary of the literature. Why are these predictable patterns not eliminated by rational arbitrageurs? The literature on behavioral finance argues that there are limits to arbitrage due to arbitrage risk and transaction impediments faced by rational arbitrageurs which can prevent arbitrageurs from exploiting these anomalies (e.g. De Long, Shleifer, Summers & Waldmann (1990), Shleifer & Summers (1990) and Shleifer & Vishny (1997).

In summary, the paradigm of efficient markets predicts that, due to the competition of investors, value-relevant information is quickly and correctly incorporated into asset prices. Even though the academic literature is far from reaching a definite conclusion on this topic, the efficient market hypothesis provides an important benchmark model. In today's modern information age, highly developed and liquid security markets are likely to be reasonably close to market efficiency. However, a recent and very active empirical literature documents a growing number of particular cases where future price changes are predictable to some degree and explains these findings with violations of the efficient market hypothesis.

The results of this estimation suggest the speed of adjustment as approximately 29%. This significant speed of adjustment is consistent with the prediction of trade-off theory, which suggests that firms follow target capital structures and when the firms'

leverage ratios deviate from these targets; they make financial decisions with the goal of closing the gap between the previous year's leverage and target leverage of the current period Arioglu &Tuan(2014).

The third group of anomalies are the ones connected with a delayed response of investors to new information. An example could be an excessively slow response to changing financial results. It has been determined that despite the fact that investors observe attentively the financial position of a company, when new information appears (be it even crucial), its influence on prices may be considerably time shifted. It is estimated that more or less three months' elapse before new information is incorporated within the price of the company's shares. The reason is most probably an excessively conservative attitude of investors to companies (Bernard, Thomas, 1989).

2.2. Three and Four Factor model predict returns by using Regression

Wijaya, Irawan &Mahadwartha (2018) this study aims to test the Fama & French Five-Factor Model (5FF) and the Three-Factor Model (3FF) on stocks listed in the LQ-45 Index over the 2013-2015 periods. The 5FF model includes factors of market risk premium, size, book-to-market equity, profitability, and investment. This study used a multiple linier regression analysis model in the form of panel data for the entire portfolio and each formed portfolio. The number of observations in this study was 648 consisting of 18 portfolios over the period of January 2013- December 2015. The research findings were similar to Fama and French research (2014) that is market risk premiere has significant effect on return. Profitability has a positive effect but not significant on return. Size and investment have a significant negative effect on return. The difference in yield lies in the profitability factor, whose effect is not significant on return.

Fama & French (1992) aimed to explore the controversial issue that was important for all the time in the capital/ stock markets. The scholars found that there was strong binding in the associated equity returns. These are examined in the so-called and particularly identified cross sectional variables. These variable included the size, earning per share, prices of capital stock, gearing market ration or (B/M) ratio. According to the scholars, they were going to identify the price effects. They examined the relationship by considering dividends, profit and loss, cash flows, momentum in risk and return many others in the context of effects happened in January only. There were many important effects of influencing factors seen on the Johannesburg Stock Exchange (Fraser & Page, 2000; Hoffman 2012; Mutooni & Muller, 2007; Page, 1996; Page & Palmer, 1991; Rensburg, 2001).

Muller & Ward (2012) carried out research work on lots of styles related to the determinants with more improved and modified technology and methodology. They used the set of the data collected according to the styles. They found that all the portfolios that are constructed in the stock markets were dependent on the basis of univariate ranked style features. The research work was carried out on the data collected from examining the significant impacts of univariate styles over the period of 1985 to 2011. The authors pointed out important and persistent excessive returns in a number of variables. The most important was earning yield, earning per share, dividend yield, capital risk and return, and at the end, interest rate and equity return. They found no impact or evidence related to the size effect, except for small firms.

Al-Mwalla (2012) objective of carrying on the study was to assess the real ability of various assets models like the one described through Fama and French; they took a three-factor model, but Al-Mwalla took four-factor model. These models equally estimated the

variations in returns. The study carried out, thus, analysed the momentum and size style of Australian Stock Exchange. The scholar found that strong positive value and size had an influence on the Australian Stock Exchange. In addition, it specified that three-factor model of Fama and French provided better prediction of the stock return variations for similar portfolios, which was a better model than Fama and French three-factor model.

Hamid, Hanif, Malook & Wasimullah (2012) evaluated the importance of the three-factors model of Fama and French in accordance with asset pricing as well as expected portfolio returns for stock in financial sector of Pakistan. They found that all the portfolios constructed in the stock markets with respect to Fama and French three factor model were used to measure multivariate regression. The research work was carried out on the data collected from examining the significant impacts of multivariate styles over the period of January 2006 to December 2010. The results showed that Fama and French three factor model was more applicable to predict the returns.

Basiewicz &Auret (2015) measured Fama & French (1993) three factor model on the JSE Limited (JSE). Size and value effect had been measured in this study. In conclusion, three factor models better explained expected return estimation for firms listed on the JSE.

Taneja (2010) revealed the failure of CAPMs beta to justify the cross-sectional stock market returns by establishing size and value Fama & French (1992, 1996, and 2004). In this study, sample size was taken 187 firms during June 2004 to June 2009. The results showed that Fama and French three factors Model was a better predictor in India stock market.

Nejla & Bergaoui (2017) described three factor model and stock returns in the small emerging market of Tunisia. The portfolio construction of the HML, SMB or MKT factors

was based on Fama & French (1993). Results revealed that cross-sectional variations in stock returns explain by size and book-to-market ratio. On the basis of above discussion, following hypothesis can be constructed:

H3: Three Factor model is a significant predictor of portfolio returns in Pakistan equity market.

One factor CAPM model proposed by Sharpe (1964) and Litner (1965) expressed that the expected returns of a stock are measured by the security risk of its covariance. This covariance is also known as market beta. The expected return of a security equal to the market value of beta time's market risk premium plus risk-free rate; which means excessive return is relative to the beta of the market. This model of expected returns worked poorly in a given point of a point due to the absence of positive and linear relation among portfolio and realized returns in case of numerous betas in a portfolio.

In this regard, Markowitz (1952) was the first to give modern portfolio theory basis. The scholar made a key assumption about investors to behave in a risk-averse manner (to avoid risk). The researcher provided guidance for investors to diversify their portfolios in order to get optimal returns. In addition, he explained high return with comparatively low risks as an optimal return. Markowitz (1952) also explored that high-risk assets were pooled in a portfolio. The risk remained to uncover by investors and it was lower owing to the high-risk assets. Black *et al.*, (1972) established a model in which risk was identified as beta (market risk). Furthermore, a number of studies specified the association between stock return and risk. In literature, there are various schools of thought as some researchers support CAPM model and some are against it.

Ajlouni, Alrabadi & Alnader (2013) aimed a study to test either dynamic nature of CAPM model (that was conditional) outperformed the static nature in forecasting the

companies' return listed on the Amman Stock Exchange (ASE) market for the period of 2000 to 2011. The authors' objective was to investigate the forecasting ability of CAPM. The study was carried out by taking samples and test of OLS, GJR-GARCH (1, 1), and Kalman filters were applied. The outcomes of the study showed that there is dynamic or conditional CAPM estimated by the GJR-GARCH (1, 1) to give outcomes of more accurate and precise forecast of the stock exchange market returns. The results given by the model indicated least values of Akaike Information Criterion and elaborated on the cross-section, multiple effects of returns of sample stocks.

Masood, Saghir & Muhammad (2012) carried out a research study to describe the validity of Capital Asset Pricing Model CAPM in the Pakistan capital and stock exchange market. For this purpose, twenty companies were chosen that were listed on the Karachi Stock Exchange market (KSE). Regular and daily stock returns of these top listed companies were taken as the basic data for analysis of CAPM model. The period for analysis of these companies return was taken from 16th December 2008 to 26th February 2010. The proxy of 100 index market was also considered in the study for more precise results. The market portfolio was taken by the researchers by considering six month Treasury bill's rate considered as the risk-free rate. The statistical tool of ordinary least squares method (OLS) was taken throughout the study to find out the beta of various stocks. It was the initial step of the research undertaken. The second step was to calculate the values for regression equations. The coefficient was further helpful in looking at the validity of the CAPM model. There were no detailed findings analysed during the study on the effectiveness of CAPM. The most critical situation for CAPM model was where the intercept became equal to 0. The scholars elaborated a particular there was a significant and direct association between risk and return. Market risk premium was important explanation related to the variables. The variables used for analysing the rejection and acceptance of

stock’s risk premium were rejected. There was a vital part of the residual risk with little bit part of proving risk related to assets. There was no proper explanation given by the market risks alone and it can't explain stocks’ excess returns. The risk factors had a unique contribution to the excess returns. The test, thus, provided evidence that CAPM only measures market beta so it is not an optimal tool to measure returns.

Muller & Ward (2013) also focused on the Capital Assets Pricing Model for analysing the risk and return factors. The whole situation was engaged into justification through as assets related factors. The outcomes of the study were based on the portfolios and also considered beta on the basis of Dimson Aggregated Coefficients model. The beta was taken on the minimum time period of at least three months. This was to overcome the loopholes of the Ordinary Least Squares regression. The statistical tools helped out to build relationships in beta and return loses.

Strugnell, Gilbert & Kruger (2011) also aimed at the observation and analysis of CAPM with the reference to research work of Rensburg & Robertson (2003). The authors extracted from the data that a strong price earning effects and regular size effect was seen in the returns in the stock market. In this study, it was concluded that beta had a negative relationship with returns and this inverse trend was based on the return on the stock from 1994-2007.

Qi (2004) also aimed to investigate the validity of Capital Asset Pricing Model. The author took variables with strong explanatory power with better theoretical support and reasoning and found that both models: three-factor and four-factor were better than CAPM in explaining the relation risk factors with rate of return. The models equally performed and were perfectly aligned with the statistical tools and techniques. The study was

contradicted by the study of (Bundoo 2006; Rogers & Securato 2007). These authors also carried out the study on the basis of three-factor approach.

Pamane & Vikpossi (2014) the relationship between risk and return is a concept of utmost significance in investment theory. Such a link draws the theoretical foundation from different investment models like the well-known Capital Asset Pricing Model. This model implies that the expected return on an asset above the risk-free rate is linearly related to the non-diversifiable risk measured by its beta. This study concerns itself with the Capital Asset Pricing Model (CAPM) and assesses its validity for the WAEMU space stock market called BRVM. It does this by using monthly stock returns from 17 companies listed on the stock exchange for the period of January 2000 to December 2008. Combining Black, Jensen and Scholes with Fama and Macbeth methods of testing the CAPM, the total time period was demarcated into four sub-periods. Moreover, and stock's betas was used instead of portfolio's betas due to the small size of the sample. The CAPM's prediction for the intercept is that it should equal zero. The slope should equal the excess returns on the market portfolio. The study refutes the above hypothesis about the slope and offer evidence against the CAPM for all the sub-periods and even for the whole period. The tests conducted to examine the nonlinearity of the relationship between return and betas support the hypothesis. It means that the expected return-beta relationship is linear. Further, this research studies whether the CAPM adequately captures all-important determinants of returns including the residual variance of stocks. The results demonstrate that residual risk has no effect on the expected returns of stocks for the whole period. The entire sub–periods except the last period of 2003 to 2008, which shows that returns are affected by non-systematic risks during that specific period, validates the fact that the operating activities of the firms affect their stocks returns.

Ameer & Jamil (2013) had view that investor made investment in stock exchange to maximize his wealth. Due to this, investor wanted to know the interdependence of factors and return. Results indicated that market beta was not appropriate measure for returns. On the basis of above discussion, following hypothesis can be constructed:

H_{3a}: The market beta is a significant predictor of portfolio returns in Pakistan equity market

Panta *et al*. (2016) aimed at taking a particular sample of firms listed on the Nepal Stock Exchange (NEPSE). The period of study was from December 2004 to July 2011. There was a sample of 134 firms that were among the best companies. There were total 176 top ranking companies of the world at that time. The author constructed the most famous model or approach of Fama and French as a market-wide predictor. The small and big capitalization and all levels of the book to market ratio were based on the research work of Fama and French three-factor CAPM model. In this model, the results were measured through regression equation. The outcomes showed that the stock exchange market of Nepal gave an extra return for bigger value assets or stocks. The Nepalese capital market gave a lower rate for smaller size stocks. The result was considered biased in the stock exchange for listed corporations. It was seen in the Nepal Stock exchange market that the financial sector corporations as more dominating in comparison to the listed companies. Due to this fact that financial corporations can never eliminate from the sample taken so it became impossible to extract categorical attribution. The authors argued that the study will be replicated after some years as better technology longer time series would be available that will surely provide more data about listed and financial firm.

Sadhwani, Bhayo& Bhutto (2019) this paper aims to explore variations in expected return captured by size, value, investment and profitability in Pakistani stock market and to analyze average returns patterns captured by three-factor and five-factor models of asset

pricing of Fama and French (1993, 2016).Using the returns data and accounting measures from Data stream for 490 listed firms for the period of July-2000 to December-2015, we find no any return premium in Pakistan's stock market. The returns on the factors of size (SMB), market, value (HML), operating profitability (OP), and investment (CMA) are approximately zero. Moreover, GRS test for Pakistan's stock market demonstrate the supremacy of five factor model in explaining average returns pattern as compare to three factor model.

Dash (2019) The Fama-French three-factor model is one of the most important models in asset pricing theory, extending the CAPM by incorporating the size and book-to-market (BTM) effects. Several studies have shown that the three-factor model has significantly greater explanatory power over the CAPM. The present study contributes to the literature by proposing fixed-effects panel regression analysis of stock performance on beta, log of total assets and the book-to-market ratio, controlling for stock specific and period-specific effects as an alternative to the classic Fama-French methodology, which involves the comparison of the rates of return of a portfolio consisting of high BTM stocks with a portfolio consisting of low BTM stocks and the comparison of the rates of return of a portfolio consisting of small firm stocks with a portfolio consisting of large firm stocks. The study examines the three-factor model using a sample of nine large-cap stocks from the banking industry in the National Stock Exchange (NSE) of India, over the study period 01/04/2008 - 31/03/2016.The results of the study indicate significant negative impact of the BTM ratio on mean returns, and no significant beta and size effects. These results are quite different from most of the previous studies in the literature, which assert that stocks with high BTM ratio tend to have higher returns than stocks with low BTM ratio; however, the results of the study do conform partially with the literature of the three-factor model, in that it was generally found the BTM factor to be dominant over the beta and size factors.

Rogers & Securato (2007) also carried out research for more detailed analysis of various tests and comparisons with three alternative models. This was to see the expected rate of return in Brazil Stock Exchange market. The alternative models for predicting and analysis were a) Sharpe-Litner-Mossin as an advanced version of CAPM b) the Fama and French three-factor model and lastly, c) the Reward Beta Model. The reward beta model was given by (Bornholt 2007). The authors took two steps model for testing. The methodology was general with creating balance in all the factors involved in the empirical procedure. Step one was based on the determination of model parameters. This was a time series of regression. Step two involved estimated or defined parameters to be further utilised by the explanatory variables and this was taken in cross-section regressions. Further going on in the study or research work, it was seen that the portfolios were constructed on the basis of (Fama & French 1993).

Bornholt's (2007) method was aimed at analysing the returns with the help of reward beta model. The beta model was applied by taking two samples from the selected sample. It means subsamples were created from São Paulo Stock Exchange (BOVESPA). The first sample was based on the time period of 1995-2001 and it was named as an ex-ante sample. The second sample was based on the data taken from 2001 to 2006 and was named as an ex-post sample. All the results supported that Brazilian market is totally aligned with Fama and French Three-Factor model. The companies and stock return for future were difficult to analyse as it was hard to estimate the book to the market outcome. This effect was not revealed or declared itself to be significant. The model was, thus, taken for prediction of the expected returns. Therefore, Brazilian stock market was analysed through the two-factor model. The first was to estimate the market excess returns, and the second factor was to capture the style size and trend and ultimate impact on the company.

In out-of-sample testing, not only the CAPM but also the three-factor model was not accepted. In comparison to it, the approach of reward beta was accepted.

Djajadikerta & Nartea (2005) objective was to thoroughly observe the New Zealand stock market for analysing the book to market ratio and the returns. The data was taken from 1994-2002. The investigation criterion was similar to the Fama and French three-factor model. This was to examine the deviation in the stock and return on the financial stock. The size of the sample easily impacted on the outcomes and the results were statistically significant. The effect was weaker on the book-to-market the model. There were certainly some more improved and powerful explanations given in the study by the authors. The Three-factor model was equally related to the conventional Capital Asset Pricing Model. The results were not equal to the magnitude expanded in the study by the authors. The report was used to study the market factors in relatively larger context.

Gharghori & Chan (2007) research was carried on the basis of Fama and French model (1993) with the aim of analysing the ability to tell about the cross-sectional differences in stock equity returns. The factors were taken as SMB and HML. These factors were considered as a proxy for the risks. The authors constructed the default risk hypothesis to analyse the Capital Asset Pricing Model along with the Fama-French model with three factors. The authors run regression by taking default models along with GMM approach. The authors' basic findings were a) equity returns were not the proxy of default risk b) the Fama-French three-factor model was not taken as the proxy of default risk.

Ammann *et al*. (2012) explained that they had constructed three-factor model that was initially introduced by (Chen *et al*. 2010). In this research work, a sample of ten countries was taken. The countries were selected from the European Monetary Union. The time period was taken from 1990-2006. There were two dominating outcomes seen related

to the study. The first was that the authors showed properties of the factors prevailing in European markets as compared with the United States factors. The second outcome was that alternative three-factor model had a strong power to explain factors risk. The power of expansion may be at equal or greater than the traditional model. The model was applied to 5 stock markets anomalies. The authors suggested that the international version of Chen presented in 2010 and the study purposed model was equally important in the empirical finance research internationally.

Brobbey (2012) aimed to determine the book to market ratio on the company style and size of portfolio and returns in the context of Ghana Stock Market. He also used exploratory power to explain the whole situation. By proceeding in his research work, he further compared the CAPM and the three-factor model. Their effectiveness was seen in the stock exchange market of Ghana. The sample was taken from the time span started at 1997 to the end of 2009. The data was taken related to the non-financial companies and empirical analysis was carried out accordingly. The author developed book to market portfolios in the research. The portfolios were named as Big-High (BH) portfolio, Big-Medium (BM) portfolio, Big-Low (BL) portfolio, Small-High (SH) etc. In the first one, big size and high book to market ratio stock were taken for comparison. In the second one, a medium book to market ration was taken but with big size stocks. In the third one, the lower book to market ratio was taken and the stocks were again big size. Next, small stocks were taken with a higher book to market ratio and so on. According to the results, the CAPM was not solely responsible for predicting the portfolio returns. The whole situation of analysis was developed by many other factors especially size and book to market ratio. This increased the influence of book to market ratio on the returns and related deviations in the stock exchange. In the Ghana stock exchange, the influence was seen stronger for the

size factor than any other market. The effect was also shown by the Fama & French (1992) on the US market.

Hoang, Huy & Phong (2013) undertook the research study in the background of Fama and French three factor model as conducted by many other authors. The model was analysed by looking at its applicability in Vietnam's stock market. The high low and medium portfolios were analysed on the basis of a book to market value. The sample was taken from 2007 to 2011 and companies were chosen to extract data for the research work. The criteria for chosen companies are on the basis of non-stop stock trading in the financial and stock market for two years. The portfolio developed was divided into three groups of high low and medium. Further, six subgroups were constructed. These were also constructed on the basis of big and small returns. The results revealed that three factor model is superior to CAPM model.

H_{3b}: The value stock proxy is a significant predictor of portfolio returns in the Pakistan equity market.

Chan, Hamao & Lakonishok (1991) aimed to inter-relate the cross-sectional variations in the Japan stock exchange market. The behaviours of four basic factors were estimated. These factors were: first was earnings yield, the second was a book-to-market ratio, third was cash flow ratio, lastly, the size of the stock. The authors used many comprehensive methods and also applied alternative statistical tools and techniques for different estimation methods. The authors, for research study, took high quality and authentic data that falls in the period of 1971-1988. The sample comprised of manufacturing and non- manufacturing firms. The Tokyo stock exchange was taken as sample market. The study aimed at finding out the relationship in variables and expected returns as compared to overall Japan market. The cash flow yield and the book to market

ratio had a more positive effect on the expected returns as compared to the other two variables.

Daniel & Titman (2006) also aimed to analyse the consequence of the book to market ratio on market value and declared it as evidence for more and more returns on the financial stocks even higher than the expectations. There were some firms with weak performance. The authors examined the points on which dispute was created on the implementation of the three-factor model. The authors also concluded that the future return on the stock of firms was not directly related to their past performance either the performance was in operational or accounting based context. The intangible returns were part of past returns as orthogonal. The equity issuance was also measured by means of in consideration of the book to the market ratio as the good proxy.

Basiewicz & Auret (2009) keenly carried out a research that aimed at a cross-section of average returns. The effect was seen in the Johannesburg Stock Exchange (JSE). There was convincing evidence given by the authors on the effectiveness of size, style and value premium in the JSE. Adjustments were made for the size and value by establishing the existence for all the trading costs. It was seen that the trading cost had a profound impact on the size and persistence. This also included in the size premium. The authors created an imaginary restriction on the prices than putting a restriction over the liquidity of the financial stocks. The stronger prediction was made by book to market ratio on the prediction of returns. The weakest was the earnings-to-price effect. The prior work showed that the value premium was higher, but in this research, it was comparatively lower.

Charitou & Constantinidis (2004) analysed the three-factor model to predict stock returns of Japanese stock market over the period of 1992-2001. The variables used included size proxy as market value of equity, a book to market equity proxy as book

equity divided by market equity, profitability measure earnings to book to market EI/BE and growth measure earning to market equity divided by market equity. The main objective of this study was explaining three-factor model to be considerably different from the US not only with concerns to its financial reporting system nonetheless as well a with the means of its direct relation with the economic characteristic. The results indicated that there is a significant association between book to market ratio, size and expected stock returns in the Japanese stock market. In addition, results showed that low BE/ME was a positive signal for earnings and high BE/ME was a negative signal for poor earnings. The profitability results were indicated to relate to size. Furthermore, results showed that four portfolio stocks (S/L, B/L, S/H, B/H) led to a size interrelated risk factor in returns. Finally, three portfolio stocks B/L, S/H and B/H results showed that BE/ME factor is essential that led to a BE/ME interconnected risk factor in returns. According to results, the value strategies yielded higher returns for the reason that such strategies exploited the suboptimal behaviour of the typical investor instead of fundamentally riskier. The empirical results showed that stock prices did not predict the earnings growth.

Clubb & Naffi (2007) examined the basic valuation criterion and perspective on the financial stock returns and clearly defined the book to market ratio. The cash flows were discounted against the expected rate of return and also declared that the book value was for future cash flows with consideration of proxies. The authors of this structure built a more developed and log-linear model that was easily estimated in the expectations of long-run BM and ROE. There was an additional criterion defined by adding the current BM as a more explanatory variable. The authors took more detailed and wider analysis; taking United Kingdom cross-sectional stock returns. These variables were having unique significance and were highly statistical. But the study included proxy variables. This helped out in extracting relevance of the basic valuation. The company characteristics were

also included for declaring the stock returns. The authors resulted positive return on stocks by considering the market value of the financial securities or equities equal to their future expected cash flows.

De Bondt & Thaler (1985, 1987) focused on the extreme losing/ poor performance and outperformance in the financial market in the consecutive years. Chan & Chen (1988) also carried out the similar study to analyse the three factor models for the financial markets. They also took data from listed companies. Ball & Kothari (1989) also aimed to examine and observe the substantial criticism that was raised in the tests and usually create issues. Chopra, Lakonishok & Ritter (1992) also followed Ball and Kothari in a similar way. Rosenberg, Reid & Lanstein (1985) objective was similar to examine high book to market and book value of stocks that were outperforming in the stock exchange markets greater than the market values and equity. The authors (Chan, Hamao & Lakonishok 1991; Fama & French 1992) worked further on the concept to refine and purify the outcomes in a more dramatic way to influence the whole historical data related to CAPM and related factors to create a new horizon. Thus, on the basis of above discussion, following hypotheses can be constructed:

H_{3c}: The growth stock proxy is a significant predictor of portfolio returns in the Pakistan equity market.

George & Hwang (2004) aimed to see the current stock prices and how they are fouled with the available information from the stock markets. They took 52 weeks that were higher proven and observed the momentum investing and related profits. They forecasted the power of industry and individual investors to see the present and past returns and the ultimate impact on future returns. The reversals were seen in both short and long-term and considered it as separate phenomena. The authors also observed problems in the present theory and factor models.

Chan *et al*. (1999) also carried out the same objective to examine the momentum strategies and profitability. They took the stock indices from the global market. The results were positively related to the momentum gains. Most of the time, momentum profit predicted stock market indices, but slightly lower in the currency markets. The outcomes indicated that higher profits for momentum portfolios applied on markets with higher volume in the prior period specified that return consistency supported by an increase in trading volume.

Tai (2003) aimed to judge the market portfolio, its size and return momentum to examine the stock return variation. Four risk variables in market portfolio (MKT) were seen by taking the size portfolio, a high low book to market value, the portfolio of returns in the context of momentum. The price significance was seen in the time variation. The empirical results concluded in the study offered robust help and justification of risk for all type of anomalies. There were higher average returns to accept the impact of market risks. These risks were captured by the capital assets pricing model. The results showed how much impact of momentum would be taken from previous studies, why some study failed to capture priced momentum variables and also book-to-market elements.

Gregory, Tharyan & Christidis (2013) this research involves alternative versions of the Fama–French and Carhart models for the UK market. It concerns itself with the purpose of leading researchers interested in asset pricing. We conduct an inclusive investigation of these models. We do it by forming risk factors using methods advanced in the current literature including value-weighted factor components and several decompositions of the risk factors. We also test whether such factor models can at least describe the returns of big firms. We find that versions of the four-factor model, using decomposed and value-weighted factor components, are able to explain the cross-section of

returns in large firms or in portfolios without extreme momentum exposures. However, we do not come across that risk factors are consistently and reliably priced.

Nartea *et al.* (2009) carried out a study to see the size, market momentum and impacts of the book to market in the stock exchange market of New Zealand (NZ). The FF model and the similar Carhart's model helped the researchers to explain the variation of returns. The research work adopted the same methodology as was in FF model. There was a size and BM factor model for the construction of the portfolio. Past returns and risk factors were also taken into account. A significant impact of momentum and BM was found relatively weaker than the impact of size. The power to explain market facts by the Fama and French model declare strong momentum impact in the stock market of New Zealand. The results were in the Carhart's model estimates the capital cost and helps the managers to draw more accurate returns. It is possible through investment in the small and large portfolio and book to market models. The performance evaluation stated about the winners and the losers. The emerging markets of world overcame the problems by using the models defined by previous market analysts. The New Zealand stock exchange market gave unbelievable settings with unique characteristics. On the basis of above discussion, four factor model is divided into market beta, firm size, book to market ratio and momentum. They are discussed in detail as under:

H4: Four Factor model is a significant predictor of portfolio returns in Pakistan equity market.

Here is very much of literature present on the momentum strategies. Numerous researchers had an opinion about stable profitability due to the momentum strategies and they had grabbed lots of investors. Various researchers are still confused about the effectiveness of the momentum strategies. Barberis *et al*. (1998) and Chan *et al*. (1995)

declared that there must be specified information needed by the companies to take action for focusing on reaction toward the strategies.

Muga & Santamaria (2007) objective was to identify the momentum strategies that yielded or accelerated profits in the stock exchange market of Latin American. These markets were emerging markets so those returns and profits were considered having more deviations. In all types of stock momentum effects played an important part in stock returns. The momentum was vital to know the risk-averse investors as well as the winner portfolios. The loser portfolios should also focus on the momentum strategies for better returns. The authors concluded that no CAPM was constantly focusing on the will of risk-averse investors that can rationalize the momentum effect.

Fong *et al*. (2005) aimed to implement the latest econometric tests applied to the stochastic dominance. This was to see the confusion a puzzle factors existing in financial markets. The first thing was to examine the stock return in the context of momentum impact. The authors focused on the stochastic dominance tests to create a difference between the hypotheses. They argued that there was a general pricing model. This model elaborated momentum in the hypothesis. There should be a rational decision made by the risk-averse investors. The authors took a sample of 24 countries and data from fiscal years 1989–2001. The results explained that the portfolios stochastically dominated loser portfolios. There was variation in risk and return features and the results were robust for two sub-periods. The transactional cost of the survivalist was according to the international index funds. The authors showed the rational CAPM model and clearly explained the momentum effect.

Korajczyk & Sadka (2004) undertook research work to explain the test carried out for momentum strategies and either they remained profitable or not. In addition, it explored

that either they were affected by the market friction or no. There were different measurements for proportional as well as non-proportional impacts of prices. The trading cost and price impact were judged in abnormal returns and tried to build portfolio strategies to reduce the portfolio size. The authors concluded the break-even determination according to funds sizes may lead to the abnormal returns to zero. They further proceeded to value-weighted momentum and related strategies so that equal and liquidity-weighted strategies were built for lowering down the trading cost of the stock. Before the trading cost, the equal-weighted strategies were best. But after the cost implication, it became worst.

Jegadeesh & Titman (1993) aimed to see the literature review from the past and how the strategies are developed and adopted by the stocks investors. It was also examined that either they performed well by selling and buying the stocks. The investors or companies generated handsome returns from holdings that they retained for 3 to 12 months. The authors focused to analyse the strategies and what profitability these can add in the stock returns and how these strategies reduce the systematic risk. The research outcomes showed abnormal returns in the first year after construction of portfolios and these were dissipated in the coming two years. There was a similar pattern seen in the earnings announcements and the returns. Both past winners and losers were affected in these situations.

McLean (2010) research paper clearly tested the persistence of the strategies of momentum and their impact to judge either it was idiosyncratic risk limiting arbitrage. The term idiosyncratic risk deterred that arbitrage was well known for the characteristics of the arbitrageur's diversification. The highly idiosyncratic risk related stocks should be prevalent with the reversal attributes and must fix an idiosyncratic risk limits arbitrage. This was intended to mispricing in the stock market. A relationship was developed in

returns and idiosyncratic risks in informed trading. The results showed that the momentum strategies produced lower returns and the returns were not associated with the idiosyncratic risk. Thus, the transactional cost was enough to avoid the arbitrageurs from kicking off momentum mispricing.

Bloomfield *et al*. (2009) also focused on the returns and risks from the three experiments that were given in the model of Hong & Stein (1999). According to the model, the results declared that informed trading was not carried out on observed prices. The long-term price reversal was created through uninformed trading. This was done by linking everything with momentum trade and strategies. Prices were also examined in the uninformed trading by the traders to generate reversals by involving the contrarian trading. Set of data was enough for judging the dominance of the contrarian behaviour. This was very important for the individual investors to focus on the price reversals in driving short-term momentum.

Rouwenhorst (1998) examined the international equity markets and found the medium return continuation in those markets. The sample was taken from 1980 to 1995 to construct a diverse portfolio in an international context for past medium-term losers and winners after going through the behaviour of risk avoidance and acceptance than one per cent per month. There was clear return continuation seen in the selected sample. The twelve countries market lasted the continuations for almost one year. The returns were inversely related to the size in such continuations. These were not specifically related to the small companies. The United States stock market was considered as the standard for exposure to factors that drive the profitability by using the momentum strategies.

Wu (2012) aimed to examine vast majority literature and concluded that the profitability from the momentum was overestimated in the American stock market and

shifted dramatically to other countries. There were rolling regression parameter's that were equally important for statistical and economical excess returns. The combined strategy aimed to gather the pure contrarian strategies and momentum strategies. The study declared that straightforward momentum strategy can't yield extra profitability when seen in the Chinese market. There were stronger results drawn by the authors by looking at smaller samples with an average half-life shorter than one year. Investment strategy was produced purely with the constraints of investment for positive returns and excess profitability to see the performance of the momentum strategy.

Asness *et al*. (2012) research objective was to find out the value and the momentum return premia. For estimating this consistency, eight most diverse and active stock markets were chosen. The asset classes and the common factor structure were taken to analysis the return patterns in these markets. There was a strong correlation between the value and momentum returns prevailing in the assets classes. But if seen individually, there was inverse relation found in the value and momentum of returns. There were coming global risks with features of three factor model of Fama and French. International results related to various researches showed liquidity risk was only a partial way of identifying these patterns. These patterns were used to examine and identify the value and momentum of returns in stock markets. The authors' finding directly challenged the present firm behaviours and rational assets pricing models and theories in practice in large investment firms of United States equities.

Daniel *et al*. (1998) and Hong & Stien (1999) focused keenly on the behavioural models that recommend the investors about the reaction that may be under or over according to the situation and specification of a particular firm. The same thing was further explained by the Hong *et al*. (2000) who argued on the profitability of momentum strategies and their downturn trend was associated with company size and worked

effectively for financial stocks with analyst coverage. In this regard, Jegadeesh & Titman (2001) argued that the companies first under-reacted and then overreacted about the specific market returns and risk related news. The scholars, however, omitted the risk elements that were mentioned by the Fama & French (1996) by driving the cross section and expected stock returns through the momentum profits. The author also stated that significant and positive profit returns or gains were seen in the first twelve months subsequent to the portfolio construction period.

Conrad & Kaul (1998) aimed to carry on a debate over the momentum strategies and resulted in profitability and also elongated the outcomes of the cross-sectional deviation. This was in the context of individual stocks. Berk *et al*. (1999) and Chordia & Shivkumar (2002) aimed to go with the past research studies and concluded that the momentum profitability was preserved due to the time variation and the expected returns. Lee & Swaminathan (2000) researched to examine the price strategies and momentum based portfolios and also carried out research on volume momentum strategy in the United States of America securities and their profitability. This was also done by creating a number of portfolios in particular holding period. Jegadeesh & Titman (2002) tried to analyse that any detailed and cross-sectional variation happening in the expected returns and profits stated about the downturn in the momentum profits.

Lewellen (2002) aimed to examine and describe the momentum strategies and profit through excess co-variance and argued it was not clearly depicting the companies under an overreaction. Shen *et al*. (2005) also concluded that momentum strategies can give investors more significant gains in commodity futures and financial market. Miffre & Rallis (2007) undertook extensive research that was relied on the short term persistence in the United States. This was to analyse the American commodity futures market. The

authors examined that 9.38% momentum gains were seen annually in the United States market. Antoniou *et al*. (2007) gone through the research and analysed the importance of omitted risk elements and variables that were associated with the business cycle. They tried to explain the momentum of these market components in stock markets of Europe. Behavioural model, according to these authors, didn't explain much more about the profitability and momentum.

Liu & Zhang (2008) aimed to see the growth rate in the production companies and the prevailing risk factors for them in the assets proving. Moreover, these authors explained the partial of momentum profits in manufacturing industries. Dapaah & Peiying (2009) argued that there were some contrarians in the way of delivering the momentum strategies. The higher performance was delivered by the firms with the stocks traded and existing in the New York stock exchange (NYSE). The high-level performance was bound according to the time period of twelve months and after that, the decline started.

Sehgal & Jain (2011) also started the research study for the purpose of evaluating any momentum patterns. They observed the stock sectorial returns by looking at the risk factors. The methodology adopted by the authors was portfolio generation based on the firm capability of short-term returns. The period of short-term returns was more than six months, but less than twelve months. The features-specified portfolios were directly regressed on the basis of risk factors. The authors used one-factor model (CAPM). The models used failed to trace the profits. The higher stocks generated more profit and avoided the risk. Zero investment, according to trading strategies, was considered as momentum-base for settling down the payoffs. This was a significant result of sectorial momentum. The portfolio managers can get a lot of support from this research study. They can

improve their trading strategies. This can give them extra returns. The asset returns in the academic context used the multi-factor framework to analyse the sectorial results.

Lee & Kuo (2010) took Chinese real estate market to analyse the impact of momentum profits. This was also a great thing to see the returns in real estate markets as there was much more profit in real states. The results revealed that the momentum effect has diverse patterns in varied market conditions for a horizon of shorter momentum and this momentum strategy would be implemented effectively only in a bullish market.

Grinblatt & Han (2005) also aimed to examine the momentum impact to help out the prospect theory. This theory was initially introduced by Kahneman & Tversky (1979). The aim of the authors was to examine the investors earning the capital profits or suffering from capital losses. The winners were reluctant to use the techniques and tools used by others to avoid the losses or to dispose of assets on which they were bearing loss. The researchers also explored that the investors earning capital gains were risk averse as well as they sold their assets to have capital profit. Moreover, the authors explored that the investors were losers as they were taking the risk of holding the capital assets for the longer time period. The individual investors were sometimes the winners in the market and performed better. The low performing collective investors were equal to the losers.

Nguyen (2012) also observed the momentum portfolios and his research work concluded that there were stronger short-term momentum impacts in financial and stock exchange market of Vietnam. The tests were conducted for a specific period of time. It was seen that the size of the stock certainly became base of poor performance in the context of momentum profit. It also controlled the risk. The investor behaviour mattered a lot in extracting momentum.

Dou *et al*. (2013) also conducted a research study to investigate the effect of momentum strategies and risk returns. The authors took Australian stock market to examine the profit and risk by taking both small and large stock markets. They concluded the rationality of three-factor model. This was seen in various markets of Australia. The momentum factors were further taken by the stock market analysts to see the profit and loss and risk factors in stock markets. Bello (2008) also observed risk deviation explained previously by (Fama & French 2012; L'Her, Masmoudi & Suret 2004; Lam, Li & So 2010). On the basis of above discussion, following hypothesis can be constructed:

H_{4a}: Momentum is a significant predictor of portfolio returns in Pakistan equity market.

2.3. Earnings growth rates, Size, Institutional ownership ratio, and Trading volume predict returns by using Vector-Autoregressive Model (VAR)

Contemporary behavioural theories elucidated that post-earnings announcement for firms' returns won't explain aggregate prices and still, there is room to develop more comprehensive behavioural models. Kothari *et al*. (2006) undertook their research on the reaction of the stock market towards the news of aggregate earnings using error correction model. In compare to a prior study of Kothari (2001), the scholars found a considerably different arrangement in pooled data. A previous study Kothari (2001) revealed that for specific firms, the reaction of stock prices is positive to the news for earnings. However, it needed some time to fully reflect earnings' information, which showed slow adjustment speed. This study found that the returns are not related to previous earning, which proposed that prices do not over or under react towards the news of aggregate earnings announcement.

Asplund, Eriksson & Friberg (2000) carried out a comprehensive study on price changes in the gasoline market of Sweden in the direction of the price changes of the worldwide gasoline market. The scholars used data on daily prices from retail chain along with exchange rate and spot market price from 1980 to 1996. The results extracted from error correction model revealed that price list had increased 130 times and decreased 120 times. Therefore, this study resulted in the period of variation as substantial; whereas, the speed of adjustment as low since small price adjustments took place. The price adjustments were expected to take place when either the exchange rate or the input price moved considerably with the previous price adjustment.

Elgers & Lo (2004) documented in their study to weigh the annual earnings' prediction of analysts implied in security prices. It is not more than the historical relationships among estimated and realized earnings. In bottom decile, securities' short position and in top decile, securities' long position for analysts cross-sectional distribution initial earnings forecasts result in substantial hedge-portfolio returns later in the year after the formation of the portfolio. This response of delayed price (low speed of adjustment) is more distinct in firms having low coverage of analyst measured through error correction model. According to the evidence, low coverage of analyst is related to a number of factors obstructing information proficiency of the security market.

Jegadeesh & Titman (1993) undertook a strategy to consider buying stocks having good performance and selling stocks having bad performance. These stocks resulted in considerable positive returns for the holding period of three to twelve months; thereby revealing high speed of adjustment measured through error correction model. They found that the possibility of such strategies is not because delayed reaction of stock price to usual factors or systematic risk. Even though, a portion of the atypical returns resulted in the 1st

year after the formation of portfolio dissipates in upcoming years. Similar kind of pattern was reported for the earnings news of past losers and past winners.

Hou & Moskowitz (2005) prudently described the strictness of market frictions influencing a stock by means of the delay with which its information response to price is matured. The firms, which delayed most, had a large premium of return not elucidated by microstructure effects, size or liquidity. In addition, delay seizes part of the size influence and idiosyncratic risk is valued in the most delayed firms. The idea of earning is monotonically enhancing in delay along with market frictions combined with investor appreciation. Therefore, it showed small adjustment speed since a small delayed firms segment with 0.02 per cent market share generates substantial change in average returns, emphasizing the significance of market frictions.

Da & Warachka (2011) analysed the inconsistency among short term and long-term projected earnings growth in place of a robust forecaster of future returns with forecast errors in the long run. Subsequent to the changes in the industry features, stocks having a forecast of earnings growth for the long run are too high or too low to their implicit forecast of earnings growth for short run. It has positive risk-adjusted returns with rising revisions in long run estimated earnings growth (high speed of adjustment) and vice versa. Other results reveal the negligence of investor toward changes in firm-level long-run earnings growth. This growth is also accountable for risk-adjusted returns.

Some researchers are also planned to assess the stock prices reaction towards dividend news and to estimate the stock price adjustment in a reaction to dividend and earning declaration. In this regard, the study of Patell & Wolfson (1984) finds out the influence of news release regarding dividends and earnings on numerous characteristics of the behaviour of stock price: serial correlation, mean returns and return variance, in

successive price changes. The initial reaction shows high adjustment speed with the news release within a couple of minutes. Although returns are assessed while closing and opening of the trade; yet the return of usual trading rules disintegrated within a couple of minutes. This serial correlation and disturbance continued for few hours or few trading days. However, the dividend declaration news induced less activity in comparison to the earnings news.

Jennings & Starks (1985) implemented the error correction model of Patell & Wolfson (1984) test to apply it on large sample size divided with a high content of information and low content of information regarding earnings announcement. This grouping scheme was found by the projection of financial analyst revisions' earning as a reaction to interim earnings news. The scholars found a different process for the speed of adjustment with the stock having high information content showing large adjustments (measured through error correction model) in comparison to stock having low information content.

Mun, Fleak & Morgan (2010) carried out their investigation on the market behaviour of investors. They studied earnings news of the firms along with allegations of accounting irregularity not settled. They also studied the time taken by investors to adjust against that news. In addition to it, the adjustment speed effect on the volatility of stock was examined in their study. The scholars found that after allegations of accounting irregularity, the market expects sufficiently good news without substantial market reaction, even though there was a huge sum of delayed short-run response for that bad news. The findings also suggested a quick market response for the good news in comparison to bad one. This inconsistent market response was appealing than the response before these allegations. However, the scholars found no relation among earning news and stock

volatility speed of adjustment in case of good news. On the other hand, in case of bad news, the stock volatility lowered down adjustment speed and the end product was considerably lagged resulting irregularity allegations. Thus on the basis of above discussion, following hypothesis can be generated:

H_{1a}: Earnings growth is a significant predictor of the speed of adjustment in portfolio returns

In behavioural finance, size of firms is measured in terms of small and large stocks. The reaction of earning news to small and large firms differs with the information environment. Pertaining to the pre-announcement news, small sized firms have a less established market due to less sophistication of investors; thereby having less pre-announcement news. Moreover, there is also a possibility that the time taken by incorporation of new information into the prices is influenced by the stock market size.

Brennan, Jegadeesh & Swaminathan (1993) made their study with its major focus on the impact of the number of investment analysts' following a firm on the adjustment speed of its stock price towards new information having common effects. The scholars reported their result that firms' portfolio returns were actually shadowed by analysts of other firms having even same size. Plenty of analyst firms were subject to move more quickly towards market returns in comparison with few analysts firms of the same size. Even though, this relation was nonlinear and had a marginal effect on the number of analysts with an increase in adjustment speed.

McQueen, Pinegar & Thorley (1996) reported an indicating asymmetry in the lagged and small stock concurrent response towards large stock movements. They concluded that with large stock negative returns, the small stock beta is high, whereas there

is insignificant lagged beta. In addition, with large stock positive returns, the small stock beta is small, whereas it has highly significant lagged beta. Therefore, it signified slow adjustment speed for small stock in positive returns, but not in negative stock return, common news.

Tauseef (2016) studied the reaction of stock price on the uncertain news of quarterly earnings releases by Pakistani listed firms. The researcher used four hundred and 33 news brought about by two hundred and 64 firms for a period of two years i.e. 2010 and 2011. The results of the error correction model revealed that unexpected news of quarterly earnings had an insignificant reaction of price in the context of Pakistan; thereby revealing slow adjustment speed. Negative as well as positive abnormal returns were taken by firms having negative and positive earnings news, respectively, but with insignificant results. This study also revealed the reaction of prices to the uncertain news of quarterly earnings had no relation to the firm size.

Atiase (1985) reported that the relation of prices adjustment to the earning news had indirect relation with the size of the firm. The amount of cautious pre-disclosure information and its distribution higher in those firms which had a market capitalization at a higher level; thereby permitting the market to make a prediction of the earnings with more preciseness. In these firms, the environment of information for large firms tended to increase the adjustment speed.

In addition, McQueen, Pinegar & Thorley (1996) study argued on the basis of earnings announcement and size of firms. The response of smaller firms deemed to be slow towards any bad news in comparison to larger firms. Thus on the basis of above discussion, following hypothesis can be generated.

H_{1b}: Firm size is a significant predictor of the speed of adjustment in portfolio returns

Naik & Padhi (2015) undertook their study on the varying aspects of the relation among institutional ownership ratio and stock returns. They used daily data for India from the start of 2002 to mid of 2012. The analysis used error correction model with two and three factors to deliberate institutional investors' investment flow for domestic institutional investors and foreign institutional investors on specific and on a collective basis to make an endogenous part of VAR model. The specific investigation resulted into domestic institutional investors. Those investors have a prominent role on market returns and foreign institutional investors behave in opposite direction. The results also revealed that both groups fund flow had considerable influence on their personal lags and its returns, indicating that not only past strategy but also recent trends of the market are followed, although have varied trading strategies. Therefore, high institutional ownership ratio had a high speed of adjustment with impact on stock price returns.

In the same way, Roychowdhury & Watts (2007) and Lin, Wu, Fang & Wun (2014) used the theory of accounting conservatism to have a reflection on the role of accounting in the practice. The scholars discovered the association between institutional ownership, accounting conservatism and earnings manipulations with the help of Benford's Law. They found the inverse relation of institutional ownership ratios with lower earnings news; thereby revealing low speed of adjustment. In addition, the results showed that if corporate managers lean toward conservatism, then institutional investor ratio increases the incentives for managers to manage earnings.

Cohen, Gompers & Vuolteenaho (2002) carried out their study on the collective behaviour of returns, earnings news and trading between individuals and institutions. The researchers concluded that institutions' shares are sold towards individuals as a result of

cash-flow news (positive or negative); thereby showing less adjustment speed. This study showed that institutional investors did not follow strategies of price momentum. With the increase in prices and absence of cash announcement, institutional investors sold their stocks towards individuals and vice versa.

Campbell, Ramadorai & Schwartz (2009) found that the trade of institutions become aggressive in order to benefit from mispricing. Institutional trading queries can be addressed if one pursued high ratio of changes in the institutional ownership. However, in the US, institutions are needed to announce their ownership on a quarterly basis. The scholars deduced the behaviour of institutional trading from the quotes, transactions and tape of NY stock exchange with the help of using an erudite method. It can best forecast the data on a quarterly basis from diverse size trades. The researchers found that on the day to day basis, institutional trades became persistent and reacted positively to current daily returns (revealing high speed of adjustment), however, in a negative manner to past long-run returns.

In a similar manner, Bartov, Radhakrishnan & Krinsky (2000) conducted their research to observe the stock return patterns after having quarterly earnings news in relation to the ratio of shares hold by institutional investors. The scholars found that institutional ratio helps to minimize mispricing after earnings news. The scholars also concluded that transaction costs, out-dated proxies and size of the firm have less growing power to enlighten post news abnormal returns. Additionally, the institutional ownership trading activity triggered the probability of stock returns with earnings news; thereby revealing high adjustment speed.

Collins, Gong & Hribar (2003) demonstrated that institutional investor ratio decreased the mispricing related with accruals. The results revealed that after controlling

dissimilarities enduring accruals among low and high institutional ownership and the firm-specific characteristics associated with future returns and institutional ownership, firms having a less institutional ratio with less profitable, smaller and less share turnover suggested preventing institutional investors from using abnormal returns, thereby revealing low adjustment speed.

Sias & Starks (1997) analysed institutional investors' trading contribution on the returns of their investment. The scholars applied serial correlation on daily returns and found that the autocorrelation of security daily return increased with the institutional ownership level. In addition, their results were coherent to their hypothesis regarding the intuitional ownership ratio and earning news for direct relation with price adjustment speed. Therefore, they concluded that the institutional investors' trading enhances price adjustment speed. Sias, Starks & Titman (2001) also studied on the yearly variation in the institutional ownership with returns assessed for the same time period. The scholars had similar findings for the speed of adjustment of price from institutional investors' trades. Thus on the basis of above discussion, following hypothesis can be generated.

H_{1c}: Institutional ownership ratio is a significant predictor of the speed of adjustment in portfolio returns

Louhichi (2008) studied the accounting figures' information content along with speed of adjustment for earning news towards stock prices. The sample size consisted of 117 overnight news published over the period of 2001 to 2003 by Reuters. On daily basis, the news was categorized among good, bad or no new announcement. The scholar used the methodology of intraday event research to assess the reaction of the market not just before but also just after the news event. The analysis resulted from the intraday study revealed numerous results. First of all, investors had a positive reaction towards good news and vice

versa. In addition, the results revealed that abnormal results are warped within fifteen minutes. Furthermore, the convergence of price equilibrium was made more swiftly for good rather than bad news. Furthermore, the results revealed evidence of a reversal in price for thirty minutes after the announcement of bad news. Finally, the association of earnings news was made with increasing volume, which remained associated with it even once the equilibrium price was set; thereby revealing high adjustment speed.

Ryoo & Smith (2004), who study the trading spot market impact on the future stock index of Korea, carried out another study. This study had revealed numerous results showing future trading accelerates adjustment speed in which information was held at prices set at spot market.

Francis, Schipper & Vincent (2002) examined varied explanations for the findings of previous studies regarding expedience of earnings news as estimated by the absolute response of market, which has accelerated over the passage of time. This study analysed this aspect for a relatively large sample of 426 stable firms for the period of 1980 to 1999. The scholars found no evidence for acceleration in market reaction magnitude over the passage of time, which is imputable to enhance the absolute unexpected earnings news conveyed or to enhance the average reaction of investors' reaction towards unexpected earnings. In order to test another explanation, an expansion in the concurrent information over the passage of time in earning news press releases is analysed. The scholars further assessed and coded 2,190 earnings news content generated in the press releases by thirty sample firms for the period of 1980 to 1999. In this time period, concurrent disclosures up surged considerably, specifically the enclosure of comprehensive income statements augment the unconditional market reactions towards earning news; thereby enhancing adjustment speed. In addition, it was found on comparing market response towards

quarterly earnings news that there was no market reaction at the opening of the market toward the overnight news; thereby revealing low adjustment speed. This low adjustment speed was also concluded by the study of Grossman (1976) since scholar projected that trading was essential for imparting new news into the price of the stock.

Cao & Rayanamoorthy (2012) found that the volatility of lesser ex-ante earnings leads in the direction of higher Post-Earnings Announcement Drift (PEAD). PEAD was a function on not only earning surprise news but also about its persistence. However, previous research had intensely researched the market reactions towards the earnings news magnitude. This study revealed that the perseverance of the earnings news was correspondingly significant. In this study, a unique characteristic of the anomalous PEAD return was reported, which showed the association among trading frictions and abnormal returns. Instead of showing that firms having the low volatility of earnings resulted in higher abnormal returns, the result revealed that firms having the low volatility of earnings resulted had low frictions in trading. Therefore, the results show that high abnormal returns and lower trading frictions are associated with each other.

Heath, Huddart & Lang (1999) also recommended that investors concentrate their decisions on the basis of past trading extremes. Especially, the rebalancing of portfolio towards large price changes can spread the activity of trade. However, the implications would be enhanced for high trading volume after large increase and decrease in price; thereby revealing high speed of adjustment. Chordia, Roll & Subrahmanyam (2001) also documented the trading activity response towards past returns proportionally. However, the results were inconsistent with the results of Heath *et al.,* (1999) which showed that trading increased with either increase or decrease in the market.

Huddart, Lang & Yetman (2003) studied the relation among weekly turnover of stocks and features of past stock price. The scholars found that trading volume was significantly higher in weeks if current price surpassed the highest possible price of the previous year; thereby showing the high speed of adjustment. This substantiation of using the highest possible price of the previous year to be used as reference point in making trading decisions of investors was asymmetric with the outcomes of negative and positive turnover returns. Thus on the basis of above discussion, following hypothesis can be generated:

H_{1d}: Trading volume is a significant predictor of the speed of adjustment in portfolio returns

Hou (2007) found out that the low pace of industry information diffusion was a major source of the lead-lag effect outcome in stock returns. In addition, the lead-lag effect among small and large firms was majorly an intra-industry process. This consequence was resulted through the slow speed of adjustment towards negative information and was robust towards other lead-lag effect determinants. Neglected, small and less competitive industries tended to experience this effect in a more pronounced manner as it was associated to the post-news drift of small firms after the earning news of large firms of the industry.

Sadka (2007) carried a study on the consideration of dividends and earnings as equal. It was not clear, however, that how much time profitability shock will take to convert into dividends. The growth of long-run dividend was influenced by diverse profitability shocks and it is actually hard to predict. The outcomes of VAR model remained consistent with the outcomes resulted using dividend yield in a way that high book-to-market has lower profitability and higher returns. The results pertaining to decomposition of stock returns using panel B remained consistent. In addition, the results

revealed the negative correlation of expected returns with earnings growth, which caused significant disparity in stock prices as well.

Callen & Segal (2004) made an analysis on translating separate earnings into the cash flow and accruals earnings. The scholars used long VAR model to study the lead lags effect on two lags per variable. The basis of shorter VAR model was on one lag per mean adjusted log cum annual dividends (excess returns), cash flow earnings, accrual earnings and book to market ratio. Even though the majority of evidence revealed that news of accrual earnings was as much important as stock returns news. When optimum control variables became part of VAR model analysis, the earnings news of accruals resulted in portfolio returns. The outcomes revealed that news of cash flow earning and accrual earnings dominated the news of expected returns. Therefore, the lead-lag relationship holds a significant place in the earnings growth rate and the returns of the stock. On the basis of above discussion, following hypothesis can be constructed:

H_{2a}: There is a significant lead-lag relationship between Earnings growth rate and portfolios returns

Karmakar (2010) investigated the relation between return and volatility spill influences in small and large stocks. The scholar used Indian National Stock Exchange and its daily index data on CNX Midcap, CNX Nifty Junior, CNX Nifty and S&P. The methodology used comprised of VAR model, response function (IRF) and variance decomposition (VDC) analysis to reveal not only casual but also dynamic relationships among size and stock returns. The results revealed that a significant relation for return spillovers from large portfolio stocks to small portfolio stocks. In order to study the volatility spill-over, Baba, Engle, Kraft, and Kroner (BEKK) model and asymmetric BEKK

were used. On the basis of standard BEKK model, the scholar observed single directional volatility spillovers from large stocks portfolio to small stocks portfolio.

Mir & Rahman (2012) also studied the lead-lag relation among large and small-sized firms. The scholars used KSE 100 Index to study the usual conditions of the market when it goes down or up. The results found no significant lead-lag relationship in the first analysis. In the second analysis, large-cap and lagged large-cap portfolio were divided on market conditions and the result remained quite interesting. The results revealed that large-cap portfolio direct small cap portfolios in case of the market downturn. On contrary, large firms, try to survive in adverse conditions as well due to enough resources. Correspondingly, the returns on small firms did no rely on the current large firm returns. The reason behind this relation was that improvement in the market conditions tended to suspect small firms as riskier. The results, therefore, revealed that lead-lag relation exists among portfolio size and its returns.

Gruener & Finke (2018) examined the lead-lag relations on the base of firm size, analyst coverage, and institutional ownership for 7 major developed markets. The results showed that in majority countries, the lead-lag relation exists among analyst coverage and firm size. In contrast, this relation is weak among institutional ownership portfolios. These results remained same in out-of-sample as well as in-sample tests. Based on these outcomes, the scholars established that trading impairments are the major cause of the unremitting existence of lead-lag relations.

Debushish & Mishra (2008) carried a study for the market of India to assess the lead-lag relation among future, options as well as NSE NIFTY index. There was a significant difference in the indices of put and call prices with respect to information

towards news reaction. The results also revealed that NSE NIFTY derivatives market for index led the underlying stock.

Kanas (2005) assessed that transmission of lagged information can comprise cointegration among the present price of small and large firm portfolios. The cointegration test was run in the study by means of data comprising three sets of equity portfolio prices per month over the period from 1955 to 2000. The first two sets comprise of monthly prices of portfolios sorted against size, however, the third set comprises monthly prices of portfolios having the same size. The results revealed that there is cointegration in first two set of portfolios and no cointegration in the last set of the portfolio. The prices of the large size portfolio were long-run, which forced small size portfolio prices; thereby signifying capitalisation size as a driving force of lead-lag relationship in long-term.

Kanas (2004) undertook study for lead-lag effects in the variance and mean between sorted sized portfolios for the stock market of UK. The study also constructed three portfolio sets: 1) size-sorted portfolios having equal-weight of varied capitalization size set 2) size-sorted portfolios value-weight of varied capitalization size set and 3) same capitalization size portfolios set. The results revealed that there is an effect of lead-lag among the variance and mean from small to large sized firms' portfolios. The evidence was, however, weaker for the third set of portfolios for the lead-lag effect. It showed that lead lad effect was because of capitalization size difference among portfolios.

Altay & Diskussionsbeitrage (2003) assessed cross autocorrelation for two stock exchanges: one for German Stock Exchange and other for Istanbul Stock Exchange over the period of 1993-2002. The lead-lag relationship was substantiated in the German Stock Exchange for large size portfolios. However, there was not any substantiation for a lead-lag relationship in the Istanbul Stock Exchange. The reason behind this deviation can be the

2001 financial crisis of Turkey. The portfolios of small and large size for European countries were also assessed for European countries with Granger causality and cross autocorrelation. It revealed that large size portfolios had a lead over small size portfolios. On the basis of above discussion, following hypothesis can be constructed:

H_{2b}: There is a significant lead-lag relationship between Size and portfolio returns

Gao, Moulton & Ng (2015) studied a new kind of lead-lag returns yielded on the long and short portfolio on the weekly basis over nineteen basis points. This novelty was different from the previous studies on the lead-lag effects determined by slowly paced information diffusion, as concentrated on economically unrelated pairs of stock. The findings revealed that pairs of stock having same institutional investors can significantly predict returns, which can't if institutional investors were not same. Therefore, there was reversal pattern seen in predictability for subsequent weeks according to temporary pressures from price and general institutional trading pattern. Generally, the systematic adjustment of portfolios by means of institutional investors induced the predictability of returns.

Jiambalvo (2002) argued that institutional investors were desperately engrossed on prevailing profitability, which reflected that through a rise in institutional ownership, less information for the present period was reflected with stock prices having less prediction for future earnings period. The results revealed that the magnitude to lead earnings of stock prices was positively associated with the institutional ownership of institutional ownership. These outcomes held true after controlling with factors related to earnings and price. It also controls endogenous portfolio institutions' choices.

DeMiguel *et al*., (2014) assessed the exploitation of stock returns serial dependence to augment the performance of the out-of-sample portfolio. The outcomes revealed that VAR model seized serial dependence of stock return in a significant way. The scholars further argued that other than momentum and contrarian portfolios, a VAR model on the basis of arbitrage portfolio had positive projected returns irrespective of asset return autocovariances and cross-covariances sign. However, on the basis of empirical evidence, not only arbitrage but also mean-variance portfolios on the basis of VAR model overtook the out-dated unconditional portfolios just for transaction costs less 10 basis points.

Badrinath *et al*. (1995) presented economic mechanism and empirical support for information transmission among equity securities as articled by Lo & MacKinlay (1990). The scholars found that past stock returns for informed institutional investors were positively associated with concurrent stock returns detained in unaware non-institutional investors. The effect was even persistent after controlling the firm size and is obvious at longer lags in comparison to size lag effects. Therefore, on the basis of above discussion, following hypothesis can be constructed:

H_{2c}: There is a significant lead-lag relationship between Institutional ownership ratio and portfolio returns

Chordia & Swaminathan (2000) undertook a study to examine trading volume effect of the lead-lag relations in stock returns. The scholars found lead-lag relations as a significant determinant of trading volume for stock returns. Daily as well as weekly returns on portfolios of high volume lead towards returns on portfolios of low volume after controlling firm size. Non-synchronous or low volume trading portfolio autocorrelations didn't explain such outcomes. These outcomes resulted as low volume returns portfolios had more responsibility towards less swift market return information. The results also

revealed differential adjustment speed towards information as a vital cause of cross-autocorrelation patterns in low volume stock returns.

Gębka (2005) assessed the data of daily returns for shares traded in one auction system. The Warsaw Stock Exchange was chosen for the said purpose over the time of 1996 to 2000. The study first assessed the relation among size and portfolio returns with the lead-lag relationship. This study further assessed trading volume role in explaining patterns of cross auto-correlation for portfolio returns and for its impartiality from possessions of size. This study also assessed the size and trading volume related patterns of lead-lag emerged from the variations in the adjustment speed of high versus low volume to common earning news of stock. This framework also helped to test volatility spill for low versus high volume portfolios and for differences among upward and downward markets and vice versa. The outcomes of the study revealed portfolio returns' cross-autocorrelation after controlling own-autocorrelation for the portfolio. This result inferred that patterns of lead-lag were not false and large volume portfolios past returns have information about small volume portfolios past returns beyond that the latter contained lagged returns.

Ragunathan & Peker (1997) study revealed that there was no relation between conditional returns with lag returns. They were affected by lagged volatilities of two contracts. In addition, the scholars found that future market of Australia had more volatility to be affected by lagged volatility. In addition, unanticipated trading volume had the propensity to have volatility effect in comparison to anticipated trading volume. The asymmetric relation among volatility, open interest and trading volume were measured by assessing weather open interest and unexpected volume had a negative or positive shock. The results revealed that positive shocks of trading volume had much influence on the volatility in comparison to negative shocks. Similar kind of findings was researched when

open shocks of interest were assessed and this positive shock had more likeliness to be impacted than a negative shock. Thus, On the basis of above discussion, following hypothesis can be constructed:

H_{2d}: There is a significant lead-lag relationship between Trading Volume and portfolio returns

2.4. Firm and Market Level return predictability by using panel data

2.4.1 Pre and Post financial crisis review

Rehman &Gul (2017) The main goal of this study is to examine firm and market level variables that predict stock returns by using quarterly data taken from July 1999 to December 2015. The study sample is sub-divided into pre and post financial crisis of 2007-08. The results of the study depict that in the pre-financial crisis period momentum and earnings growth rate are the significant predictors of stock returns while momentum, earnings growth rate, institutional ownership and trading volume are the significant predictors of stock returns in the post-financial crisis period. Furthermore, overall results show that momentum, earnings growth rate and size are the significant predictors of stock returns for the overall sample period. The results of the study are robust and can be generalized to other time periods.

Girgin, Nguyen & Karlis (2017) a growing body of theoretical and empirical literature analyses the relationship between finance and economic growth. The relationship has been strongly supported by many empirical analyses. However, the 2008 Global Financial Crisis (GFC) and the significantly improved econometric techniques made scholars to revisit this relationship. The main motivation of this paper is to empirically revisit the relationship between financial development and economic growth, especially one under the effect of the world's greatest financial crisis since the Great Depression. In

this study, both fixed effect and dynamic panel data analysis are conducted by using 147 countries over the period of 2000-2013. The analysis results prove the destructive effect of the GFC on the relationship between financial development and economic growth. Also, the finding showed that the effect of traditional financial development proxies has reduced after the crisis.

Vodwal *et al.,* (2019) the sub-prime crisis of 2008 in the US shook the world markets through financial market integration, global trade links, and international banking diversification. The financial crisis led to changes in various policies both at macroeconomic and firm-level around the world. In this scenario, this study is an attempt to identify and uncover the changes in firm and institutional determinants of Debt Financing Ratio in India, before and after the crisis. Micro and macro panel data of 306 non-financial Indian listed firms were used for the period of 2002-2017 to study the factors affecting leverage. Two-step system GMM was employed to study the dynamics of leverage and its determinants during 2002-2008 (precrisis period) and 2009-2017 (post-crisis period). Pre and post-crisis analysis are undertaken by employing firm-specific factors represented by Non-debt tax shields, Asset Composition (tangibility), Size, Profitability, Growth Opportunity (Market to Book), and Liquidity in the firms and institutional factors represented by Economic Growth Rate and Inflation. Two models, with different measures of leverage as dependent variables, have been constructed to analyse the impact of the crisis. The results favoured that the Indian firms tend to adjust their capital structure to reach an optimum level of debt (Target Leverage). The study confirms that profitability, and size of the firm are robust determinants of leverage in both pre and post-crisis periods; tangibility is found to be insignificant in the pre-crisis period and statistically significant in the post-crisis period for both measures of leverage. Market to Book (MTB) ratio is consistently a non-significant factor for book measure of leverage, and it holds

significant negative relation to the market measure of leverage. Based on the model employing the book measure of leverage as a dependent variable, the factors tangibility and liquidity show different behaviour in pre and post-crisis period. They are not found to be significant during the pre-crisis period but after the crisis, they show significance in the determination of leverage of Indian non-financial firms. Economic indicators show a negative relation of inflation with leverage in the pre-crisis period and positive relation in the post-crisis period. Economic growth measured through GDP does not show significance during the pre-crisis period but shows a positive influence in the post-crisis period.

Ketenci &Natalya (2017) this study presents an empirical analysis of the impact of the global financial crisis on the economic development of the Eurasian region. The region covers fifteen states of the former Soviet Union: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. Emerging economies of estimated countries are highly attractive for foreign investors, who stimulate economic growth in the region. This paper particularly investigates the relationship between economic growth and international capital flows in the Eurasian region before and after the global financial crisis. Panel estimations using annual data for the period 1990-2014 are made applying the Generalized Method of Moments estimation technique for the dynamic panel data, developed by Hansen (1982). Empirical results reveal that the main determinant of the regions' economic development is FDI inflow. This study finds evidence that after the global financial crisis, economic growth in the region becomes more responsive to capital flows compared to the pre-crisis period.

Nasir&Du(2018)This study analyses the dynamics of integration among global financial markets in the context of Global Financial Crisis (2008) by employing a Panel

Vector Autoregressive (VAR) model on the monthly data of nine countries and three markets from Jan 2003 to Oct 2015. It was found that there has been a shift in the association among the global financial markets since Global Financial Crisis (GFC). Moreover, the British financial sectors in Post- GFC world clearly showed a change in the association with the global financial sectors. Particularly, the emerging markets including China, Brazil and India showed a comparatively more significant impact on the UK financial sector implying the increased importance of the latter in the recent past. The German and USA financial sector also showed a change in its impact in the Post-GFC world. It showed that Germany and USA financial sectors have become competitive to the UK financial Sector as the surge in them lead to a relative response from the UK financial sector which could be associated with the portfolio adjustment.

H_5: Firm and market level variables are significant predictors of firm stock returns.

Chen *et al*. (2010) objective was to see the predictable stock and capital asset returns in the market of China. The authors took eighteen specific variables. The documentation and the paperwork showed cross-sectional stock and related returns in American markets. The data was compared to China stock market for the time period of 1995-2007. There was a weaker trend seen in the Chinese stock exchange market. There were 5 firm-specific factors predicted for returns in the Chinese market. The United States stock and asset return rate gave more predictors and accurate information about the cross-sectional stock return variation. There were two reasons for weak returns predictability. One was that the return forecasters in the Chinese stock market have minimum reach in the case of heterogeneity of distribution likened to the American stock markets. The second was that stock price did not give proper information in the Chinese stock market as per associated to the American market.

Elias, Kirlys & Topyan (2017) took Santiago Stock market to examine the return patterns. The period from 2007 to 2016 was taken to construct portfolios. There was no significant and predictive power of beta as computed by the authors. They elaborated the results' various portfolio techniques. The outcomes of research showed that risk was always present with predictors and was never found important to predict the real power of beta, overall volatility, and specific idiosyncratic volatility in all assets or financial stocks. There was economic and statistically vital predictive power taken toward the stock returns in the market of Santiago Stock Exchange market. The smaller stocks have a smaller book to market ratio. The beta, B/M ratio and the momentum had no significant values.

Hodric, Xing & Zhang (2006) aimed to judge the cross-sectional gains and returns related to the pricing aggregates and the volatility risks showing inverse signs in the stock markets. The results showed that stocks experiencing higher idiosyncratic volatility were not clearly explaining the size value and the return momentum. There were liquidity impacts on the low returns. The returns were affected by the size and the value. There were many other important factors like volume, leverage, market and earnings ratios, turnovers and risks that impacted on the returns. There were also fixed returns and consistency performance seen in bullish and bearish markets.

Avramov & Chordia (2006) objective was to examine the conditional pricing model that was considered useful for securities and stocks. These conditions also explained the effect of size, volume, and value in the stocks expected gains. There were different levels and size of companies with different betas. There was a need for frequently explained past and present turnover patterns to forecast the future ones. There was also a difference in the book to market ratio and possibly due to macroeconomic factors. The framework chosen by various level firms adjusted their risks through already captured facts and elements in

past studies. There were different tolerability of beta according to the firm size and book to market ratio.

Fama & MacBeth (1973) examined the New York Stock exchange market and the average returns in the context of risks. The research gave two parameters dependent on the market equilibrium and the portfolio model. The authors constructed a null hypothesis, which can't be rejected due to the reason that risk-averse investor always focused on common stock. These common stock portfolios were efficient in time variations, value and return rates. The fair market game was a predictor of risk returns and showed stable regression in the capital market.

Lam (2002) examined the relation in the stock returns and the variables like market beta, size of stocks, leverage, equity ratio and (E/P) earning price ratio in the stock exchange of Hong Kong. The market beta didn't explain the month wise returns of stocks listed in the stock market. The period of research was taken from 1983-1996. The earnings per share and the book to market ratios depicted the capability of the variables that were focused on the cross-sectional deviation. The monthly returns and related calculations indicated the leverage size, value and volume that the authors captured in the cross-sectional deviation. The authors committed to the impacts and domination of equity ratio and book to market equity ratio directed to reflect the average returns. These were terminated during the measurements of mentioned ratios. The results were also found stable when seen in sub-periods and across months, which showed abnormal returns.

Fama & French (2015) focused on those factors that were marginally strong and had explanatory power for asset pricing in the cross section features. The scholars discovered five-factor model in the stock exchange markers that could be applied to see the performance and return profitability of the firms. As the authors had already used the three

factor model so they better understood what to do in their next model. Also, same variables were used each time i.e. market beta, size, profit returns, investment and value of the stock. It concluded that by using investment and profitability factor, the worth of three-factor model becomes redundant for explaining the average returns.

Kubota & Takehara (2017) aimed to describe the five-factor models through smooth pricing structure of financial stocks by taking long-term data and information. The Japan market data was taken from 1978 to 2014. This was a long period for a research study. The authors focused on the standard cross section capital asset pricing model and found the explanatory strength of the latest Fama and French variables. The profitability was out of negative trends there was strong minus weak and conversion minus aggressive profitability and investment respectively. The results depicted that all the variables were not statistically significant. This was explained by generalized method of moments (GMM) tests. The new method of Fama and French five-factor model was considered as the benchmark in the Japan stock exchange.

Singh *et al*. (2015) examined the CAPM by following the three-factor model of Fama &French (1993), and also by following the five-factor model presented in 2015 by Fama and French in the Indian market. The company variables that were used to observe the level were capitalization, market ratio, profitability, and investment. The three-factor model gave better performance than the CAPM. The results indicated the five-factor model was more than any other model. The construction of the portfolio was on the basis of the investment. The outcomes were similar with Hou *et al*. (2015) research that basic investment and expected profitability, similarly, played an important part in describing deviation in stock returns.

Ceylan *et al*. (2015) analysed the stock return deviation by including the three-factor model in the context of foreign ownership to the Fama and French. The adding up of more variables depicted that more returns were expected in the market. There was more influence of the SMB and HML and these are related to the technique used in the Fama & French's (1993) outcomes. The important thing to note was positive market beta and possible portfolios. The results showed that the coefficients were near 1. The stock and securities size and the returns had negative correlation.

Eraslan (2013) analysed the three-factor model presented by Fama and French. He applied the model in the Istanbul Stock Exchange (ISE). The data were taken on a monthly basis from the stock market during the period of 2003-2010 to analyse the returns. The portfolios were constructed for large financial firms. This was to see the higher excessive return and compare small size companies to show their performance and return momentum. The portfolios may be based on the book to market and equity ratios. These ratios analysed the company performance in the specified period. Sometimes the high ratio firms didn't generate better outputs. There were proper directions given by the author about the variation in the returns and they also examined the risk factors associated with the portfolios. The larger stock firms did not consider portfolio returns as compared to the smaller stock firm. The medium-sized firms were flexible enough for under and over returns. The results showed the ratio and factors impact on the portfolios. The main conclusion of the research was that the three-factor model was strong enough to clearly depict difference in portfolio return.

Güzeldere & Saroglu (2012) researched the capital asset pricing model and the three-factors involved constructing the portfolios of CAPM in the stock exchange markets of Istanbul. The financial period of 1999 to 2011 was chosen to generate the empirical

results. Monthly returns and return momentum were analysed on the basis of empirical data. The authors generated empirical results by adopting the panel data analysis approach. The results depicted that Fama and French three-factor model was effectively dictating the cross-sectional differences in stock returns instead of the CAPM.

Hassan & Javed (2011) also examined the premium size, value, and equity returns associated with the stock exchange market of Pakistan. The data were taken by taking a time period of 2000 to 2007 from Pakistan stock exchange market by following the Fama & French (1992, 1993) models. They also examined the link in the factors used in the large sample of two hundred and fifty in the listed stocks of Karachi exchange market. The results depicted the size and BM ratio by examining the momentum of the market. The results in the context of market variables and statistical data were associated with the portfolio returns. The outcomes of the market variables were significantly linked with the portfolio return. The CAPM was found to be significant predictor of portfolio returns. There was also strong explanatory power in the Pakistan stock exchange market extracted only with the help of CAPM. The Fama and French model using three-factor model was also effectively used and 15% more returns were seen. The whole results were aligned with the empirical outcomes explained by Mirza (2008) in his research work for the Pakistani market. The premium size and value in the current market of Pakistan were used by the authors for decision making in the investment and equity flows. The decision making of the investors showed that there was a strong relation in the factors related to decision making and the concerning investment and the financing valuation of the financial stocks.

Heston, Rouwenhorst &Wessels (2002) analysed beta and size by describing cross-sectional variation in average returns in 12 European countries. According to the results, average stock returns had positively associated to beta and negatively associated to

firm size. High beta countries performed high and low beta countries performed low. Size and beta portfolio could be described by market risk and excess return of small over large stock (SMB). After controlling size, the outcome showed that there had no significant relationship between returns and exposure to SMB.

Borys & zemcik (2014) studied size and book-to-market ratio influence concerning Visegrad countries like the Czech Republic, Hungary, Poland, and Slovakia. Those results align with the US stock market as well as many other flourishing stock markets. The outcomes showed that size and value measured expected returns in Eastern Europe. As a result, they proceeded through the size of the area and book-to-market portfolios for a sum total Visegrad market. The returns on these portfolios had provided in the form of factors along with market portfolio.

Güzeldere & Saroglu (2012) also aimed to give validity analysis of the Fama and French three-factor model taken for the test in the Istanbul Stock Exchange-100 index. There was a detailed analysis of the monthly returns and sample of thirty-six firms was taken from the Istanbul market. The financial years selected were from 1999 to 2011. The empirical analysis was carried out by panel data and analysis method. The results depicted effective predictors by using the three-factor model to analyse the stock exchange market returns than CAPM. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5a}: Firm size is a significant predictor of firm stock returns.

Sadka & Sadka (2009) examined the earnings and the returns relation. They focused on the company-level and the aggregate-level variables. The authors hypothesized and gave consistent evidence for earning and return relation and declared it positive for

investment firms as earning is unpredictable and may be the investor dream for higher future gains.

Ball & Brown (1968) aimed to show the importance of information taken from the earning and revealed by the fiscal year or fiscal period. When the earnings were not announced, it was seen that data and information about total or aggregate earnings were announced in the prior year. There were certain implications for stock pricing and expected cash flows associated with the stock or asset. The authors concluded that there were two types of elements impacting on the prices by the cash flows and the discount rates. The higher earnings were always associated with risk factors and the investor demanded a lower rate of return. The results were implied on different stock prices and not exactly derived from a single factor.

Bordalo, Gennaioli, Porta & Shleifer (2017) analysed and reviewed the La Porta's (1996) research work on the stock returns aligning them with the long-term gains and examined the predictions of the optimistic analyst. The earnings were lower in the stocks having extreme pessimistic predictions. The history of growth and earning was forecasted by the analysts. They may overreact to certain situations related to more empirical and expected probability. There were strong reasons for predicting future by the analysts that they considered necessary for earnings growth. The mechanism or system created a difference in the Bayesian learning and adaptive prospects as adopted by the investors. There were helping inductions and supportive indication in the model that supposed to give a great explanation. The model included vital trading patterns, prospects, and profits.

Demirtas & Zirek (2011) analysed the predictions over the aggregate stock returns after taking 20 emerging markets as a sample. The results showed that the variables for prices were not mitigating the aggregate earnings through various predictable factors. On

the other hand, the authors also showed that there was covariance in the aggregate earning when statistical techniques were used with the market returns. There was no mean reversion for the stock prices. The stock prices were also not liable for predicting the strength of earning yield in emerging markets.

Huang *et al*. (2009) aimed to examine the relation between the earnings growth and the higher dividend pay-out ratio. The research also focused on the conventional wisdom. The higher cash flows and dividends may weaken the earnings. The future earnings growth must be aligned and there must be contradictory explanations to reach certain conclusions. The results showed that high payout ratio was positivity linked with the growth and earning. The patterns were used for future and various approaches of return momentum and also for the earnings growth. The outcomes also shared similar results as of previous studies had.

Demirtas & Zirek (2011) carried out a time series study on the predictability of aggregate stock returns over twenty emerging markets of the globe. The scholars considered aggregate earnings not being a standardized variable for stock price, rather a predictive variable. Contrary to the United States' aggregate level outcomes, this study found earning yields to forecast the aggregate stock returns. In addition, this study found covariance of aggregate earning with the returns of market. Hence, aggregate earning is not mere stock prices mean reversion responsible to forecast the earnings yield power.

Beaver, McNichols & Wang (2015) also analysed the earnings by dividing into the quarterly basis. The authors went for earnings announcements along with nonparametric techniques to analyse the real earning capability in the time period of 1997-2011. The results depicted the explicit evidence related to the earnings' announcements. The authors took data and information for particularly non-announcement periods. After 2001, the

applications of Sarbanes Oxley restructuring was undertaken. In the period of great depression, there was severe economic downturn observed by the authors and there was also serious downfall in the returns. There was cross-sectional deviation observed related to the stock market. The earnings announcements were directly linked with the profitability in the context of statistical values and found positive regression and correlation in the content information. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5b}: Earning growth rate is a significant predictor of firm stock returns.

Han, Subrahmanyam & Zhou (2017) examined a new relation in credit growth and the equity markets by examining the informational content of the credit spread and the structure of various models applied in the stock markets. The results declared that predictability was less apparent in financial and the stocks markets with the high company or firm ownership, analyst examining or coverage, liquidity and vice versa.

Weber (2015) research on the institutional ownership examined the proxy for short-term sale constraints. The results were used to show that cash flow and the return in the specified period was developing a negative relationship. There was also equity return considered as unconstrained stock. These were stable with models according to the author and were considered as rare catastrophes. This evidence was for small and large stocks, plus for valued and growth stocks.

Juambalvo, Rajgopal & Venkatachalam (2010) carried a study to find that with increase in institutional ownership, stock prices may reflect more information for current period, thereby providing prediction for future period of earnings. The scholars found significant relation between earning and price after controlling endogenous portfolio

selections of institutions (for example, institution investors can be attracted towards firms having rice environmental information with stock prices leading towards earnings.

Nagel (2004) argues that short-sale limitations have more probability to bind the stocks in a portfolio, which have less institutional ownership. Due to limitations of institutional, most of the expert investors never sell their stock in short term and can't make trade in the stock overpricing for which they don't have ownership. In addition, the supply of stock loan had tendency of sparse as well as short selling became expensive with lower institutional ownership. With the help of using proxy for institutional ownership, the scholars found that short-sale limitations help to explain anomalies of stock return. In specific, fixing firm size, the stocks' under-performance with higher market value to book value, analysts predict variance, volatility or turnover is more definite among stocks having less institutional ownership. In addition to it, the possessive investors' ownership with programs for larger lending of stocks partly overcomes this kind of under-performance revealing some aspects of supply for stock loan. The stock prices with less institutional ownership also under-react towards cash flows' bad news and over react towards cash flows' good news. Hence, results are consistent with the short-sale limitations short-sale limitations' idea, which held negative thoughts of these stock markets.

Cornett, Marcus, Saunders & Tehranian (2007) carried a research to examine the relation between large firms' operating performance and involvement of institutional investor. The scholars found a significant association between the returns of firm's operating cash flows and also with the stock institutional ownership ratio along with the sum of institutional stockholders. However, the results were held for only a part of institutional investors with less probability of firm relation with business. These outcomes

suggested the investors who have a business relationship with the firms where they invest, are compromised as monitors of the firm.

Yan & Zhang (2009) studied on the institutional investors and equity returns. The scholars showed positive relation among future stock returns and institutional ownership as supported from Gompers & Metrick (2001) study, which was determined by short-term institutions. In addition, the future stock returns were forecasted by the trading of short run institutional owners. This probability did not opposite in the long period of time and was stronger for growing and small stocks. The institutional trading at short run is s also positively correlated with the future unexpected earnings. In comparison to it, the trading of institutions for long run does not predict future returns. Moreover, it is also not connected to the news of future earnings. These outcomes were reliable with the perspective that institutions with short run news are more informed and they actively traded their information to reap best results.

Liang *et al*. (2011) researched on the association between firm performance and institutional ownership by using an unbalance data for panel regression. The data covered emerging market of Taiwan by adopting the framework of simultaneous equations to find out the presence of relationship over period of firm's life cycle. They found that institutional ownership is a predictor of firm performance, specifically at maturity. By means of dynamic specification, evidence seems to have lack of presence for ownership impacts over time. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5c}: Institutional ownership ratio is a significant predictor of firm stock returns.

Lee *et al*. (2012) argued that there were so many ways in which the return momentum impacted on the company performance level in Chinese real estate stocks. The quintile regression method was used by the scholars along with dummy estimator variables. There were high performance and low performing stocks with asymmetric phenomenon prevailing in the stock exchange markets on various perspectives. There were inconsistent results shown by the majority of previous studies. The results of this study also showed that high/ low performance was associated with the positive/ negative returns. There were robust calculations found in bullish or bearish markets. The authors recommended that there were two investment portfolios with more authenticity for real estate stocks markets.

Fama & French (2008) introduced the strategies for the profit that depended on the price momentum along with the earning and risk momentums. The dispersion of various factors like volatility, growth, capital investment etc. were taken by the authors by observing the worst rated stock in the stock exchange markets. The results were given with two types of rating on the size and anomalies. These factors were really strong to create rationality in various investment groups. The results advised for the firms with the profitability and also related them to the anomaly-based trading strategies. The worst rated companies were focused with the aim of short-term strategies for low value affects mitigation in the low rated stocks.

Walkshäusl (2014) aimed to find out the maximum return in the previous time period on the daily basis that was again expanded by taking historical data by Bali *et al*. (2011). According to the scholar, there was a strong and significant predictor of stock returns outside America. There are controlled variables in the stock exchange markets like market beta, firm size, B/M ratio, momentum returns, illiquidity, regression, correlation, means and variances, artificial variables and volatility of cash flows.

Wójtowicz & Czapkiewicz (2014) examined the portfolio returns and the cross-sectional variation by computing various deviations. The deviations explained by the variables were already declared by many authors as size, volume, value, marker and equity ratios etc. The return variations were first analysed by the authors through three-factor model. After that, the four-factor approach was used for more authentic return predictor in stock variation for profits. The stock exchange market of Warsaw (WSE) being the largest one in Europe depicted important predictors in return patterns by using the four-factor model as compared to three-factor model.

Lewellen (2011) focused on the addition of explanatory variables for generating better outcomes in the cross-sectional average returns and argued how to spread out the portfolios. The research was carried out by using three variables in the first step and then seven variables were joined with the three basic variables. The basic variables were size, book to market ratio, and the momentum that was joined with stock issued, past and present accruals, gains and growth of assets. In the third step, 8 more variables were added. These variables are not considered as to produce the gains expected by the investors. There were some factors or variables that were considered weak by the authors in the context of explanatory power in the regressions. The jump was to see the differences in the expected returns. The basic purpose was to add the variables to identify the stronger explanatory power. The Fama and French (2006) also explained regression model by constructing various steps of 2, 5, 7 and 9 explanatory variables.

Yao (2012) examined two significant strategies of stock trading: intermediate term momentum and long run contrarian. The author introduced two important stock trading strategies. The elements for long run were featured with the effect of common January size impact. The overreaction of the investor was rejected by various authors like DeBondt &

Thaler (1985). On the other hand, there was a study carried out by the Marx (2012) concerned with the return momentum and the autocorrelation by showing the larger performance of quarterly returns and momentum. This was observed by the strong January cross-sectional profitability. It was also suggested that the long-term contrarian was measured through higher deceptive. The quarterly momentum should be carried forward to the annual returns for the year.

Zaremba & Konieczka (2015) investigated characteristics and sources of size, momentum profits and value on the stock market of Poland. The research was carried out on the entire stocks of Warsaw Stock Exchanges over the period of 2001 to 2013 to find out-of-sample evidence on size premiums, momentum and value. It also explored the interdependences of the factors and also that factor premiums were existing after considering accounting for constraints related to liquidity. This study results that size premiums, momentum and value were present in the Polish market, though moderately. In addition, they supported each other; however they withdraw after accounting for liquidity and transaction costs.

Chen, Marx, & Zhang (2011) argued that a new factor model comprising market factor, return-on-equity factor and investment factor were better predictable of stock returns. The scholars further argued that firm will made huge investments with high profitability and low cost of capital. After controlling profitability, there is negative correlation of investment with expected returns. After controlling investment, there is positive correlation of profitability with expected returns. This three factor model decreases the abnormal returns magnitude for a large number of anomalies based strategies (trading). The performance of this model along with the economic intuition recommended that it can

be utilized to find expected results of the firms. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5d}: Momentum is a significant predictor of firm stock returns.

Jena *et al*. (2018) focused on explaining the relationship in the trading activities, the volume and interest on stock price. These were three (volume, interest and trading activities) most dominating elements for managers and investors as studied by (Copeland 1976; Shalen 1993). The author used stronger casualty test to measure the power of the different prospects of stock markets and returns. There was robustness in the results seen by the authors. There was a period of financial crises from 2008 to 2009 that split up the data. Therefore, the whole trading strategies were changed due to crises.

Shu (2012) was the first to carry study on the impact of institutional trading volume on financial stock market anomalies. The overall trading volume was measured through evaluation model. The percentage impact was examined for the volume of stock traded under institutions context. The impact was seen in the four stock markets anomalies. The four anomalies were price, value premium, post earning drift and investment anomaly.

Jegadeesh (1990) and Lehmann (1990) carried out their studies to predict the future returns and included the last predictions of various scholars in their research work to draw better conclusions about markers and their behaviours for investment and returns. Trading volume was able to do predictability as examined by the Conrad *et al*. (1994) in the context of profitability. Later on, the scholars like Datar (1998) also focused on the same discussion of future returns on investments.

Chen *et al*. (2013) looked at the stock returns that were collected from the individual trading and constructed the portfolio model of (Fama & MacBeth, 1973). The

authors categorized the regression techniques and drew various conclusions about the previous research of various authors. The results showed that there was not proper balance and also negative future predictors seen in individual trading for stock returns. There were biases related to various stocks. The individual investors experienced noise traders to a certain extent. The authors also used the principal component approach to explain that noise trading was not effective.

Fama & French (1996) explored the average and expected return on the stock returns and declared that these were associated with the company features like volume, earning, growth, price, cash returns, sales and purchase patterns, securities and holdings etc. The long and short term past average returns were also focused in the research. Due to this purpose, capital asset pricing model was used. The authors didn't ignore the so-called anomalies that may destroy the real aim of using three-factor model.

Bessembinder *et al.* (1996) carried out the study to see the relation in the trading volume and the derivatives. S&P 500 index was used as a base for finding empirical results. There was interest hidden in the use of proxy only for the trade opinion divergences. The results again depicted that trading volumes may be higher at the spot. The rising trend in interest rate will definitely drop one day as it was a common thing in stock exchange markets. The trading volume was closer to the information flows. There was discrepancy influence in the small stock and it was definitely higher than the small capitalization stocks. Market inclusive news had no explanatory power. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5e}: Trading volume is a significant predictor of firm stock returns.

Fama & French (2017) took North American, Asia Pacific and European markets to analyse the average stock returns. They also focused on the book to the market ratio for looking at the profitability. They found a negative relation in investment and the various important factors in Japan had a strong association in the returns and the book to market value. There was a declining trend seen in the profitability or investment. Fama & French (1993) worked on the three-factor model to see the trends of average returns. In the Fama & French (2015, 2016) research, the main problem of their model was not properly capturing the low returns of small stocks due to lower returns, rather the companies invested aggressively. It was found that just Japan market was decreasing in size due to the absence of momentum returns. There was a new start in the big and small financial stocks and there was no positivity due to spread in average momentum returns. The research focused on the empirical assets related pricing models and investigated how they captured the momentum patterns along with the value. There was an average return seen in all three international markets. The second thing was that the asset pricing showed four regions that were integrally influenced. The authors declared that the test didn't support the integrated pricing in the regions. The local models in each market utilised the local returns for safely managing the portfolios and local average return. The size and value always influenced on the growth and return along with the safe description. It was also concluded that the local models had less effectiveness. Therefore, investors should keep the focus on the momentum and portfolio constructed in local markets.

Cakici, Fabozzi & Tan (2013) studied the impact of value and momentum in eighteen stock markets of Eastern Europe from 1990 to 2011. The portfolios were sorted on the basis of size and B/M ratio. The authors used the famous factor models. The lagged momentum was observed in the market of United States. According to research, local factors were more effective for the emerging markets.

Nguyen et al., (2019) this study aims at assessing the risk–return profile of stock portfolios by different levels of the foreign ownership ratio. The paper also evaluates the performance of portfolios by their size and the book-to-market ratio (BTM). In this study, we apply GMM approach with the data computed from stock-related database in Ho Chi Minh Stock Exchange and Ha Noi Stock Exchange for the period 2010–2017. Our findings reveal a pronounced foreign ownership impact, whereby the increase in the foreign ownership ratio results in the upturn in stocks' liquidity, return and size but also brings about the higher risk for stocks.

Cohen *et al*. (2003) aimed to view the cross-sectional variation of company book-to-market ratios in the United States market in addition to in the international market. The authors used time series for calculating results on the temporary cross-sectional differences. It was observed that fifteen years stock returns showed lower 20 to 25% variation in the overall variance. There was a value-minus-growth strategy applied to compute the expected returns. The strategy showed results when speed over the book-to-market ratios that was wider at the time of research.

Shafana *et al*. (2013) aimed to review the expected stock behaviour in the company featured with the company size and book to market equity. The market chosen was Milanka Price Index and time period was taken from 2005-2010. In the stock returns, there was notable negative influence in the book to market ratio. The authors didn't bother with the impact of size on stocks returns. These impacted on the decision making power of investors. The scholars argued there is no direct link in the company size and return and identified a negative relationship for a book to market stock and return.

Chen & Lee (2013) examined the market structure and the differences in the equity returns and found the relation in the default risk with the equity in emerging markets of the

world. Vassalou & Xing (2004) also conducted similar research to analyse the option pricing technique to cover the default risk process that was also explained in the earlier literature of Merton (1973) model. The results of the study were: first of all, empirical results indicated that there were necessary adjustments for the liquidity related to the default results. Secondly when size and volume were decided or measured without set pattern for the default results. The book to market ratio was also used for all levels.

Da & Gao (2010) argued that their results showed the difference in the returns and default risks. There was no similarity in high and low default risks. The time period and related adjustments were very important in the first month. Results depicted that interpretation of B/M ratio for a major portion of the default risk was vital to explain the equity returns. There was no influence of liquidity and returns on equity. This research was also carried out on the stock exchange market of Taiwan to see the market liquidity and default risks.

Griffin & Lemmon (2002) also tried to explain the relation in default risk and the returns by taking the B/M ratio. The study was conducted for the emerging markets that were more sensitive to the multifaceted relationship between default risk and equity returns.

Jiang (2007) also aimed to explain the strong association between the performance of firms and the BM ratio effect. The results were consistent with the results given by Daniel & Titman (2006). They showed the positive impact of BM ratio and carried more focused research on the equity returns and the reversal patterns in stock exchange markets. Thus on the basis of above discussion, following hypothesis can be generated:

H_{5f}: Book to market ratio is a significant predictor of firm stock returns.

Vassalou & Xing (2004) also declared that there was no stable pattern of returns while specifically looking at the smaller size and higher book to market ratio. The authors selected the Taiwanese stock market. The results showed that the default risks may impact on the equity returns. The factors of stock exchange were analysed in the CAPM. The default risk never went with other price information. This finally gave information about the size, ratios and returns. The outcomes didn't help the test for asset pricing. The default risk introduced in the research study was a systematic risk. The three-factor model and Carhart four-factor models was significant predictor for the stock markets. The Taiwan market and the selected time period showed distress results of returns and depicted short-term reversals on the constructed portfolios.

Beneish, Lee & Nichols (2013) introduced effective accounting-based earnings that were controlled and based on revealing the model. Firms having high M-score (manipulation probability) earned less returns on decile portfolio categorized by book-to-market, accruals, short interest, size and momentum. The extrapolative power of M-score rooted from its capability to predict accrual changes. It is most stated among low-accrual stocks. The results assist the investment value of for forensic and fundamenal analyses among the firms publically listed.

Chai *et al*. (2013) analysed the use of the proxy for the stock liquidity and the impact of proxy over the stock returns. The authors also used Fama and French framework. They also followed the Carhart four-factor model. The liquidity was tested with asset pricing and liquidity factors. The empirical test was examination in Australia stock market. The scholars found that liquidity is the significant predictor of stock return variation after controlling book to market, momentum and size. The same factors were taken to examine the market. The authors recommended the results to the investors and stakeholders of the

market for the liquidity factor test and found that they normally impacted on the marginal explanatory power to contemporary asset pricing models.

Chiah *et al*. (2016) also followed the Fama & French (2015a) five-factor model by including the profits and gains on investment factors. There were less effective results related to returns seen in the already presented three-factor model in 1993. The use of a wider sample from the time period of 1982 to 2013 was done only to extract more authentic results. The aim was also to examine the level of performance of the five-factor model in Australia stock exchange market in the CAPM and asset pricing anomalies. The scope was seen in competitive asset pricing model. Certain things are underpinned in the model. The BM ratio and related factors have stronger explanatory power in the context of the investment and return momentum and factors. The results were stronger for development of alternative factor. The authors concluded that this model adds comparative evidence over financial and equity stock markets of the world.

Brailsford et *al*. (2012) aimed to give study about the value and investment strategies by looking at the fact that value stocks beat growth stocks. The portfolio group strategies were given with more reliable results. The authors used a variety of equity stocks to know about the features of size, BM ratio and return patterns. There was the difference in the return patterns and investment criteria in various stock markets. The distribution of stock was also different as many markets were well known for the illiquidity concerns along with the lower investment. Various scales of measuring investment were used in the use of portfolio construction were concluded by the authors. They used a value premium that was important for classification of stock due to the size and volume of the stock. The impact of size may vanish once the portfolios were according to the range of reasonable investment groups.

Li, Vassalou & Xing (2006) assessed the significance of information help by sector for investment growth to explain the equity returns of cross-section. It is proposed by the scholar that their empirical description outperforms the Cochrane's (1996), CAPM and Fama & French (1993) model to explain twenty five FF size-and book-to-market-sorted portfolios along with other test assets' set. The specified model explained the small sized and value premiums. Moreover, it is a significant predictor for growth of small portfolios extremely tough to be priced.

Charteris *et al*. (2018) also focused on the capital asset pricing model of Fama and French published in 1993. The three-factor model was considered more effective in most of the stock markets as compared to any other model. However, it was also unsuccessful to explain the momentum of returns. Moreover, it was also analysed that the Carhart's (1997) four-factor approach had some parameters or prediction power in this respect.

Balakrishnan (2016) focused on finding the definite anomalies when stock return patterns were demonstrated according to the size and momentum effects. He also examined the asset pricing model and grabbed the additional portfolios structured for the size to value and size to momentum variable analyses. The results stated that CAPM is not actual predictor of portfolios' average return.

Balakrishnan (2014) objective was to examine the ability of the alternative asset pricing models of CAPM. It explained the returns of firm size and value as significant predictors of stock returns. The early study of the return portfolios was ranked with various sets of variables. The empirical study based on 448 companies in the stock exchange from 1997 to 2012 was taken for a research study. The BSE-500 index results followed Fama and French three-factor model. The results found that three factor model was better than CAPM model in explaining excessive returns on sorted portfolios. CAPM gave a clear

view of the features in the constructed portfolios. Asset pricing results were relevant in the context of size and value and usage of various market proxies. The authors also used the Carhart four-factor model. It enhanced the worth of research study. Both long and short-term momentums were also discussed in the portfolio analyses. Thus on the basis of above discussion, following hypothesis can generate:

H_6: Firm or market level variables are significantly better predictors of firm stock returns

*2.5.*Literature GAP:

Three significant contributions have been made in literature: First, we provide a framework that can be used to organize different methods of estimating expected returns. The framework illustrates that these methods can be thought of as different approximations of a conditional expectation. This framework can be used to evaluate the relative pros of different techniques on simple metrics. Further argue that, within this framework, portfolio construction, regression and panel regressions are suited to evaluate the independent information in the entirety of many cross-sectional predictor variables and their possible relations. Additionally, to further validate the four-factor model, in Pakistani stock market context The fact that the momentum effect did not disappear may suggest that the factors involved in its creation are an indispensable part of the market, and this seems to undermine the commonly accepted hypothesis about the efficiency of capital markets. Chugatti & Hassan 2016; Hassan & Javed, 2012; Merło&Konarzewski2015; Mirza & Shahid 2008).

Second contribution in literature by this study is a certain assuming that returns on specific stocks has analytically lead-lag association that can produce positive expected returns (Lo & Mackinaly, 1990). Moreover, it constructs portfolios according to (DeFond

et al. 2007); Landsman *et al*. 2011). The assign according to type (large, medium, and small) of dissimilar firms' size, tv, ior and egr are divided into a nine (3x3) set portfolio, separately. After that VAR methodology is applied to estimate the results. Third, contribution in literature we apply our methodology to pool the data and we estimate overall, pre and post-financial crisis results by using fixed and random effect. After rigorous search no study could be found out that used these variables i.e. SIZE, TV, IOR, EGR, BMR and MOM to study the pre and post financial crisis variations Rehman &Gul (2017).

2.6.Conclusion

In short, this chapter lays down the theoretical foundation of predictors for portfolio returns in threefold. The first model is again divided into two sub-models in which first sub-model discusses price adjustment speed and another sub model discusses the lead-lag relationship. Therefore, the literature is explored to identify new knowledge, new techniques, new procedures and new outcomes derived from specific markets for studying the earnings growth rate as a significant predictor for price adjustment speed in portfolio returns. It also studies the size as a significant predictor of price adjustment speed in portfolio returns. Additionally, it studies the institutional ownership ratio as a significant predictor of price adjustment speed in portfolio returns. Lastly, it studies the trading volume as a significant predictor of price adjustment speed in portfolio returns. In the context of a lead-lag relationship; the relationships between earnings growth rate and portfolios return, size and portfolios return, the institutional ownership ratio and portfolios return and trading volume and portfolios return are studied. The second model of this study comprises three and four-factor models to predict the stock returns. Third and last model of this study comprises firm-specific and market level predictors of the stock returns. In the context of methodology, this study uses vector –auto- regression model for the first model,

regression for the second model and panel data for the third model. More precisely, the two sub-groups of first model use error correction model and lead-lag relationship VAR model, respectively.

CHAPTER 3
METHODOLOGY AND DATA DESCRIPTION

3.1 Methodology and Data Description:

3.1.1 Methodology

3.1.1.1 Introduction

To find out the answer of the problem statement and set proposed objectives specified in the introduction chapter, empirical study based on firm and market level "Predictors of firm and portfolio level returns in Pakistan equity market". This chapter provide the data and methods used to find the answer to the problem statement of the study. This chapter provide first discuss the research design and its importance for current study. Next, this study provides detail discussion the population and sampling selection criteria used to compute the estimation of this study. For the justification of the sample size and sample selection criteria references have been provided in the study. The sources from where the data have been collected, the methods of data collection, measurement models and the operational definition of variables have been added. The statistical tests and the software used for testing the hypothesis have been added at the end of the chapter.

From the co-integration and VECM, the Granger causality test which was first formulated by Granger (1969), is used to interpret whether one factor may be influential in another factor's future value. The regression model is estimated using linear Ordinary Least Square (OLS) procedure and has been tested in a number of studies to forecast excess returns as applied by Ferson & Korajczyk (1995), Stambaugh (1999), Cochrane & Piazzesi (2005), Rapach & Wohar (2006) and Pastor & Stambaugh (2009).An alternative approach that is widely used is cointergration analysis which was initially proposed by Granger (1986) and subsequently enhanced by Johansen (1991) and is a well-established

methodology when testing long run relationships among variables. A finding of cointergration amongst the variables over an extended period of time implies the existence of a long run relationship as they share a common trend. If it exists, one is able to determine the relationship amongst these variables by using a vector error correction model (VECM). From the cointegration and VECM, the Granger causality test which was first formulated by Granger (1969), is used to interpret whether one factor may be influential in another factor's future value. VAR models in economics were made popular by Sims (1980). The definitive technical reference for VAR models is Lütkepohl (1991), and updated surveys of VAR techniques are given in Watson (1994) and Lütkepohl (2013) and Waggoner & Zha (1999).

On the basis of its theoretical advantages, the Arellano Bond estimator has been chosen in favor of the Blundell–Bond estimator. To address the possibility of endogeneity in the models Arellano and Bond develop the difference GMM model by differencing all regressors and employing Generalized Method of Moments (Hansen, 1982), Arellano & Bond (1991) have suggested a consistent and efficient estimator for short panels based on the first difference of the dynamic model).Further, the approach also envisages appropriate specification like the diagnosis test of the final model so that the data analysis does not produce misleading inferences owing to any probable inappropriate specification. This leads to the use of Sargan test and Arellano Bond Serial correlation test.

The purpose of this section is to describe the econometric techniques that are available for use in the study. Using Panel Data analysis (PDA), the models like Fixed Effects, Random Effects for Static PDA and Generalized Method of Moments (GMM) technique for Dynamic PDA have been used for the estimation of the data. Hsiao & Tahmiscioglu (1997) argue that pooling data, using appropriate estimation techniques, and

grouping individuals according to certain *a priori* criteria can help overcome heterogeneity problem. However it is rather difficult to establish exogeneity between the regressors and error term especially in company financial data and therefore the direction of causality between variables might be ambiguous because of the potential endogeneity. Consequently, the contemporaneous data for both dependent variable and its determinants may cause spurious results. In financing literature the endogeneity problem is either largely ignored or corrected for only using fixed effects or control variables approach. The researcher controls this important problem by employing GMM technique to avoid significant bias in estimates.

Size, IOR,MOM and TV first chek the stationarity of the data.The data are stationary at first difference,further move to next step to apply VAR model on the data series.Corporate finance researchers acknowledge at least two potential sources of endogeneity: unobservable heterogeneity and simultaneity. However, one source of endogeneity that is often ignored (explicitly or implicitly) arises from the possibility that current values of variables are a function of past (Wintoki, Linck & Netter, 2012). This study Generalised Method of Moment to explain this issue because independent variables in this study are more likely to be correlated with each other.

3.2 Research Design

This chapter presents a general layout of how the researcher will answer the researched questions and achieve the research objectives. The source of the data, methods of the data collection, sample size, sampling technique and methods for analysing the data have been discussed (Saunders, Saunders & Thornhill, 2011). Similarly research design which provides details of the process to be followed for conducting the research (Sreejesh,

Mohapatra & Anusree, 2014) has also been added. The research design of the study is based on the research objectives formulated and the research questions rose. This study is explanatory in nature and the approach used in the study is deductive in nature. Secondary data are collected from Yahoo finance, Business Recorder, and State Bank of Pakistan; a well-known data stream in Pakistan. The firms selected for this study are listed on Pakistan Stock Exchange (PSX); the only stock exchange of Pakistan after the merging the previously three stock exchanges including Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE). The convince sampling technique use to data collection.

The time from January 2008 to May 2009 is excluded due to the financial crisis around the world. During this time, first Pakistan stock exchange remained freeze and then there was very high volatility therefore, observations of this time are excluded from the final sample. Market efficiency theory stated that the market is efficient but in the financial crisis, the period market suffers financial distress. Therefore, this time is excluded in the final sample.

3.3 The population of the Study

Model 1	Model 2	Model 3
Portfolio Level Approach. Sixteen Years of Historical Data. Non-Financial Sector Firms Listed on PSX. 637 firms listed on PSX at the end of June 1999. Earnings Growth Rate Model by using VAR.496 firms were from the non-financial sector, which comprises the target population of this study.	Portfolio Level Approach. Sixteen Years of Historical Data. Non-Financial Sector Firms Listed on PSX. 637 firms listed on PSX at the end of June 1999. Earnings Growth Rate Model by using VAR.496 firms were from the non-financial sector, which comprises the target population of this study.	Portfolio Level Approach. Sixteen Years of Historical Data. Non-Financial Sector Firms Listed on PSX. 637 firms listed on PSX at the end of June 1999. Earnings Growth Rate Model by using VAR.496 firms were from the non-financial sector, which comprises the target population of this study
Time Frame from July 1999 to December 2015. One-quarter previous value i.e. April-June quarter is taken to calculate returns for the first quarter i.e. July-September quarter. Exclude the data of firms with negative BM ratios.	Time Frame from July 1999 to December 2015. One-quarter previous value i.e. April-June quarter is taking to calculate returns for the first quarter i.e. July-September quarter. Exclude the data of firms with negative BM ratios.	Time Frame from July 1999 to December 2015. One-quarter previous value i.e. April-June quarter is taking to calculate returns for the first quarter i.e. July-September quarter. Exclude the data of firms with negative BM ratios.

Firms are selected whose stocks are traded on the stock market for at least one quarter to calculate the stock returns. Construct a portfolio at time t0 i.e. for the first quarter.	Firms are selected whose stocks are traded on the stock market for at least one quarter to calculate the stock returns. Construct a portfolio at time t0 i.e. for the first quarter.	Firms are selected whose stocks are traded on the stock market for at least one quarter to calculate the stock returns. Construct a portfolio at time t0 i.e. for the first quarter.

3.4 Sample Selection Criteria Model 1,2,3

	Model 1	**Model 2**	**Model 3**
Sample Selection	Data used in this study is collecting in two sub-sample periods i.e. from June 1999 to December 2007 and June 2009 to December 2015. Firms with at least five years of data are included in the final sample. The time from January 2008 to May 2009 is excluding due to financial crisis around the world. During this time, first Pakistan stock	Data used in this study is collecting in two sub-sample periods i.e. from June 1999 to December 2007 and June 2009 to December 2015. Firms with at least five years of data are included in the final sample. The time from January 2008 to May 2009 is excluding due to financial crisis around the world. During this time, first Pakistan stock	Data used in this study is collecting in two sub-sample periods i.e. from June 1999 to December 2007 and June 2009 to December 2015. Firms with at least five years of data are included in the final sample. The time from January 2008 to May 2009 is excluding due to financial crisis around the world. During this time, first Pakistan

	exchange remained freeze and then there was very high volatility therefore, observations of this time are excluded from the final sample.	exchange remained freeze and then there was very high volatility therefore, observations of this time are excluded from the final sample.	stock exchange remained freeze and then there was very high volatility therefore, observations of this time are excluded from the final sample.
Classi-fication	**Three Factor Model:** Further, divided into two groups 180 firm large-cap (market capitalization) and 180 companies in the small-cap (market capitalization). Next step, to take large-cap 180 firms further divide into three groups according to Fama& French (1992) assign weights B-H, 30% B-M 40% B-L30 %. According to the above large-cap classification into three groups 54 B-H firms, 72 B-M firms and 54 B-L firms. Next step, to small-	Further, divided into two groups 170 firm large-cap (market capitalization) and 170 companies in the small- cap (market capitalization). Next step, to take the large-cap 170 firms further divided into three groups according to Carhart (1997) and Fama & French (1992) assign weights Higher Earnings, 30% Medium Earnings 40% Small Earnings 30 %.According to the above large-cap classification into nine groups 51 HSHE, HSME and HSSE firms, 68	A total of 496 non-financial firms are part of the population but after data screening, some firms are excluded leaving 363 firms which are used in the final sample. Since quarterly data are used for this study, therefore, the final sample comprises of 22,134 observations. Out of these 11,970 observations are from the July 1999 to December 2007 period while 10,164 observations are from the

cap 180 firms further divide into three groups according to Fama & French (1992) assign weights B-H, 30% B-M 40% B-L30 %. According to the above small-cap classification into three groups 54 S-H firms, 72 S-M firms and 54 S-L firms. After that, take an average for six portfolios and get one value for- every six portfolios. A further difference between three small portfolios and three big portfolios and divided by three to get SMB value. To get the value HML further step to take S-H, B-H minus S-L and B-L.	MSHE, MSME and MSSE firms and 51 SSHE, SSME and SSSE firms. Next step, to small-cap 170 firms further divide into three groups according to DeFond et al. (2007) and Landsman et al. (2011), Fama & French (1992) and Carhart (1997) assign weights HSHE, HSME and HSSE, 30% MSHE, MSME and MSSE 40% SSHE, SSME and SSSE 30 %.According to the above small-cap classification into three groups 51 HSHE, HSME and HSSE firms, 68 MSHE, MSME and MSSE firms and 51 SSHE, SSME and SSSE firms. After that, take an average for nine portfolios and get one value for every nine portfolios. For taking	July 2009 to December 2015 period.

	a difference between higher earnings minus small earnings to get HMSE value the above procedure use to subsequent whole quarters.
Four Factor Model:	
Further, divided into two groups 180 firm large-cap (market capitalization) and 180 companies in the small- cap (market capitalization). Next step, to take large-cap 180 firms further divide into three groups according to Carhart (1997) assign weights Winner, 30% Neutral 40% Loser 30 %. According to the above large-cap classification into six groups 54 BHW and BHL firms, 72 BMW and BML firms and 54 SLW and SLL firms. Next step, to the small-cap 180 firms further divide into three groups according to Carhart (1997) assign weights SHW and SHL, 30% SMW and SML 40% SLW and SLL 30 %. According to the above small-cap classification into three groups 54	

SHW and SHL firms, 72 SMW and SML firms and 54 SLW and SLL firms. After that, take an average for twelve portfolios and get one value for every twelve portfolios. The winner minus loser factor is computed as the return sorted out positive and negative; assume that positive return as a winner and negative return as a loser after that average of positive and negative return as a winner and loser portfolio.

3.5 Portfolio Construction Criteria

3.5.1 Calculation Criteria of Market Premium SMB, HML and Momentum Factors:

Portfolio construction method used of the study is similar as proposed by (Chen *et al*. 2014; Chordia & Swaminathan 2000; DeFond *et al*. 2007; Fama & French 1996; Jegadeesh & Karmakar 2010; Landsman *et al*. 2011; Livnat 2006a, 2006b). To measure the size of firm, natural log of market capitalization is used as a proxy. For market capitalization market price per share is multiplied with the number of common shares outstanding at the end of each quarter for each firm. Book-to-market (BM) ratio is calculated by shareholder equity divided by market capitalization/ market value of equity (BVE/MVE) for each quarter of the sample firms. The stocks are then ranked and categories into three Book-to-market groups based on the break points of bottom 30% classified as low(L), middle 40% classified as Medium(M) and top 30% classified as high(H). Six portfolios are formed on the intersection of two size and three book-to-market

portfolios. The six portfolios are B/H, B/M, B/L, S/H, S/M and S/L. B/L portfolio, for example, contains stocks that are of big size firms and have low Book-to-Market ratio. S/H portfolio, similarly, contains stocks that are small size firms and have high book-to-market ratio. The other portfolios are also formed on the same criteria.

The factors SMB and HML are constructed on the basis of capitalization and book-to-market ratio while Momentum factor is constructed on the basis of winner minus loser by using quarterly log returns. We define factors in a similar manner as Carhart (1997) and Fama & French (1996) with slightly modifications mainly due to number of securities in our data-set. Market premium of returns are taking difference between market premium and treasury bill rates. In order to create the fourth factor, winner minus loser (WML), all stocks are divided into three groups (losers, neutral and winners) according to their past quarter returns to the portfolio formation moment. Because our data starts from July 1999 thus first momentum portfolios are formed for the quarter ended on June 1999. The loser's portfolio contains 30% of the stocks with the lowest last quarter returns, while 30% of stocks with the highest past quarter returns are assigned to winner's portfolio and the remaining 40% of stocks are included in the neutral portfolio. Then similar to the previous procedure, these portfolios are independently sorted on size & momentum and value & momentum which result in twelve portfolios i.e.
$(BHW, BMW, BLW, SHW, SMW, SLW, BHL, BML. BLL, SHL, SML, SLL)$. The winner minus loser factor is computed as the return sorted out positive and negative; assume that positive return as winner and negative return as loser after that average return of positive and negative return as winner and loser portfolio. The $market\ premium\ of\ return$ $BHW, BMW, BLW, SHW, SMW, SLW, BHL. BML, BLL, SHL, SML\ and\ SLL$ of the market portfolio return are taken as the difference between quarterly Treasure bill rate. At the end

of each quarter, stocks with a positive book value are divided into twelve groups for future classification.

3.5.2 Calculation Criteria of Size, Institutional Ownership Ratio, Earning Growth Rate and Trading Volume:

This study uses VAR to analyse high size portfolios (HS) with different earnings growth rates including size, ior, egr and tv. It is difference between return of higher earnings growth minus small earning growth rate. Aforementioned dissertation purpose assign according to type such as HS categorize larger size portfolio, MS categorize medium size, and SS categorize smaller size. After that stock to lower place portfolio are more categorized into three types based on earning growth rates. Next step, to earnings portfolio assign according to type such as HEGR categorize larger earnings, MEGR categorize medium earnings, and SEGR categorize smaller earnings. Hence, it allocated the stocks constructed on size and earnings growth rates; within nine portfolios (3×3). The portfolio assigns according to type such as HSHEGR categorize larger size and larger earnings growth rate, HSMEGR categorize larger size and medium earnings, SSEGR categorized smaller size and smaller earnings. In the same way, the portfolio assigns according to type such as HTV categorized larger trading volume, MTV categorize medium trading volume, and STV categorized smaller trading volume. Similarly, the portfolio assigns according to type such as HIOR categorized larger institutional ownership ratio, MIOR categorize medium institutional ownership ratio, and SIOR categorized smaller institutional ownership ratio.

Market risk premium is assessed so:

$RP_t = R_{mt} - R_f$ ….. (15)

In equation SMB show the returns in risk premium associated with firm size. The equation calculated as average returns of the equal weighted three small markets capitalization portfolio minus three big market capitalization portfolios. Analytical written as:

$SMB = 1/3[{}^{S}/_{L} + {}^{S}/_{M} + {}^{S}/_{H}] - [{}^{B}/_{L} + {}^{B}/_{M} + {}^{B}/_{H}]$ …. (16)

In equation HML show the returns in risk premium associated with firm value. The equation measured as the return on portfolio of high book to market ratio stocks minus return on a portfolio of low book to market stocks, created numerical unbiassed regarding size. Analytical written as:

$HML = 1/2[{}^{S}/_{H} + {}^{B}/_{H}] - [{}^{S}/_{L} + {}^{B}/_{L}]$ …..(17)

WML accounts for momentum that is related to past returns. It is the difference between return on a winner portfolio and return on a loser portfolio. Mathematically

$\text{WML} = \frac{1}{6}(\text{BHW} + \text{BMW} + \text{BLW} + \text{SHW} + \text{SMW} + \text{SLW}) -$ -

(BHL+BML+BLL+SHL+SML+SLL) …..(18)

The winner minus loser factor is computed as the return sorted out positive and negative, assuming positive return as winner and negative return as loser, hence the difference between the two gives winner minus loser or momentum measure. The $market\ premium\ of\ return$

$BHW, BMW, BLW, SHW, SMW, SLW, BHL. BML, BLL, SHL, SML\ and\ SLL$ are taken by the difference between quarterly Treasure bill rates. Finally, separately to each quarter, stocks through a positive book value are divided into twelve groups.

$HMSE = \frac{1}{18}(HSHE + HSME + HSSE + HTVHE + HTVME + HTVSE + HIORHE +$

$HIORME + HIORSE + HEGRHE + HEGRME + HEGRSE) - (MSHE + MSME +$

$MSSE + MTVHE + MTVME + MTVSE + MIORHE + MIORME + MIORSE +$

$MEGRHE + MEGRME + MEGRSE) - (SSHE + SSME + SSSE + STVHE + STVME +$

$STVSE + SIORHE + SIORME + SIORSE + SEGRHE + SEGRME + SEGRSE$

Where ….. (19)

$HSHE$ Firm is higher size and firm with higher earnings.

$MSHE$ Firm is medium size and firm with higher earnings.

$SSHE$ Firm is smaller size and firm with higher earnings.

$HEGRHE$ Firm is higher earnings growth rate and firm with higher earnings.

$MEGRHE$ Firm is medium earnings growth rate and firm with higher earnings.

$SEGRHE$ Firm is smaller earnings growth rate and firm with higher earnings.

$HIORHE$ Firm is higher institutional ownership ratio and firm with higher earnings.

$MIORHE$ Firm is medium institutional ownership ratio and firm with higher earnings.

$SIORHE$ Firm is smaller institutional ownership ratio and firm with higher earnings.

$HTVHE$ Firm is higher trading volume and firm with higher earnings.

$MTVHE$ Firm is medium trading volume and firm with higher earnings.

$STVHE$ Firm is smaller trading volume and firm with higher earnings.

$HSSE$ Firm is smaller size and firm with smaller earnings.

$MSSE$ Firm is medium size and firm with smaller earnings.

$SSSE$ Firm is small size and firm with smaller earnings.

$HEGRSE$ Firm is higher earnings growth rate and firm with smaller earnings.

$MEGRSE$ Firm is medium earnings growth rate and firm with smaller earnings.

$SEGRSE$ Firm is smaller earnings growth rate and firm with smaller earnings.

$HIORSE$ Firm is higher institutional ownership ratio and firm with smaller earnings.

$MIORSE$ Firm is medium institutional ownership ratio and firm with smaller earnings.

$SIORSE$ Firm is smaller institutional ownership ratio and firm with smaller earnings.

$HTVSE$ Firm is higher trading volume and firm with smaller earnings.

$MTVSE$ Firm is medium trading volume and firm with smaller earnings.

$STVSE$ Firm is smaller trading volume and firm with smaller earnings.

3.6 Data Sources and Data Collection Methods

The past statistics attained as of the information system of the Yahoo Finance, Business Recorder, and balance sheet & financial statements analysis data of State Bank of Pakistan, a leading database and a well-known data stream in Pakistan.

3.7 Variables and their Operational Definitions

3.7.1 Variables Operational Definitions

3.7.1.1 Size

To measure the size of firm, natural log of market capitalization is used as a proxy. For market capitalization market price per share is multiplied with the number of common shares outstanding at the end of each quarter for each firm. Banz (1981) describe the market equity ME (stock price multiple by shares outstanding) market value is used as proxy of market equity by taking the natural logarithm to end of quarter *t*-1 for each stock (Cakici & Topyan, 2013; Chen & Lee, 2013; Chen *et al*., 2013; Fama & French, 1992).

3.7.1.2 Trading volume

Trading volume is defined as the natural log of number of common shares traded each quarter similar to (Chordia & Swaminathan 2000; Chen *et al*. 2013).

3.7.1.3 Institutional ownership ratio

Institutional ownership ratio is defined as per the sum of shares held by institutional investors divided through total sum of common shares outstanding. The institutional ownership ratio is the percentage of stock shares owned by institutional investors at the end of the quarter as used by different researchers including (Sias *et al*. 2006; Chen *et al*. 2014;

Demiralp *et al*. 2011; Nofsinger & Sias 1999). Nagel (2005) also uses this proxy by considering the percentage of shares owned by institutions. Gompers & Metrick (2001) use change in institutional ownership ratio calculated as % of stock i held by institution at time t minus % of stock i held by institution at time t-1. Weber (2015) calculated the institutional ownership ratio (IOR) by first summing the holdings of all reporting institutions at the security level and then dividing by the total shares outstanding. Qiu (2009) instead calculated the change in institutional ownership as the number of institutions holding stock i at time t minus the number of institutions holding stock i at time t-1 divided by number of institutions holding stock i at time t-1.Our study use this method Institutional ownership ratio as the number of shares held by institutional investors divided by the total number of common shares outstanding.

3.7.1.4 Earnings growth rates

For earnings growth rate the ratio of current quarter's net income ($N.I_{it}$) with previous quarter's net income ($N.I_{it-1}$) is used as a proxy. Earnings growth rate is the change in earnings from the previous quarter divided thru the earnings of the earlier quarter (Jegadeesh & Livnat, 2006a; Chen *et al*., 2013). Net income values are used for this purpose. There are different variations of earnings used by researchers but in this study, we use the percentage change in the net income as per a proxy for earnings growth rate. Aforementioned is persistent with practise by (Jegadeesh & Livnat 2006a; Chen *et al*. 2013).

3.7.1.5 MOM (Momentum)

Momentum is defined as winners' minus losers' firm stocks portfolios returns (Carhart, 1997; Fama & French, 1998). All stocks are divided into three groups/ portfolios (losers, neutral and winners) according to their returns. Since quarterly data are used for this study and our data sets start from July 1999 thus first portfolios for momentum are

formed at the start of the previous quarter. The stocks cover 30% loser and 30% winner and the remaining 40% stocks are part of the neutral portfolio.

In this study book value of equity (BVE) is calculated as total assets minus total liabilities and preferred equity (if any). Then this value is divided by the total number of common shares outstanding to get the book value per share. For market value per share the closing price of the stock, at the end of each quarter, is used. The ratio of B/M is then calculated for each firm at the end of respective quarter. As mentioned above, the portfolios are independently sorted on size & momentum and book-to-market value & momentum resulting in twelve portfolios as follows:

$$(BHW, BMW, BLW, SHW, SMW, SLW, BHL, BML. BLL, SHL, SML, SLL).$$

The winner minus loser factor is computed as the stocks are sorted on returns as the highest, and lowest return portfolios; assume that the highest 30% stocks as winner and lowest 30% stocks as loser portfolios. The quarterly difference in the returns of the two portfolios (winner minus loser) is used as proxy of momentum. The different author argument about momentum effect is detected when portfolios are created on the base of returns on or after the prior 12 months (Jegadeesh, 1990; Jegadeesh & Titman, 1993; Szyszka, 2006). However, quarterly portfolios are used and hence portfolios are arranged quarterly base starting from July 1999. This procedure for capturing momentum effect is consistent with previous literature (Lam, Li &So 2009); Lieksnis 2011; Haung (2015). The return premium of

$$BHW, BMW, BLW, SHW, SMW, SLW, BHL. BML, BLL, SHL, SML \; and \; SLL$$

portfolios are taken by the difference between each portfolio quarterly returns and the quarterly rate of Treasury bill. This study uses Carhart (1997) and Fama & French (1998) procedure to calculate momentum.

3.7.1.6 Book-to-market ratio

In this study book value of equity (BVE) is calculated as total assets minus total liabilities and preferred equity (if any). Then this value is divided by the total number of common shares outstanding to get the book value per share. For market value per share the closing price of the stock, at the end of each quarter, is used. The ratio of B/M is then calculated for each firm at the end of respective quarter. We also delete the data of firms with negative BM ratios using Chen *et al.,* (2014) and Weber (2015) procedure. Cakici & Topyan (2014), Fama & French (1992), Chen & Lee (2013), and Lewellen (2011) take natural log of book to market value for individual firms. Weber (2015) defined book equity (BE) as total stockholders' equity plus deferred taxes and investment taxes credit (if available) minus the book value of preferred stock. Based on availability, Weber (2015) used the redemption value, liquidity value, or par value (in that order) for the book value of preferred stock. Weber (2015) preferred the shareholders equity number as per stated thru COMPUSTAT. If these figures are not obtainable, then he calculated shareholders' equity as per the sum of common and preferred equity. If neither of the two is accessible, then Weber defined shareholders' as the difference between total assets and total liabilities. In this study, as the availability of data is constraint therefore, we use the last procedure defined be Weber to calculate the book value of equity i.e. total assets minus total liabilities.

3.7.1.7 Stock Returns

The quarterly continuously compounded rate of return is used to estimate the return aimed at appropriate duration as:

$$R_t = l_n \, P_{t/P_{t-1}} \ldots\ldots (20)$$

So 'R_t' is the continuous compounded return for 't' is time period and P_t/P_{t-1} is the current quarter stock price divided by previous quarter stock price and then taking its natural log denoted by 'ln'.

3.8 Model 1

Following are the econometric equations/ empirical models to test the hypotheses of this research.

$R_i = R_{F+}\beta_i^{mkt}RMRF+\beta_i^{size}SMB+\beta_i^{value}HML+\beta_{WML}i\ WML_t+\mu_i t$ ….. (13)

SMB= ''the return to small stocks - the return to large stocks".

B^{size}= ''the sensitivity of security i to movements in small stocks".

HML= ''the return to value stocks - the return to growth stocks".

B^{value}= ''the sensitivity of security i to movements in value stocks".

WML (*t*) = ''the difference between the month *t* returns on diversified portfolios of the winners and losers of the past year. This model will predict firm-level stock returns".

3.9 Model 2

The VAR model equation of *HSHE–HSSE* portfolio return is specific as per below

$$HSHE_{t=} \propto_t + \sum_{k=1}^{n} \propto_{1j} HSHE_{t-k} + \sum_{k=1}^{n} \propto_{2k} HSME_{t-k} + \sum_{k=1}^{n} \propto_{3k} HSSE_{t-k} + \mu_{1t} \ldots..(1)$$

$$HSME_{t=} \gamma_t + \sum_{j=1}^{n} \gamma_{1j} HSHE_{t-j} + \sum_{j=1}^{n} \gamma_{2j} HSME_{t-j} + \sum_{j=1}^{n} \gamma_{3j} HSSE_{t-j} + \mu_{2t} \ldots.. \quad (2)$$

$$HSSE_{t=} \delta_t + \sum_{j=1}^{n} \delta_{1j} HSHE_{t-j} + \sum_{j=1}^{n} \delta_{2j} HSME_{t-j} + \sum_{j=1}^{n} \delta_{3j} HSSE_{t-j} + \mu_{3t} \ldots.. \quad (3)$$

$$HTVHE_{t=} \varphi_t + \sum_{k=1}^{n} \varphi_{1j} HTVHE_{t-k} + \sum_{k=1}^{n} \varphi_{2k} HTVME_{t-k} + \sum_{k=1}^{n} \varphi_{3k} HTVSE_{t-k} + \mu_{1t} \ldots. \quad (4)$$

$$HTVME_{t=} \psi_t + \sum_{j=1}^{n} \psi_{1j} HTVHE_{t-j} + \sum_{j=1}^{n} \psi_{2j} HTVME_{t-j} + \sum_{j=1}^{n} \psi_{3j} HTVSE_{t-j} + \mu_{2t} \ldots.. \quad (5)$$

$$HTVSE_{t=} \chi_t + \sum_{j=1}^{n} \chi_{1j} HTVHE_{t-j} + \sum_{j=1}^{n} \chi_{2j} HTVME_{t-j} + \sum_{j=1}^{n} \chi_{3j} HTVSE_{t-j} + \ldots.. \quad (6)$$

$$HIORHE_{t=} \rho_t + \sum_{k=1}^{n} \rho_{1j} HIORHE_{t-k} + \sum_{k=1}^{n} \rho_{2k} HIORME_{t-k} + \sum_{k=1}^{n} \rho_{3k} HIORSE_{t-k} + \mu_{1t} \ldots \quad (7)$$

$$HIORME_{t=} \omega_t + \sum_{j=1}^{n} \omega_{1j} HIORHE_{t-j} + \sum_{j=1}^{n} \omega_{2j} HIORME_{t-j} + \sum_{j=1}^{n} \omega_{3j} HIORSE_{t-j} + \mu_{2t} \ldots. \quad (8)$$

$$HIORSE_{t=} \delta_t + \sum_{j=1}^{n} \delta_{1j} HIORHE_{t-j} + \sum_{j=1}^{n} \delta_{2j} HIORME_{t-j} + \sum_{j=1}^{n} \delta_{3j} HIORSE_{t-j} + \mu_{3t} \ldots.. \quad (9)$$

$$HEGRHE_{t=} \gamma_t + \sum_{k=1}^{n} \gamma_{1j} HEGRHE_{t-k} + \sum_{k=1}^{n} \gamma_{2k} HEGRME_{t-k} + \sum_{k=1}^{n} \gamma_{3k} HEGRSE_{t-k} + \mu_{1t} \ldots.(10)$$

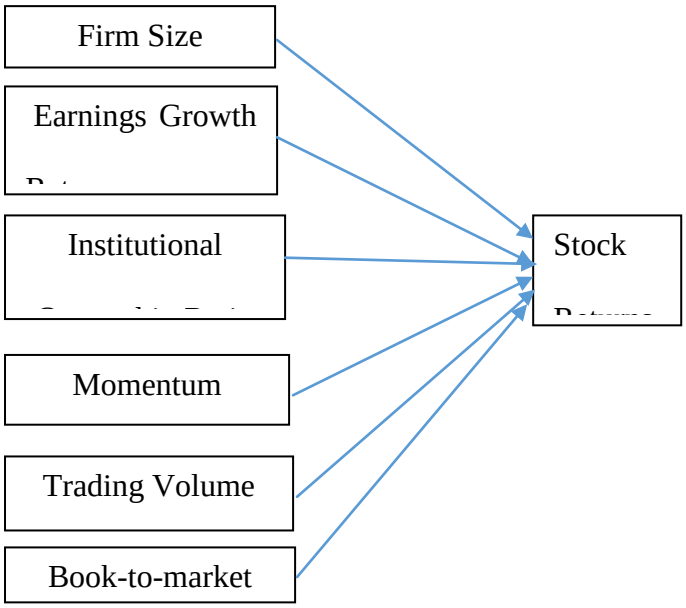
$$HEGRME_{t=} \omega_t \sum_{j=1}^{n} \omega_{1j} HEGRHE_{t-j} + \sum_{j=1}^{n} \omega_{2j} HEGRME_{t-j} + \sum_{j=1}^{n} \omega_{3j} HEGRSE_{t-j} + \mu_{2t} \ldots. \quad (11)$$

$$HEGRSE_{t=} \varphi_t +$$

$$\sum_{j=1}^{n} \varphi_{1j} HEGRHE_{t-j} + \sum_{j=1}^{n} \varphi_{2j} HEGRME_{t-j} + \sum_{j=1}^{n} \varphi_{3j} HEGRSE_{t-j} + \mu_{3t} \ldots..(12)$$

Figure 1: Firm and Market Level Return Predictors

3.10 Model 3



$$R_{i,t=} \propto_{i} + \beta 1_{SIZEi,t} + \beta 2_{VOLUMEi,t} + \beta 3_{IORi,t} + \beta 4_{EGRi,t} + \beta 5_{BMRi,t} + \beta 6_{MOMENTUMi,t} + \mu_{i,t} \ldots..(14)$$

This model predicts firm stock returns based on firm and market level predictors.

3.11 Data Analysis Methods

3.11.1 Unit Root Tests:

The accompanying two econometric models are utilized to assessment the null hypothesis of a unit root as under:

3.11.1.1 Augmented Dickey Fuller

Dickey& Fuller (1979, 1981) set up a technique in the direction of effectively test for non-stationary. The main contribution in this regard they are testing for non-stationarity remains comparable testing for the presence of a unit root. The stationarity check by Dickey-Fuller is normally check on coefficient of the lagged dependent variable y_{t-1} whether γ=0. The t-statistic is the lagged dependent variable of Dickey-Fuller test. If critical value is greater than statistical value in absolute term by Dickey-Fuller test then reject the null hypothesis of unit root in addition conclude that y_t is a stationary process. Moreover, Dickey & Fuller protracted their test technique proposing an augmented form of the test which contains added lagged terms of the dependent variable in order to remove autocorrelation; on the other hand, error term is improbable to be white noise. A unit root test is essential condition for time series to check stationarity. Moreover, applying unit root test presents autoregressive model by means of Augmented Dickey-Fuller test. A simple AR (1) model is $Y_t = \rho Y_{t-1} + \mu_t$, the place Yt is those variables about concern may possibly the time index is a coefficient, additionally μt is the error term and regression model equation mathematically shown as

$$\Delta_{yt} = \delta_1 + \rho_2 + \varphi Y_{t-1} + \Sigma_{i=1}^{s} \propto_i \Delta Y_{t-1} + \mu_t \ldots\ldots (21)$$

The increased Dickey-Fuller (ADF) statistics, utilized within the test, may be a negative number What's more this model could be used to estimate as more testing for a

unit root may be equal will testing=0. It may be negative too stronger rejection of the hypothesis that there is a root toward specified level of confidence.

This study use unit root test for set purpose in model 1 and model 2.The financial time series have problem for non-stationarity of data. The unit root test use in model 1 to investigation the stationarity of data, variables include in model 1 like size, institutional ownership ratio, trading volume and earnings growth rate. Moreover, variables include in model 2 S_H, S_M, S_L, B_H, B_M, B_L R_m-R_f, SMB, HML and Momentum to check the stationarity of the data. According, to our time series data first check the stationary of the data. For this purpose first check the stationarity of series by using Augmented Dickey-Fuller test both models.

3.11.1.2 Phillips Parron

The distribution theory support Dickey-Fuller technique underpins and accept as the error terms are measurable self-determining in addition take a constant variance. Phillips & Perron (1988) build up that they accurately take a constant variance. Phillips & Perron (1988) build up simplification of the ADF test technique premise on the presumptions concerning the distribution of error terms. The test regression for the Phillips-Perron (PP) test is the AR (1) process:

$$\Delta_{yt-1} = \varphi_0 + \psi_{yt-1} + \mu_t \ldots\ldots (22)$$

The PP statistics technique are unbiassed modification of the ADF t-statistic that takes in the direction of through account not as much of restraining nature of the error measure while by Phillip-Perron check permission the error instabilities in the direction of remain in reasonably reliant on and heterogeneously distributed.

$$Y_t = \rho + \rho 1 Y_{t-1} + \alpha_t \{T\text{-}T/2\} + \mu_t \ldots\ldots (23)$$

Test statistics for regression coefficient under the null hypothesis that the data are generated by

$Y_t = y_{t-1} + \mu$ ….. (24)

For this purpose, first use the Augmented Dickey-Fuller test after that Phillips & Perron test to check the stationarity of the data. For Phillips & Perron test results support to Augmented Dickey-Fuller Test. The Phillips-Perron test use in model 1 to check the stationarity of data, variables include in model 1 like size, institutional ownership ratio, trading volume and earnings growth rate. Moreover, variables include in model 2 S_H, S_M, S_L, B_H, B_M, B_L R_m-R_f, SMB, HML and Momentum to check the stationarity of the data by using Phillips-Perron test.

3.11.2 Vector Auto-Regressive Model:

The general framework is used by vector autoregressive (VAR) model to define dynamic association between stationary variables. Moreover, whether to check the series are stationary at level, if the series are not stationary at level then take first difference of the series. The VAR framework use when the time series are not stationary at level. The VAR model provides reliable estimation of the interrelationships among the series. If the series are stationary at first difference I (1) then vector error correction (VEC) model appropriate to apply. Further, the vector error correction (VEC) can similarly take into explanation any co-integration relationships among the variables. The VAR model use set purpose lead-lag relationship among variables in model 1.The variables include in model 1 like size, institutional ownership ratio, trading volume and earnings growth rate. The optimal lag length criteria select by using VAR model. The most popular lag length criteria selection Schwartz Bayesian Criteria (SBC) and Akaike Information Criteria (AIC).This study

choose one of the criteria to select optimal lag mostly which value is lesser choose to select optimal lag selection.

3.11.2.1 Vector Error Correction Model (VECM):

The VECM in place with measurement short-term properties of the co-integrated series. Moreover, if no co-integration exists in series vector error correction model (VECM) remains not at all extended important at that time straight lead to to Granger causality assessment to found causal associations between variables.

$$\Delta Y_t = \propto_1 + P_1 e_1 + \sum_{i=0}^{n} \beta i \, \Delta Y_{t-i} + \sum_{i=0}^{n} \delta i \, \Delta X_{t-i} + \sum_{i=0}^{n} \gamma i \, Z_{t-i} \ldots\ldots (25)$$

$$\Delta X_t = \propto_2 + P_2 e_{i-1} + \sum_{i=0}^{n} \beta i \, Y_{t-i} + \sum_{i=0}^{n} \delta i \, \Delta X_{t-i} + \sum_{i=0}^{n} \gamma i Z_{t-i} \ldots\ldots (26)$$

Moreover, the co-integration rank indicate the number of co-integration vectors. The error correction model (ECM) a negative and significant coefficient as shown in e_{i-1} the above equation indicate that short term variations between independent and dependent variables. As a result, increase in the direction of a long run link between the variables. All the variables assume in VAR model are endogenous. Consequently, this dissertation performs impulse response and variance decomposition technique use to estimate the outcomes of variables size, trading volume, and institutional ownership ratio and earnings growth rate. Granger (1986, 1988) argues that if two variables are co-integrated. Therefore Granger causality must be in at least uni or bi direction as a result the links described by the error correction model (ECM).On the other hand, same time those variables might most likely part common stochastic trends, all things consider those dependent variable in the VECM ought to a chance to be Granger-caused eventually pursuing lagged values of the error-correction terms. But the lagged value is use of the level variables, subsequently, temporal Granger causality among variables may be analysed by a joint F-test concerning the coefficient of each regressed variable in the VECM. Therefore, reason such as a variable Granger-causes alternate on it helps estimate its future values.

Vector Auto-Regressive Model Equation:

$$y_t = \alpha + \Sigma_{i=1}^{p} B_i \; y_{t-i} + \mu_t \; \ldots. (27)$$

Granger Causality Equation:

$$y_t = \propto_1 + \Sigma_{i=1}^{n} \beta_i \; x_{t-i} + \Sigma_{j=1}^{m} \omega_j \; y_{t-j} + \varepsilon_{1t} \; \ldots.. (28)$$

$$x_t = \propto_2 + \Sigma_{i=1}^{n} \delta_i \; x_{t-i} + \Sigma_{j=1}^{m} \gamma_j \; y_{t-j} + \varepsilon_{1t} \; \ldots.. (29)$$

Johansen testing methodology (1988) similarly as reflected previously, Tong (2001) is an vector starting with of the error-correction model of the taking after expression.

Vector Error-Correction Equation:

$\Delta Xt = \sum_{i=1}^{j-1} \Gamma i \;\; \Delta X_{t-1}$ -$\prod X_t$-j+μ_t …..(30)

Where

$\Gamma i = \text{I} + \prod + 1 + \ldots\ldots + \prod i$, (i=1, j-1) and $\prod$=1-$\prod$1-$\prod$1……$\prod$j ….. (31)

Xt is an n X 1 vector of I (1) variables.

n X n matrix that has rank r $< n \; if \; Xt \; are \; co - integrated.$

Johansen use two statistics test to determine rank firstly, maximal eigenvalue test show the null hypothesis of rank equal r – 1 in contrast to the alternative of rank equal to r while secondly, Trace statistic the null hypothesis of rank r against alternative of full rank Johansen (1988) and Johansen & Juselius (1990).

3.11.3 Regression Analysis of Three and Four Factor Model

This dissertation use regression model approach to analysing the relationship among two or more variables. In other words, to examine which variable causing-effecting the other variable in addition, regression approach is show the direction of causation between two variables. The regression equation is written as under:

$$Y_t = \alpha + \beta X_t + \mu_t \ldots\ldots (32)$$

The above equation μ_t is referred to as a "random error term" and general idea behind that the number of other main variables will not include too get perfect response. The interpretation of α and β are same in above regression equation. The equation tells us about the change how much Y change if X change by one unit. It is vital will note that though the association between of X as more Y will be curvilinear, the regression line will make a deviation present as differing straight line. The further improbable those value of the relationship between of X and Y the better may be that prediction. Evaluate the relationship that exists, on the usual, between that explanatory variable and the dependent variable. Control those impacts from claiming every dependent variables on the indigent variable, variable those effects for repetitively on different explanatory variables. Predict the value of dependent variable to a provided for value of the explanatory variable.

Further, the problems occur mostly in economic analysis are established cause and effect relationship. The regression is very popular technique mostly use in economic and business research. Additionally, the estimation of correlation coefficient (r) and coefficient of determination (R^2) support regression coefficient. The coefficient of regression shows the relationship between two quantitative variables as well as the direction and strength of the relationship between variables. Further, explain the total deviation from mean sub-divided two major components, which is frequently estimated as the sum of squares or total variance. The mean value minuses predicted value of Y. This is called regression sum of square, or explained portion of the deviation. On the other hand, second component is residual sum of squares, which estimate prediction errors. Moreover, this part is called unexplained portion of the deviation. As below formula written as the total sum of squares is the sum of regression sum of squares and the residual sum of squares.

. $R^2 = Regression\ SS/TSS$ ….. (33)

The regression model explains more variance show the higher the (R^2).Further, residual the portion of dependent variable is not described through the model under-over predictions. The regression analysis use set purpose in Model 2 of this study. Model 2 divided further two groups three factor and four factor model. To estimate both three and four factor model use regression analysis because our series are stationary at level. Therefore, regression technique uses to get desire outcomes.

3.11.4 Econometric Equations of Regression Models

$S_H - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (34)

$S_M - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (35)

$S_L - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (36)

$B_H - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (37)

$B_M - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (38)

$B_L - Rf = \alpha + \beta_1 \text{SMBt} + \beta 2 HMLt + \mu t$ ….. (39)

3.11.5 Model-1

$BHW - Rf = \alpha + \beta 1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (40)

$BMW - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (41)

$BLW - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (42)

$SHW - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (43)

$SMW - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (44)

$SLW - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (45)

$BHL - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t$ (46)

$$BML - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t \quad (47)$$

$$BLL - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t \quad (48)$$

$$SHL - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t \quad (49)$$

$$SML - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t \quad (50)$$

$$SLL - Rf = \alpha + \beta_1 \text{SMBt} + \beta_2 HMLt + \beta_3 MOMENTUM + \varepsilon t \quad (51)$$

3.11.6 Panel regression

Panel regression technique use for this dissertation to set purpose, our data based on two components, first is time series and second is cross-sectional. Panel regression technique is used in Model 3; which based on firm and market level predicting variables. The firm level prediction variables include size, earnings growth rate and institutional ownership ratio, and market level predictors including; trading volume, book-to-market ratio and momentum. Hausman test is applied to check individual variation to select from fixed and random effect models. Further, fixed effect approach the constant is preserved as group specific. On the other hand, this method assumes that model used for different constant for each group.

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \mu_{it} \ldots\ldots (52)$$

Moreover, the expected coefficient of fixed effect model cannot be biased due to ignored time-invariant features because fixed effect method panels all the time-invariant changes among the individuals. Generally speaking, if the error terms are correlated, at that time fixed effect approach is not suitable because inferences might not be correct and that link maybe due to random effect. In addition, this is the main purpose for the Hausman approach. On the other hand, main purpose behind that random effect model is that the variation through entities expected to be random and uncorrelated using the predictor or

independent variables in the model. The variables are absorbed by the intercept in the fixed effect model. The random effects model equation is written as:

$$Y_{it} = \alpha + \beta X_{it} + \mu_{it} + \varepsilon_{it} \ldots. (53)$$

Random effect anticipates that the entity's errors terms are not correlated with the predictors over time. Further time invariant variables take to a position as explanatory variables. To specify the interpretation of random effect further than the pattern used inside the model. Hausman test is use to decide whether fixed effect model approach appropriate or random effect model. The null hypothesis decided that random effect is better or fixed effect model.

Hausman (1978) approach assumes that there are two estimators as under:

$\hat{\beta}$ and $\hat{\beta}_1$ of the parameter vector of β

In H_0 both estimators are consistent.

$\hat{\beta}_0$ is inefficient.

H_1, $\hat{\beta}_0$ is consistent and efficient, but $\hat{\beta}_1$ is inconsistent.

The fixed or random effects method in place of the panel statistics the suitable optimal choice perceives whether or not the regressed are associated with error terms.

The following statistical test equation uses the Hausman test written as below:

$$H = (\hat{\beta}^{FE} - \hat{\beta}^{RE})' [\text{Var}(\hat{\beta}^{FE}) - \text{Var}(\hat{\beta}^{RE})]^{-1}(\hat{\beta}^{FE}) - \text{Var}(\hat{\beta}^{RE}) \sim \chi^2(k) \ldots..(54)$$

It is assumed that random effect model is more consistent when the outcome of statistical value is small at that point is very important because base on the difference between the estimate values reject null hypothesis. On the other hand, large outcome

statistical value show that fixed effect is more appropriate. On the basis of Hausman test suggest that which model is more appropriate.

The following equation is tested in this study:

$$R_{i,t=} \propto_i + \beta 1_{SIZEi,t} + \beta 2_{VOLi,t} + \beta 3_{IORi,t} + \beta 4_{EGRi,t} + \beta 5_{BMRi,t} + \beta 6_{MOMi,t} + \mu_{i,t}$$

Where

$R_{i,t}$ is the stock returns of firm i at time t, $\beta 1_{SIZEi,t}$ is the size of firm i at time t, $\beta 2_{VOLi,t}$ is trading volume of firm i at time t, $\beta 3_{IORi,t}$ is institutional ownership ratio for firm i at time t, $\beta 4_{EGRi,t}$ is earning growth rate of firm i at time t, $\beta 5_{BMRi,t}$ is book-to-market ratio of firm i at time t and $\beta 6_{MOMi,t}$ is the momentum of firm i at time t.

3.11.7 Mean Square of Error

The mean square of error assumes that $\hat{Y}$ is a vector of n predictors, then Y is the vector of observed variables reliable to the inputs toward the function which caused the predictions, at that point the Mean Square of Error of the predictor can be predictable by the following equation as under:

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(\hat{Y}_i - Y_i)^2 \quad \ldots..(55)$$

$\frac{1}{n}(\sum_{i=1}^{n})$ Mean square of errors $(\hat{Y}_i - Y_i)^2$.This is sample dependent and very easily calculable measure for a specific sample. The estimator of mean square of error (MSE) $\hat{\theta}$ using with an unknown parameter θ is defined such as

$$\text{MSE}(\hat{\theta}) = \mathbb{E}_{\hat{\theta}}[(\hat{\theta} - \theta)^2] \quad \ldots..(56)$$

The above equation define unknown parameter in addition, this is logically property of an estimator of mean square of error (MSE). Meanwhile mean square of error is not a random variable. Moreover, MSE may possibly a function of unknown parameters in this scenario;

any estimator of mean square of error established on estimates of these parameters would be a function of the data by means of as a result of a random variable. It is assume that estimator is imitative from a sample statistic in addition to, estimate about population, at that time the probability is using to the sampling distribution of the sample statistic.

Mean Square of Error equation can be written as under:

$$\text{MSE}(\hat{\theta}) = \text{Var}_{\hat{\theta}}(\hat{\theta}) + Bias(\hat{\theta}, \theta)^2 \ldots..(57)$$

The mean square of error and variance are equivalent when the sum of variance estimator and squared bias estimator in case a suitable way to estimate the MSE and involving that provide unbiased estimator. The mean square of error applied for this study for set purpose. The return predictability for firm and market variables are included in this study. Mean square of error are more appropriate tools to differentiate firm and market level variables, which is better predict stock returns.

3.12 Data Analysis Tools and Software

This dissertation to apply the above expressed procedure, to statistically examine the research hypothesis, Statistical software Package for E-views 8 adaptation is utilized. Microsoft Excel is additionally utilized for few data examination as it simple to enter and compute the three factors, four factor, firm or market level return predictability and earnings growth rate models and other variables computation than data transfer to E-views 8. Panel regression model, fixed effect, random effect, Hausman test, regression analysis, unit root test. Vector auto-regressive model, Granger causality, Variance decomposition, Error correction and Impulse response of the data are verified thru using different tests proposed by past research. After the applying the initial tests on the data, the results are provided in the results chapter. E-views have been used to enter the data and perform

various statistical tests to check the validity and reliability for regression model. An overview of the data have taken by finding the descriptive statistics i.e. mean, median, standard deviation, frequency distribution, minimum and maximum values. The suitability of the data has been established after checking the skewness and kurtosis of the data and applying and Jarque Bera. At the end the descriptive statistics have also been performed to test the hypothesis on the chosen sample then enticement valuable results and conclusion intended for the population.

3.13 Chapter Summary

At the end of chapter, the aforementioned achieved a particular procedure useful in this dissertation is constructed on the procedures used thru past studies in the field of stocks and portfolio returns predictability. This technique is constructed on the greatest applies used in quantitative research transversely the earth by researchers. A number of econometrics test applied including regression analysis, fixed and random effect, unit root test, vector auto-regressive model, granger causality, vector error correction model, variance decomposition and impulse response. The following chapter offers particulars of the results and findings of the present study.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 RESULTS AND DISCUSSION

4.1.1 Introduction

The variable computation is discussed in Chapter 3 in a detailed manner. In this chapter the tests and result outputs are discussed. This study applied sets of econometric tests, like descriptive statistics, correlation, unit root test, regression model, vector autoregressive model, granger causality test, variance decomposition test, error correction model, impulse response, fixed effect and random effect models, and panel regression models. This chapter only provides the interpretation of the results and the detailed discussion of the results is included in Chapter 5.

4.2 Empirical Results

Table 1*: Descriptive statistics for four factor model*

	B_H	B_M	B_L	S_H	S_M	S_L	RM_RF	SMB	HML	MOMENTUM
Mean	.013	.054	.096	-.117	.007	.048	-.145	-.075	-.122	.600
Median	-.011	.046	.065	-.107	.024	.036	-.154	-.049	-.098	.526
Maximum	1.030	1.053	1.032	.972	1.057	.902	.619	.056	.194	2.710
Minimum	-.107	-.172	-.069	-1.486	-.628	-0.253	-.455	-.783	-.644	.341
Std. Dev.	.146	.136	.168	.253	.184	.150	.156	.123	.141	.323
Skewness	5.618	6.412	3.748	-1.308	1.913	2.752	1.857	-4.172	-1.141	4.897
Kurtosis	39.171	48.268	19.495	19.987	21.259	18.025	10.877	22.531	5.642	31.001
Jarque-Bera	706.119	5718.792	848.141	763.199	899.093	661.53	195.93	1165.455	31.491	2273.43
Probability	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Table 1 results show that mean value of B_H .013, B_M .054, B_L .096, S_H -.117, S_M .007, S_L .048, RM_RF -.145, SMB -0.075, HML -.122 and momentum .600.The maximum values of momentum 2.710 and the minimum value of S-H -1.4. The standard deviation values of B_H .146, B_M .136, B_L .168, S_H .253, S_M .184, S_L .150, RM_RF.156, SMB .123, HML .141 and momentum .323.The skewness values of

B_H 5.618, B_M 6.412, B_L 3.748, S_H -1.308, S_M 1.913, S_L 2.752, RM_RF 1.857, SMB -4.172, HML-1.141 and momentum 4.897.The kurtosis values B_H 139.171, B_M 48.268, B_L 19.495, S_H 19.987, S_M 21.259, S_L 18.025, RM_RF 10.877, SMB 22.531, HML 5.642 and momentum 31.001.The Jarque Bera values B_H 3706.119, B_M 5718.792, B_L 848.141, S_H 763.199, S_M 899.093, S_L 661.531, RM_RF 195.935, SMB 1165.455, HML 31.491 and momentum 2273.43.The p-values of B_H .000, B_M .000, B_L.000, S_H.000, S_M.000, S_L.000, RM_RF.000, SMB .000, HML.000 and momentum.000.Our results indicate that series is not normally distributed. Further step is taken if series are stationary at level so move to ordinarily least square method. Next step is to take series' unit root.

Table 2*: Unit Root Test Three and Four-Factor Model*

PORTFOLIO		ADF (LEVEL)	PP (LEVEL)
S_H		-7.518	-7.521
S_M		-7.068	-7.078
S_L		-7.526	-7.820
B_H		-7.954	-7.970
B_M		-8.162	-8.162
B_L		-8.313	-8.295
R_m-R_f		-8.949	-9.448
HML		-7.329	-7.329
SMB		-7.936	-7.943
MOM		-7.567	-3.929
	1%	5%	10%
Critical value	3.435	-2.863	-2.568

Table 2 indicates that unit root tests, ADF and PP, are applied to six the portfolios. HML, SMB and momentum outputs show that these series are stationary at level. The data are stationary at level so we move to ordinary least square approach.

Table 3: *Correlation matrix six portfolios*

	S_H	S_M	S_L	B_H	B_M	B_L
S_H	-	.292	.592	.568	.470	.573
S_M	.292	-	.496	.324	.406	.367
S_L	.592	.496	-	.538	.459	.225
B_H	.568	.324	.538	-	.546	.590
B_M	.470	.406	.459	.546	-	.755
B_L	.573	.367	.225	.590	.755	-

Table 3 reports the correlations among explanatory variables. It is calculated to explore the possibility of multicollinearity problem and found within tolerable limit.

Table 4*: B-H regress three-factor model*

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	.146	.020	6.976	.000
RM-RF	.567	.082	6.849	.000
SMB	-.470	.140	-3.354	.001
HML	.697	.121	5.737	.000
F-statistic	24.148	Durbin-Watson sta		2.071
Prob(F-statistic)	.000			

Table 4 the coefficients of RM-RF .567, SMB -.470 and HML .697 are statistically significant as their p-value are .000, .000, .000 any acceptable significance level. The coefficients of RM-RF, SMB and HML however, are statistically significant at the level of .001, respectively. The results show that B_H is significantly negatively affected by SMB (size) stock returns. Our results output show that adjusted R-squared 44.0%, F-statistic 15.250 and Durbin-Watson stat 2.140.

Table 5*: B-M regress three factor model*

Variable	Coefficient	Std. Error	t-Statisti	Prob.
C	.147	.021	6.741	.000
RM_RF	.582	.086	6.733	.000
SMB	-.195	.146	1.337	.186
HML	.188	.126	1.481	.143
F-statistic	15.250	Durbin-Watson stat		2.140
Prob(F-statistic)	.000			

Table 5 the coefficients of SMB -.195 and HML .188 are statistically insignificant as their p-value are .186, .143 any acceptable significance level. The coefficients of RM_RF.582 however, are statistically significant at .001 levels, respectively. The results show that B_M is significantly positively affected by RM_RF stock returns. Our results output show that adjusted R-squared 41.2%, F-statistic 15.250 and Durbin-Watson stat 2.140.

Table 6*: B-L regress three-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.145	.028	5.151	.000
RM_RF	.595	.111	5.333	.000
SMB	-.342	.189	-1.811	.075
HML	-.101	.164	-.621	.536
F-statistic	12.181	Durbin-Watson sta		1.871
Prob(F-statistic)	.000			

Table 6 the coefficients of RM-RF .595 is statistically significant as their p-value are .000 statistically significant at .01 levels, respectively. The coefficients of SMB (size) -.342, and HML -.101 statistically insignificant as their p-value are .075, .536.Our results output show that adjusted R-squared 35.4%, F-statistic 12.181 and Durbin-Watson stat 1.871.

Table 7*: S_H regress three factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.130	.028	4.535	.000
RM_RF	.623	.113	5.491	.000
SMB	.759	.192	3.954	.000
HML	.811	.166	4.866	.000
F-statistic	50.251	Durbin-Watson stat		1.906
Prob(F-statistic)	.000			

Table 7 the coefficients of RM-RF.623, SMB (size) .759 and HML .811 are statistically significant as their p-value are .000,.000,.000 statistically significant at .001 levels, respectively. The coefficients of HML -.248 however, is statistically significant at .01 levels, respectively. The results show that S_H are positively significantly affected by

SMB (size), RM-RF and HML growth stock returns. Our results output show that adjusted R-squared 70.7%, F-statistic 50.251 and Durbin-Watson stat 1.906.

Table 8*: S_M regress three factor model*

Variable	Coefficient	Std.Error	t- Statistic	Prob.
C	.171	.025	6.745	.000
RM_RF	.530	.100	5.286	.000
SMB	.599	.169	3.527	.000
HML	.330	.147	2.241	.028
F-statistic	27.503	Durbin-Watson stat		2.034
Prob(F-statistic)	.000			

Table 8 the coefficients of RM-RF.530, SMB.599 and HML.330 are statistically significant as their p-value are .000,.000 and .028 statistically significant at .001 levels, respectively. The results show that S_M is being significant positively affected by RM-RF, SMB (size), and HML growth stock returns. Our results output show that adjusted R-squared 56.5%, F-statistic 27.503 and Durbin-Watson stat 2.034.

Table 9: S_L regress three-factor model

Variable	Coefficient	Std. Erro	t-Statistic	Prob.
C	.137	.020	6.728	.000
RM_RF	.585	.081	7.215	.000
SMB	.643	.137	4.689	.000
HML	-.369	.119	-3.099	.000
F-statistic	28.678	Durbin-Watson sta		2.117
Prob(F-statistic)	.000			

Table 9 the positive coefficients of RM-RF .585, SMB .643 and negative coefficient of HML-.369 are statistically significant as their p-value are .000,.000,.000 statistically significant at .001 levels, respectively. The results show that S_L are significantly positively affected by RM-RF, SMB (size), and negatively significant with HML growth stock returns. Our results output show that adjusted R-squared 57.6%, F-statistic 28.678 and Durbin-Watson stat 2.117.

Table 10*: BHW regress four-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-.052	.033	-1.574	.120
RM_RF	-.045	.094	-.480	.632
SMB	-.095	.161	-.594	.554
HML	.115	.142	.811	.420
MOMENTUM	.349	.046	7.499	.000
F-statistic	14.870	Durbin-Watson stat		1.689
Prob(F-statistic)	.000			

Table 10 the coefficients of RM-RF -.045, SMB -.095 and HML .115 are statistically insignificant as their p-value are .632, .554, and .420 any acceptable significance level. The coefficients of momentum .349 however, are statistically significant at .001 levels, respectively. The results show that BHW are significantly positively affected by momentum stock returns. Our results output show that adjusted R-squared 47.6%, F-statistic 14.870 and Durbin-Watson stat 1.689.

Table 11: BMW regress four factor model

Variable	Coefficient	Std. Error	t- Statisti	Prob.
C	.010	.035	.297	.766
RM_RF	-.086	.099	-.861	.392
SMB	.064	.170	.379	.705
HML	.064	.150	.426	.671
MOMENTUM	.353	.049	7.189	.000
F-statistic	14.302	Durbin-Watson sta		1.540
Prob(F-statistic)	.000			

Table 11 the coefficients of RM-RF -.086, SMB.064 and HML.064 are statistically insignificant as their p-value are .392, .705, .671 any acceptable significance level. The coefficients of momentum .353 however, is statistically significant at .001 levels, respectively. The results show that BMW is significantly positively affected by momentum

stock returns. Our results output show that adjusted R-squared 46.5%, F-statistic 14.302 and Durbin-Watson stat 1.540.

Table 12*: BLW regress four factor model*

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	-.089	.085	-1.053	.296
RM_RF	.047	.240	.196	.845
SMB	.179	.409	.439	.661
HML	-.200	.361	-.554	.581
MOMENTUM	.600	.118	5.075	.000
F-statistic	7.360	Durbin-Watson stat		2.089
Prob(F-statistic)	.000			

Table 12 the coefficients of RM-RF .047, SMB .179 and HML -.200 are statistically insignificant as their p-value are .845, .661 and .581 any acceptable significance level. The coefficients of momentum .600 however, are statistically significant at .001 levels, respectively. The result is show that BLW significant positively affected by momentum stock returns. Our results output show that adjusted R-squared 29.4%, F-statistic 7.360 and Durbin-Watson stat 2.089.

Table 13*: SHW regress four-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-.028	.058	-.489	.626
RM_RF	.005	.165	.030	.975
SMB	-.112	.281	-.398	.691
HML	.347	.248	1.397	.167
MOMENTUM	.575	.081	7.067	.000
F-statistic	12.843	Durbin-Watson stat		2.151
Prob(F-statistic)	.000			

Table 13 the coefficients of RM-RF .005, SMB -.112 and HML .347 is statistically insignificant as their p-value are .975, .691 and .167 any acceptable significance level. The coefficients of momentum .575 however, are statistically significant at .001 levels, respectively. The results show that SHW is significantly positively affected by momentum stock returns. Our results output show that adjusted R-squared 43.7%, F-statistic 12.843 and Durbin-Watson stat 2.151.

Table 14: SMW regress four factor model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.059	.047	1.248	.217
RM_RF	.123	.135	.915	.363
SMB	-.015	.230	-.067	.946
HML	-.035	.203	-.175	.861
MOMENTUM	.451	.066	6.793	.000
F-statistic	12.524	Durbin-Watson sta		1.963
Prob(F-statistic)	.000			

Table 14 the coefficients of RM-RF .123, SMB -.015 and HML -.035is statistically insignificant as their p-value are .363, .946 and .861 any acceptable significance level. The coefficients of momentum .451 however, are statistically significant at .001 levels, respectively. The results show that SMW is significantly positively affected by momentum

stock returns. Our results output show that adjusted R-squared 43.0%, F-statistic 12.524 and Durbin-Watson stat 1.963.

Table 15*: SLW regress four-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.129	.035	3.611	.000
RM_RF	-.051	.100	-.514	.608
SMB	.237	.171	1.385	.171
HML	-.161	.151	-1.065	.291
MOMENTUM	.300	.049	6.062	.000
F-statistic	11.418	Durbin-Watson sta		1.892
Prob(F-statistic)	.000			

Table 15 the coefficients of RM-RF -.051, SMB .237 and HML -.161 are statistically insignificant as their p-value are .608, .171 and .291 any acceptable significance level. The coefficients of momentum .300 however, are statistically significant at .001 levels, respectively. The results show that SLW is been significant positively affected by momentum stock returns. Our results output show that adjusted R-squared 40.5%, F-statistic 11.418 and Durbin-Watson stat 1.892.

Table 16*: BHL regress four-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.034	.034	.987	.327
RM_RF	.023	.097	.240	.810
SMB	.056	.166	.337	.736
HML	-.220	.147	-1.494	.140
MOMENTUM	-.414	.048	-8.597	.000
F-statistic	19.220	Durbin-Watson sta		1.801
Prob(F-statistic)	.000			

Table 16 the coefficients of RM-RF .023, SMB .056 and HML-.220 are statistically insignificant as their p-value are .810, .736 and .140 any acceptable significance level. The coefficients of momentum -.414 however, are statistically significant at .001 levels, respectively. The results show that BHL is been significant negatively affected by

momentum stock returns. Our results output show that adjusted R-squared 54.4%, F-statistic 19.220 and Durbin-Watson stat 1.801.

Table 17: BML regress four-factor model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-.100	.048	-2.095	.040
RM_RF	.086	.135	.636	.527
SMB	.074	.230	.323	.747
HML	-.059	.203	-0.292	.771
MOMENTUM	-.384	.066	-5.776	.000
F-statistic	9.149	Durbin-Watson sta		1.206
Prob(F-statistic)	.000			

Table 17 the coefficients of RM-RF .086, SMB .074 and HML-.059 are statistically insignificant as their p-value are .527, .747 and .771 any acceptable significance level. The coefficients of momentum -.384 however, are statistically significant at .001 levels, respectively. The results show that BML is been significant negatively affected by momentum stock returns. Our results output show that adjusted R-squared 34.8%, F-statistic 9.149 and Durbin-Watson stat 1.206.

Table 18: BLL regress four-factor model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.147	.047	3.126	.002
RM_RF	-.105	.132	-.792	.431
SMB	-.052	.225	-.234	.815
HML	.270	.199	1.353	.181
MOMENTUM	-.589	0.065	-9.031	.000
F-statistic	24.146	Durbin-Watson sta		1.920
Prob(F-statistic)	.000			

Table 18 the coefficients of RM-RF -.105, SMB -.052 and HML.270 are statistically insignificant as their p-value are .431, .815 and .181 any acceptable significance level. The coefficients of momentum -.589 however, are statistically significant at .001 levels, respectively. The results show that BLL is been significant

negatively affected by momentum stock returns. Our results output show that adjusted R-squared 60.2%, F-statistic 24.146 and Durbin-Watson stat 1.920.

Table 19*: SHL regress four factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.100	.082	1.223	.226
RM_RF	-.049	.232	-.212	.832
SMB	.101	.395	.255	.799
HML	-.394	.349	-1.127	.264
MOMENTUM	-.867	.114	-7.582	.000
F-statistic	14.773	Durbin-Watson sta		2.071
Prob(F-statistic)	.000			

Table 19 the coefficients of RM-RF -.049, SMB -.101 and HML-.394 are statistically insignificant as their p-value are .832, .799 and .264 any acceptable significance level. The coefficients of momentum -.867 however, are statistically significant at .001 levels, respectively. The results show that SHL is been significant negatively affected by momentum stock returns. Our results output show that adjusted R-squared 47.4%, F-statistic 14.773 and Durbin-Watson stat 2.071.

Table 20*: SML regress four factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-.059	.088	-.674	.502
RM_RF	-.139	.249	-.558	.578
SMB	.119	.424	.281	.779
HML	.091	.374	.244	.807
MOMENTUM	-.797	.122	-6.506	.000
F-statistic	11.637	Durbin-Watson sta		1.515
Prob(F-statistic)	.000			

Table 20 the coefficients of RM-RF -.139, SMB .119 and HML.091 are statistically insignificant as their p-value are .578, .779 and .807 any acceptable significance level. The coefficients of momentum -.797 however, are statistically significant at .001 levels, respectively. The results show that SML is been significant negatively affected by

momentum stock returns. Our results output show that adjusted R-squared 41.0%, F-statistic 11.637 and Durbin-Watson stat 1.515.

Table 21*: SLL regress four-factor model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-.094	.056	-1.681	.098
RM_RF	.176	.157	1.119	.267
SMB	-.039	.268	-.147	.883
HML	.441	.237	1.859	.068
MOMENTUM	-.315	.077	-4.055	.000
F-statistic	7.455	Durbin-Watson sta		2.053
Prob(F-statistic)	.000			

Table 21 the coefficients of RM-RF .176, SMB -.039 and HML.441 are statistically insignificant as their p-value are .267, .883 and .068 any acceptable significance level. The coefficients of momentum -.315 however, are statistically significant at .001 levels, respectively. The results show that SLL is been significant negatively affected by momentum stock returns. Our results output show that adjusted R-squared 29.7%, F-statistic 7.455 and Durbin-Watson stat 2.053.

Table 22*: Size unit root test*

Years	ADF (LEV)	ADF 1st Diff	PP (LEV)	PP1st Diff
1999Q3	-1.979	-19.332	-1.983	-19.330
1999Q4	-1.264	-20.664	-.880	-21.277
2000Q1	.295	-12.863	-.144	-20.252
2000Q2	-1.157	-17.989	-1.162	-17.949
2000Q3	.163	-19.120	.185	-19.080
2000Q4	-2.343	-21.665	-2.156	-21.712
2001Q1	-.116	-17.970	-.195	-17.985
2001Q2	-1.532	-20.469	-1.509	-20.449
2001Q3	-1.226	-20.294	-1.218	-20.272
2001Q4	-2.370	-18.867	-2.435	-18.869
2002Q1	-.238	-21.316	-.060	-21.359
2002Q2	-.830	-19.820	-.505	-20.514
2002Q3	-1.012	-13.218	-.685	-20.126
2002Q4	-.335	-13.677	-.433	-20.566
2003Q1	-.878	-13.558	-.511	-20.515
2003Q2	.252	-17.350	.173	-17.334
2003Q3	-1.140	-13.278	-.718	-21.301
2003Q4	-.131	-22.416	.052	-23.078
2004Q1	-1.043	-18.717	-.964	-18.849
2004Q2	-.617	-20.082	-.406	-20.382
2004Q3	-2.426	-20.343	-2.510	-20.343
2004Q4	-.457	-17.503	-.436	-17.444
2005Q1	-.904	-19.524	-.824	-19.589
2005Q2	-.607	-20.322	-.507	-20.357
2005Q3	-.936	-20.227	-.810	-20.367
2005Q4	-.822	-19.036	-.843	-19.036
2006Q1	-1.172	-19.851	-1.102	-19.881
2006Q2	-.552	-18.034	-.578	-18.021
2006Q3	-.461	-20.878	-.258	-21.058
2006Q4	-.508	-21.178	-.396	-21.182
2007Q1	-1.000	-19.570	-.998	-19.566
2007Q2	-.520	-21.054	-.357	-21.321
2007Q3	-1.835	-19.990	-1.834	-19.972
2007Q4	-.273	-17.371	-.297	-17.301
2009Q1	-.344	-18.485	-.300	-18.509
2009Q2	-.675	-18.639	-.969	-18.639
2009Q3	-.866	-17.824	-.676	-18.057
2009Q4	-.304	-18.907	-.387	-18.907
2010Q1	-1.889	-19.602	-1.847	-19.628
2010Q2	-.632	-16.738	-.819	-16.746
2010Q3	-1.116	-17.555	-1.201	-17.505
2010Q4	-.942	-18.920	-.883	-18.944
2011Q1	-1.016	-18.697	-1.071	-18.715
2011Q2	-2.228	-18.144	-2.225	-18.190
2011Q3	-2.063	-20.144	-2.016	-20.174
2011Q4	-.072	-18.966	-.090	-18.967
2012Q1	-1.261	-19.535	-1.322	-19.537
2012Q2	-1.543	-16.581	-1.634	-17.067
2012Q3	-1.975	-20.943	-1.931	-20.897
2012Q4	-1.966	-19.783	-1.947	-19.783
2013Q1	-1.387	-11.151	-1.333	-19.256
2013Q2	-1.259	-20.093	-1.296	-20.081

2013Q3	-1.491	-20.278	-1.570	-20.255	2015Q1	-1.159	-19.148	-1.250	-19.245
2013Q4	-1.041	-16.924	-1.270	-17.289	2015Q2	.514	-19.274	.661	-19.275
2014Q1	-1.533	-18.832	-1.550	-18.831	2015Q3	-.883	-19.057	-.903	-19.060
2014Q2	-1.397	-19.661	-1.436	-19.650	2015Q4	.430	-3.979	-.013	-18.222
2014Q3	-2.264	-19.085	-2.243	-19.085					
2014Q4	.829	-18.546	.748	-18.546					

Test critical values:	.% level	3.4482
	5% level	2.8693
	.0% level	2.5709

Table 22 results show that first take natural logarithmic the series of quarterly data of firm size. After that series is integrated at level I (0). Our results indicate that series is not more than Mackinnon tabulated value (-2.860), thus series is not stationary at level I (0). Further step is taken to check the stationarity of series at first difference, hence the ADF statistics are greater than the Mackinnon tabulated value (-2.860) so we reject our null hypothesis of non-stationarity. Our results indicate that our data series for firm size is stationary at 1st difference I (1).

Table 22's results show that Phillip-Perron test supports the ADF test results. Our series are not stationary at level I (0). Further step is taken to check the stationarity of series at first difference; hence the PP statistic values are not greater than the Mackinnon tabulated value (-2.860) thus reject our null hypothesis of non-stationarity at first level of difference. Our results indicate that our data series of firm size is stationary at 1st difference I (1). So, both the tests conclude that the series of firm size data is stationary at first level of difference.

Table 23: Earnings Growth Rates unit root test

Years	ADF (LEVEL)	ADF 1st Diff	PP (LEVEL)	PP1st Diff
1999Q3	-.045	-19.009	-.045	-19.009
1999Q4	-1.658	-15.124	-1.635	-18.292
2000Q1	-2.226	-15.302	-2.165	-18.770
2000Q2	-2.223	-19.132	-2.232	-19.172
2000Q3	-2.330	-18.794	-2.356	-18.793
2000Q4	-1.765	-19.258	-2.436	-19.873
2001Q1	-1.438	-20.055	-1.385	-20.055
2001Q2	-2.567	-16.846	-.841	-18.893
2001Q3	-1.430	-20.477	-1.395	-20.471
2001Q4	-1.463	-18.485	-1.566	-18.626
2002Q1	-1.739	-19.728	-1.789	-19.796
2002Q2	-1.837	-19.965	-1.848	-19.949
2002Q3	-1.847	-20.514	-1.844	-20.476
2002Q4	-1.680	-21.554	-1.683	-21.383
2003Q1	-1.604	-21.110	-1.563	-21.110
2003Q2	-1.368	-17.604	-1.376	-17.623
2003Q3	-1.527	-20.949	-1.461	-21.361
2003Q4	-.794	-20.204	-.623	-20.691
2004Q1	-1.807	-19.295	-1.912	-19.295
2004Q2	-2.173	-20.099	-2.024	-20.353
2004Q3	-.840	-18.899	-.855	-18.899
2004Q4	-2.367	-19.946	-2.246	-20.158
2005Q1	-.202	-19.193	-.135	-19.194
2005Q2	-2.116	-22.519	-2.244	-23.350
2005Q3	-.654	-18.960	-.654	-18.960
2005Q4	-1.897	-18.205	-1.888	-18.201
2006Q1	-2.336	-18.723	-2.315	-18.724
2006Q2	-1.929	-22.490	-1.999	-22.263
2006Q3	-2.147	-20.041	-2.129	-20.040
2006Q4	-2.121	-20.190	-2.124	-20.159
2007Q1	-2.296	-8.877	-2.296	-21.290
2007Q2	-2.421	-17.768	-2.421	-17.772
2007Q3	-2.344	-19.020	-2.342	-19.024
2007Q4	-1.403	-16.948	-1.528	-16.947
2009Q1	-1.445	-18.433	-1.466	-18.512
2009Q2	-1.764	-18.110	-1.767	-18.089
2009Q3	-1.812	-13.346	-1.843	-19.358
2009Q4	-1.168	-19.902	-1.070	-20.142
2010Q1	-1.643	-19.098	-1.636	-19.115
2010Q2	-.098	-19.079	-.102	-19.079

2010Q3	.096	-19.079	.119	-19.079
2010Q4	-2.449	-16.254	-2.322	-16.226
2011Q1	-2.163	-17.806	-2.185	-17.806
2011Q2	-2.476	-20.447	-2.476	-20.409
2011Q3	-.658	-3.152	-.658	-3.152
2011Q4	.706	-3.140	.819	-3.140
2012Q1	-2.451	-22.923	-2.485	-22.780
2012Q2	.170	-19.034	.265	-19.034
2012Q3	.489	-3.505	.511	-3.502
2012Q4	-1.796	-16.888	-1.719	-16.888
2013Q1	-1.870	-20.605	-1.696	-19.797
2013Q2	-1.672	-22.145	-2.177	-19.001
2013Q3	-1.401	-18.430	-1.823	-20.378
2013Q4	-.998	-9.856	-1.990	-18.742
2014Q1	-1.870	-20.605	-1.866	-20.545
2014Q2	-1.672	-22.145	-1.668	-22.128
2014Q3	-1.401	-18.430	-1.401	-18.433
2014Q4	-.998	-9.856	-1.084	-17.980
2015Q1	-.466	-19.905	-.432	-19.904
2015Q2	-.785	-19.640	-.686	-19.728
2015Q3	-.810	-20.445	-.664	-20.802
2015Q4	-.709	-19.811	-.497	-20.229

Table 23 earnings growth rate results show that first take natural logarithmic of the series. Our results show that for each of the series in non-stationary when the variables are defined in levels. On the other hand when first difference is taken the series eliminates the non-stationary components. Hence we rejected our null hypothesis at 5% significance level, however our series are stationary at level one *I (1).*

Table 23 results indicate that Phillips-Perron (PP) test are not basically different from the respective Augmented Dickey-Fuller (ADF) outcomes. Our results show that earnings growth rate at level *I* (0) clearly point to presence of a unit root. Therefore, take first difference of the series clearly show that reject the null hypothesis as a result, series are stationary at first difference *I* (1).

Table 24*: Institutional ownership Ratio unit root test*

Years	ADF (LEVEL)	ADF 1st Diff	PP (LEVEL)	PP1st Diff
1999Q3	-1.415	-19.779	-1.380	-19.791
1999Q4	-.879	-17.361	-1.046	-17.305
2000Q1	-.819	-19.499	-1.005	-19.584
2000Q2	-.596	-18.412	-.731	-18.471
2000Q3	-.818	-18.297	-.907	-18.336
2000Q4	-.863	-18.968	-.838	-18.981
2001Q1	-1.019	-15.381	-.959	-18.721
2001Q2	-1.115	-18.229	-1.153	-18.230
2001Q3	-.991	-20.355	-.840	-20.531
2001Q4	-1.941	-19.412	-1.920	-19.422
2002Q1	-1.474	-18.241	-1.319	-18.455
2002Q2	-2.350	-21.096	-2.267	-21.126
2002Q3	-2.490	-20.386	-2.417	-20.386
2002Q4	-2.535	-20.032	-2.455	-20.120
2003Q1	-2.466	-5.997	-2.011	-3.110
2003Q2	-1.188	-4.559	-1.048	-3.869
2003Q3	-1.455	-18.418	-1.468	-18.418
2003Q4	-2.192	-18.915	-2.256	-18.921
2004Q1	-1.835	-17.750	-1.837	-17.709
2004Q2	-1.784	-21.668	-2.039	-21.884
2004Q3	-1.684	-7.249	-2.262	-26.507
2004Q4	-1.538	-7.172	-2.322	-29.650
2005Q1	-2.083	-19.434	-2.034	-19.517
2005Q2	-1.477	-17.514	-1.562	-17.503
2005Q3	-2.112	-7.521	-1.311	-2.812
2005Q4	-1.529	-20.906	-1.454	-20.967
2006Q1	-1.879	-9.996	-1.888	-20.917
2006Q2	-1.769	-18.672	-1.757	-18.927
2006Q3	-.905	-18.661	-.892	-18.661
2006Q4	-1.119	-17.413	-1.118	-17.347
2007Q1	-.244	-17.778	-.288	-17.808
2007Q2	-.461	-20.718	-.249	-20.823
2007Q3	-.421	-19.967	-.376	-19.966
2007Q4	-.623	-19.213	-.623	-19.213
2009Q1	-.678	-19.076	-.678	-19.076
2009Q2	-1.272	-18.055	-1.334	-18.056
2009Q3	-.625	-19.758	-.600	-19.759
2009Q4	-1.435	-19.375	-1.468	-19.372
2010Q1	-.973	-18.359	-1.0144	-18.386
2010Q2	-2.324	-18.164	-2.317	-18.204

2010Q3	-.989	-20.023	-.980	-20.026
2010Q4	-1.093	-18.362	-1.103	-18.361
2011Q1	-1.834	-18.682	-1.836	-18.682
2011Q2	-1.846	-20.813	-1.826	-20.774
2011Q3	-1.737	-20.791	-1.732	-20.737
2011Q4	-1.923	-22.467	-1.804	-22.468
2012Q1	-1.712	-19.616	-1.720	-19.670
2012Q2	-1.476	-18.994	-1.476	-19.050
2012Q3	-1.951	-22.879	-1.877	-22.614
2012Q4	-2.171	-19.458	-2.101	-19.521
2013Q1	-1.367	-17.474	-1.371	-17.464
2013Q2	-1.709	-18.241	-1.710	-18.237
2013Q3	-.401	-20.119	-.333	-20.127
2013Q4	-1.675	-16.300	-1.740	-16.300
2014Q1	-1.277	-18.098	-1.290	-18.077
2014Q2	-.0278	-17.511	-.018	-17.459
2014Q3	-1.777	-18.938	-1.776	-18.938
2014Q4	-1.519	-20.422	-1.458	-20.425
2015Q1	-2.451	-17.191	-2.455	-17.155
2015Q2	-1.624	-17.546	-1.689	-17.503
2015Q3	-1.358	-19.842	-1.344	-19.843
2015Q4	-1.722	-19.775	-1.705	-19.776

Table 24 results indicate that institutional ownership ratio series non-stationary at level *I* (0). Therefore, further step to take first difference of the series. Our results indicate that at first difference series eliminate the non-stationary components and null hypothesis rejected at 5% significance level. After that series integrated at first difference. Our results clearly show that series are stationary at level one *I (1).*

Table 24 results indicate that Phillips-Perron (PP) test are not basically different from the respective Augmented Dickey-Fuller (ADF) outcomes. Empirically the outcomes after the test in the level of institutional ownership ratio series surely point to the existence of a unit root. Further step to take first difference of the series clearly show that reject the null hypothesis therefore, series are stationary at first difference *I* (1).

Table 25*: Trading volume unit root test*

Years	ADF (LEVEL)	ADF 1st Diff	PP (LEVEL)	PP1st Diff
1999Q3	-1.544	-20.562	-1.516	-20.523
1999Q4	-1.260	-22.176	-1.360	-22.129
2000Q1	-2.240	-19.771	-2.228	-19.774
2000Q2	-1.301	-18.751	-1.347	-18.829
2000Q3	-1.604	-21.908	-1.693	-21.726
2000Q4	-1.887	-18.692	-1.913	-18.691
2001Q1	-1.261	-17.984	-1.280	-17.965
2001Q2	-1.962	-18.192	-1.971	-18.176
2001Q3	-.294	-20.042	-.331	-20.017
2001Q4	-1.430	-16.935	-1.486	-16.946
2002Q1	-1.367	-19.651	-1.374	-19.640
2002Q2	-1.844	-18.488	-1.845	-18.487
2002Q3	-1.260	-17.844	-1.270	-17.816
2002Q4	-2.052	-19.354	-2.044	-19.355
2003Q1	-1.912	-18.679	-1.995	-18.682
2003Q2	-1.729	-17.932	-1.718	-17.937
2003Q3	-2.263	-13.274	-2.109	-19.5
2003Q4	-2.123	-20.475	-2.071	-20.510
2004Q1	-1.733	-19.926	-1.667	-19.963
2004Q2	-.929	-20.094	-.929	-20.062
2004Q3	.586	-21.040	-.740	-21.088
2004Q4	-1.623	-18.449	-1.623	-18.442
2005Q1	-1.976	-22.109	-2.158	-22.109
2005Q2	-.996	-22.641	-1.090	-22.504
2005Q3	-.968	-12.868	-1.108	-22.726
2005Q4	-.868	-22.341	-.783	-23.000
2006Q1	-1.294	-14.306	-1.853	-42.347
2006Q2	-.607	-18.108	-.798	-18.129
2006Q3	-1.477	-23.554	-1.482	-24.537
2006Q4	-1.270	-22.066	-1.272	-22.263
2007Q1	-1.279	-17.880	-1.347	-17.868
2007Q2	-2.212	-21.755	-2.085	-21.704
2007Q3	-.119	-19.642	-.049	-19.665
2007Q4	-1.594	-19.383	-1.582	-19.386
2009Q1	-1.887	-19.431	-1.961	-7.300
2009Q2	-2.019	-6.5280	-1.925	-5.735
2009Q3	-2.068	-6.3730	-2.085	-6.032
2009Q4	-1.838	-7.631	-1.676	-6.070
2010Q1	-2.137	-7.922	-2.010	-7.338
2010Q2	-2.474	-18.516	-2.502	-7.820
2010Q3	-2.181	-19.022	-2.396	-5.786
2010Q4	-1.818	-19.485	-1.810	-8.163
2011Q1	-.720	-18.869	-.696	-18.871
2011Q2	-1.372	-18.927	-1.243	-19.096
2011Q3	-.487	-20.952	-.567	-20.888
2011Q4	-.994	-16.782	-1.137	-16.692
2012Q1	-.167	-18.715	-.534	-3.619
2012Q2	-2.353	-18.232	-2.363	-18.272
2012Q3	-1.855	-23.534	-.948	-18.990
2012Q4	-1.575	-17.736	-1.629	-17.692
2013Q1	-1.269	-18.923	-1.361	-18.926
2013Q2	-.695	-3.9793	-.903	-3.988
2013Q3	-2.398	-18.813	-2.475	-18.812
2013Q4	-2.401	-18.902	-2.411	-18.912
2014Q1	-2.190	-19.127	-2.243	-19.127
2014Q2	-.482	-2.9727	-.602	-2.972
2014Q3	-1.101	-19.593	-1.105	-19.586
2014Q4	-2.512	-17.847	-2.567	-17.960
2015Q1	-1.896	-18.284	-1.982	-18.284
2015Q2	-.574	-17.773	-.713	-17.773
2015Q3	-.721	-17.441	-1.077	-17.554
2015Q4	.893	-17.697	.786	-17.687

Table 25 first take natural logarithmic the series of quarterly data of firm trading volume. Our results indicate that trading volume series clearly point to presence of unit root. Therefore, further step to take first difference of the series. Our results indicate that at first difference series eliminate the non-stationary components and null hypothesis rejected at 5% significance level. At the same time our series are stationary at level one *I (1).*

Table 25's results show that Phillip-Perron test supports the ADF test results. Empirically the outcomes after the test in the level of trading volume series surely point to the existence of a unit root. Further step to take first difference of the series clearly show that reject the null hypothesis therefore, series are stationary at first difference *I* (1).

Table 26: *VAR Lag Order Selection Criteria SIZE*

	LogL	LR	FPE	AIC	SC	HQ
0	-135219.5	NA	2.18e+24	67.392	67.399	67.394
1	-92684.37	84964.25	1.37e+15	46.202	46.233	46.213
2	-92133.19	1099.888	1.05e+15	45.935	45.991	45.955
3	-92006.08	253.392	9.90e+14	45.879	45.861*	45.908
4	-91968.12	75.614*	9.79e+14*	45.968*	45.975	45.906*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 26 results show that selection of lag length criteria by using VAR model. Our selection criteria to choose optimal lag length by using AIC and SBC, whichever is less; so table results show that SBC value is less so we choose optimal lag selection criteria SBC.

Table 27*: VAR size Standard errors in () & t-statistics in [ ]*

	HSHE	HSME	HSSE	MSHE	MSME	MSSE	SSHE	SSME	SSSE
HSHE (-1)	-.261	1.432	1.075	1.321	.808	.742	-.219	.991	1.426
	(.185)	(.567)	(.851)	(.430)	(.348)	(.350)	(.569)	(.507)	(.877)
	[-1.410]	[2.524]	[1.262]	[3.065]	[2.321]	[2.116]	[-.385]	[1.956]	[1.626]
HSHE (-2)	-.544	.042	-.387	.048	-.123	.370	-.417	.452	-.883
	(.165)	(.507)	(.762)	(.385)	(.311)	(.314)	(.509)	(.454)	(.784)
	[-3.286]	[.083]	[-.508]	[.125]	[-.395]	[1.179]	[-.819]	[.997]	[-1.125]
HSHE (-3)	-.111	1.893	.383	1.601	.721	.7146	.441	1.086	1.982
	(.196)	(.602)	(.905)	(.458)	(.369)	(.372)	(.604)	(.539)	(.932)
	[-.566]	[3.142]	[.424]	[3.495]	[1.949]	[1.961]	[.729]	[2.014]	[2.126]
F-statistic	4.180	.965	.551	2.103	1.813	2.380	1.795	1.601	1.654

Table 27 higher size portfolios symbolised as HS, while results show HSHE return is influence through its own return t-value 3.286 in preceding second period. Intended for the portfolio; which denoted HSME is influence through its own return first and second time period t-values 2.524, 3.142. The medium size portfolio symbolised as MS, MSHE is influence through its own return first and third time period t-values 3.065, 3.495. Further, reported MSHE comes under the impact through returns MSME, MSSE earlier first as well as third time. However, MSME is effect through its own return in earlier first time period as well as third time period t-values 2.321, 1.95. Additional, MSME is influence through return MSHE earlier first as well as third time period. Next, MSSE comes under the impact through its own return in earlier first time period as well as third time period t-values 2.116,1. 961.

After that MSSE is as well influence through return MSHE, MSSE earlier one time period. At the end, small-size portfolio symbolised *SS*, the quarterly return of *SSME* comes under effect through its own return in the earlier first as well as third time period t-value 1.96, 2.014. The quarterly return of *SSSE* is influence through its own return in the earlier third period t-value 2.126. Furthermore, *SSME* comes under effect through its own return in the preceding third period t-vale 2.014.

Table 28*: VAR Lag Order Selection Criteria Earnings Growth Rates*

Lag	LogL	LR	FPE	AIC	SCB	HQ
0	1725.411	NA	1.60e-37	-59.186	-58.866	-59.062*
1	1817.962	153.186*	1.11e-37*	-59.584	-56.387	-58.339
2	1871.618	72.158	3.45e-37	-58.642*	-52.567	-56.275
3	1951.752	82.897	6.24e-37	-58.612	-49.659*	-55.125
4	2037.116	61.815	2.00e-36	-58.762	-46.932	-54.154

Table 28 results show that selection of lag length criteria by using VAR model. Our selection criteria to choose optimal lag length by using AIC and SBC whichever less is so table results show that SBC value is less so we choose optimal lag selection criteria SBC.

Table 29*: Earnings growth rate*

	HEGRHE	**HEGRME**	**HEGRSE**	**MEGRHE**	**MEGRME**	**MEGRSE**	**SEGRHE**	**SEGRME**	**SEGRSE**
HEGRHE (-1)	-.0540	.899	-.012	-.091	.108	.623	.427	.573	-.187
	(.221)	(.397)	(.233)	(.236)	(.148)	(.265)	(.216)	(.261)	(.145)
	[2.243]	[2.262]	[-.055]	[2.387]	[2.733]	[2.350]	[1.973]	[2.189]	[-1.294]
HEGRHE (-2)	.132	-.089	-.090	.094	.018	-.151	-.035	-.014	-.141
	(.253)	(.454)	(.267)	(.270)	(.169)	(.303)	(.247)	(.299)	(.165)
	[.523]	[-.197]	[-.338]	[.347]	[.109]	[-.500]	[-.143]	[-.049]	[-.853]
HEGRHE (-3)	-.3151	.382	-.572	-.363	-.159	-.389	-.309	-.418	-.085
	(.267)	(.479)	(.281)	(.285)	(.178)	(.319)	(.260)	(.315)	(.174)
	[1.177]	[.799]	[-2.032]	[1.972]	[-1.991]	[2.218]	[2.184]	[-1.326]	[-.489]
F-statistic	2.474	1.343	2.224	3.566	2.603	3.849	2.908	.758	.751

Table 29 higher-earnings growth rate portfolio symbolised as (*HEGR*), the quarterly return of *HEGRHE* is influenced through its own return t-value 2.243 in preceding second

period. Intended for the portfolio, which represented *HEGRME* comes under the effect through its own return at preceding first period of time t-value 2.262. Further, reported HEGRHE similarly, comes under the effect through return in the preceding first period. Additionally, reported HEGRSE portfolio, similarly, the impact through its own return in the preceding third period t-value -2.032. The medium-earnings growth rate portfolio symbolised as (*MEGR*), the quarterly return of *MEGRHE* is influenced through its own return first as well as third period t-value 2.387,1. 972. However, M*EGR*HE comes under the effect through return of M*EGR*ME, M*EGR*SE in the preceding first as well as third period of time. Furthermore, M*EGR*ME comes under the impact through its own return in earlier first as well as third period of time t-value 2.733, 1.991. Next, *MEGRME* portfolio is influenced through return of *MEGRHE in* the preceding first as well as third period of time. Moreover, *MEGRSE* comes under the effect through its own return in the preceding first period as well as third period of time t-values 2.350, 2.218. Aforementioned, MEGRSE is influenced through return of *MEGRHE, MEGRSE* in the preceding one then third periods. At the end, the small-earnings growth rate portfolio (*SEGR*), the quarterly return of *SEGRHE* is influenced through its own return in the earlier first period as well as third time period t-values 1.973, 2.184. The quarterly return of *SEGRME* is influenced through its own return in the preceding first time period t-value 2.189. Similarly, *SEGRME* comes under the impact through SEGRHE in the preceding first period.

Table 30*: Institutional Ownership Ratio VAR Lag Order Selection Criteria*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1788.221	NA	1.83e-38*	-61.352	-61.032	-61.227*
1	1855.849	111.935	3.00e-38	-60.891	-57.694	-59.645
2	1926.664	95.233	5.17e-38	-60.540	-54.465	-58.173
3	1996.874	72.631	1.32e-37	-60.168	-51.215*	-56.680
4	2153.421	113.361*	3.62e-38	-62.773*	-50.943	-58.165

Table 30 results show that selection of lag length criteria by using VAR model. Our selection criteria to choose optimal lag length by using AIC and SBC whichever less is so table results show that SBC value is less so we choose optimal lag selection criteria SBC.

Table 31*: VAR Institutional Ownership Ratio*

	HIORHE	HIORME	HIORSE	MIORHE	MIORME	MIORSE	SIORHE	SIORME	SIORSE
HIORHE(-1)	.267	.151	.046	.295	.249	.024	-.035	-.082	-.188
	(.196)	(.105)	(.083)	(.210)	(.308)	(.096)	(.093)	(.207)	(.231)
	[2.357]	[2.429]	[.559]	[2.400]	[.807]	[.251]	[-.384]	[-.396]	[-.812]
HIORHE(-2)	-.280	-.126	-.145	-.100	-.404	-.168	-.041	-.111	.209
	(.197)	(.106)	(.084)	(.212)	(.310)	(.096)	(.094)	(.208)	(.233)
	[-1.415]	[-1.192]	[-1.730]	[-.472]	[-1.302]	[-1.732]	[-.446]	[-.533]	[.898]
HIORHE(-3)	.240	.090	.052	.193	.278	.151	.0212	.188	.081
	(.167)	(.090)	(.071)	(.180)	(.263)	(.082)	(.079)	(.177)	(.197)
	[1.433]	[1.006]	[1.957]	[1.076]	[1.056]	[1.962]	[2.265]	[1.964]	[.412]
F-statistic	2.436	2.120	2.258	2.701	.842	2.092	2.618	2.002	.709

Table 31 higher institutional ownership ratio portfolio symbolised as HIOR, while outcomes specify return of HIORHE is influence thru its own return t-value 2.357 in the preceding first period of time. Intended for the *HIORME* portfolio is clearly influence through its own return in the preceding first period of time t-value 2.429, Further, reported HIORHE return is influenced through in preceding first period of time. Abovementioned, the *HIORSE* portfolio is influenced clearly through its own return in the preceding third period of time t-value 1.957.In the medium- institutional ownership ratio portfolio (*MIOR*), the

quarterly return of *MIORHE* is influenced through its own return in the preceding first period of time, t-value 2.400. Next, M*IOR*HE comes under the impact of return of M*IOR*SE in the preceding first period. Similarly, *MIORSE* comes under the effect of its own return in the preceding third period t-value 1.962. In addition, quarterly return of MIORSE affects MIORHE in the preceding third period. In the small- institutional ownership ratio portfolio (SIOR), the quarterly return of SIORHE comes under the impact of its own return in the preceding third period t-value 2.265. Furthermore, SIORHE comes under the influence of the quarterly return of SIORME in the preceding third period. The quarterly return of SIORME, similarly, comes under the impact of its own return in the previous third period t-value 1.964. Also, SIORME is contains the quarterly return of SIORHE in the preceding third period.

Table 32*: VAR Lag Order Selection Criteria Trading Volume*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1781.976	NA	2.27e-38	-61.137	-60.817	-61.012*
1	1882.919	167.078	1.18e-38*	-61.824	-58.627	-60.579
2	1960.253	104.000*	1.62e-38	-61.698	-55.623	-59.332
3	2048.376	91.162	2.23e-38	-61.944*	-52.991	-58.456
4	2179.933	95.265	1.45e-38	-63.687	-51.857*	-59.079

Table 32 results show that selection of lag length criteria by using VAR model. Our selection criteria to choose optimal lag length by using AIC and SBC whichever less is so table results show that SBC value is less so we choose optimal lag selection criteria SBC

Table 33*: Trading Volume Vector Auto-Regression Estimates*

	HTVHE	HTVME	HTVSE	MTVHE	MTVME	MTVSE	STVHE	STVME	STVSE
HTVHE (-1)	-.095	.212	.242	.348	.226	.202	.102	.295	-.036
	(.225)	(.217)	(.277)	(.327)	(.292)	(.432)	(.223)	(.294)	(.454)
	[-.420]	[1.976]	[1.983]	[1.065]	[.774]	[2.467]	[.459]	[1.004]	[-.079]
HTVHE (-2)	.541	.179	-.154	.048	-.014	-.307	.017	-.036	.661
	(.229)	(.220)	(.281)	(.332)	(.297)	(.438)	(.226)	(.299)	(.461)
	[2.362]	[.814]	[-.549]	[.146]	[-.047]	[-.700]	[2.078]	[-.122]	[1.434]
HTVHE (-3)	.111	-.118	.205	.188	-.018	.360	-.297	-.212	.166
	(.193)	(.186)	(.237)	(.280)	(.251)	(.370)	(.191)	(.252)	(.389)
	[.575]	[-.634]	[.863]	[.671]	[-.071]	[.973]	[-1.554]	[1.959]	[.426]
HTVHE (-4)	-.174	-.059	.160	.079	-.011	.151	.140	-.142	-.202
	(.201)	(.194)	(.247)	(.292)	(.261)	(.386)	(.199)	(.263)	(.405)
	[-.862]	[-.304]	[.648]	[.272]	[-.045]	[.392]	[1.976]	[-.543]	[2.100]
F-statistic	2.392	2.296	2.384	1.351	.694	2.834	3.672	2.706	2.395

Table 33 higher trading volume symbolised as HS, while outcomes specify return of HTVHE comes under the impact through its own return t-value 2.362 in the preceding second period of time. Abovementioned, HTVME portfolio is influenced clearly through its own return in the preceding first period of time t-value 1.976, Further reported HTVHE return comes under the impact through in preceding second period of time. Furthermore, HTVSE portfolio comes under the impact through its own return in the preceding first period of time t-value 1.983, similarly, HTVHE return is influenced through preceding second period of time. In the medium- trading volume portfolio (*MTV*), the quarterly return of *MTVSE* comes under the impact through its own return in the preceding first period of time t-value 2.467.Moreover, small trading volume symbolised as STV, the quarterly return of *STVHE* comes under the effect through its own return in the preceding second and fourth period of time t-value 2.078, 1.976. In addition, quarterly return of S*TV*HE affects STVME in the preceding second period of time. The quarterly return of *STVME* comes under the impact through its own return in the preceding third period of time t-value 1.959. Likewise, quarterly return of *STVME* affects in the preceding second period of time. The quarterly return of *STVSE* is influenced through its own return in the preceding fourth period of time t-value

2.100. At the end, *STVSE* comes under the impact through the quarterly return of S*TV*HE in the preceding fourth period of time.

Table 34*: Institutional Ownership Ratio Granger Causality Test*

Lags: 2	F-Stat	P-Value
HIORHE does not granger cause HIORME	1.522	.227
HIORHE does not granger cause HIORSE	2.844	.066
HIORHE does not granger cause MIORHE	.322	.725
HIORHE does not granger cause MIORME	.581	.562
HIORHE does not granger cause MIORSE	.063	.938
HIORHE does not granger cause SIORHE	1.455	.242
HIORHE does not granger cause SIORME	1.150	.324
HIORHE does not granger cause SIORSE	.431	.652
HIORME does not granger cause HIORSE	.976	.383
HIORME does not granger cause MIORHE	.060	.941
HIORME does not granger cause MIORME	.901	.411
HIORME does not granger cause MIORSE	.227	.796
HIORME does not granger cause SIORHE	6.048	.004
HIORME does not granger cause SIORME	2.054	.137
HIORME does not granger cause SIORSE	.267	.766
HIORSE does not granger cause MIORHE	5.963	.004
HIORSE does not granger cause MIORME	.710	.496
HIORSE does not granger cause MIORSE	.249	.779
HIORSE does not granger cause SIORHE	.629	.536
HIORSE does not granger cause SIORME	1.271	.288
HIORSE does not granger cause SIORSE	.614	.544
MIORHE does not granger cause MIORME	.655	.523
MIORHE does not granger cause MIORSE	1.231	.299
MIORHE does not granger cause SIORHE	5.947	.004
MIORHE does not granger cause SIORME	3.306	.044
MIORHE does not granger cause SIORSE	.193	.824
MIORME does not granger cause MIORSE	2.920	.062
MIORME does not granger cause SIORHE	4.980	.010
MIORME does not granger cause SIORME	.122	.884
MIORME does not granger cause SIORSE	2.807	.069
MIORSE does not granger cause SIORHE	.976	.383
MIORSE does not granger cause SIORME	.762	.471
MIORSE does not granger cause SIORSE	2.448	.095
SIORHE does not granger cause SIORME	6.072	.004
SIORHE does not granger cause SIORSE	.032	.967
SIORME does not granger cause SIORSE	.117	.889

Table 34 results show that HIORHE does Granger Cause HIORSE F-statistics value is 2.844 and p-value is .066 in this case granger causality in uni-direction. HIORME does Granger Cause SIORHE F-statistics value is 6.048 and p-value is .004 in this case granger causality in uni-direction. HIORSE does Granger Cause MIORHE F-Statistics value is 5.963 and p-value is .004 in this case granger causality in uni-direction. MIORHE does Granger Cause SIORHE F-Statistics value is 5.947 and p-value is .004, while MIORHE does granger Cause SIORME F-Statistics value is 3.306 and p-value is .044 in this case granger causality in bi-direction. MIORME does Granger Cause MIORSE F-Statistics value is 2.920 and p-value is .062 in this case granger causality in uni-direction. MIORME does Granger Cause SIORHE F-Statistics value is 4.980 and p-value is .010 in this case granger causality in uni-direction. MIORME does Granger Cause SIORSE F-statistics value is 2.807 and p-value is .069 in this case granger causality in uni-direction. MIORSE does Granger Cause SIORME F-statistics value is 2.448 and p-value is .095 in this case granger causality in uni-direction. SIORHE does Granger Cause SIORME F-statistics value is 6.072 and p-value is .004 in this case granger causality in uni-direction.

Table 35: Size Granger Causality Test

Lags: 2	F-stat	P-value
HSHE does not granger cause HSME	4.221	.019
HSHE does not granger cause HSSE	3.025	.056
HSHE does not granger cause MSHE	1.849	.166
HSHE does not granger cause MSME	5.331	.007
HSHE does not granger cause MSSE	4.548	.014
HSHE does not granger cause SSHE	4.264	.018
HSHE does not granger cause SSME	4.600	.014
HSHE does not granger cause SSSE	1.584	.214
HSME does not granger cause HSSE	2.320	.107
HSME does not granger cause MSHE	.187	.829
HSME does not granger cause MSME	.981	.381
HSME does not granger cause MSSE	.042	.958
HSME does not granger cause SSHE	.413	.663
HSME does not granger cause SSME	.246	.782

HSME does not granger cause SSSE	.276	.759
HSSE does not granger cause MSHE	.134	.874
HSSE does not granger cause MSME	1.113	.335
HSSE does not granger cause MSSE	.216	.806
HSSE does not granger cause SSHE	.235	.791
HSSE does not granger cause SSME	.249	.780
HSSE does not granger cause SSSE	.348	.707
MSHE does not granger cause MSME	.922	.403
MSHE does not granger cause MSSE	.655	.523
MSHE does not granger cause SSHE	.866	.425
MSHE does not granger cause SSME	1.271	.288
MSHE does not granger cause SSSE	.742	.480
MSME does not granger cause MSSE	1.570	.216
MSME does not granger cause SSHE	3.208	.047
MSME does not granger cause SSME	1.398	.255
MSME does not granger cause SSSE	.036	.963
MSSE does not granger cause SSHE	.957	.390
MSSE does not granger cause SSME	.954	.391
MSSE does not granger cause SSSE	.096	.908
SSHE does not granger cause SSME	.751	.476
SSHE does not granger cause SSSE	.244	.784
SSME does not granger cause SSSE	.430	.652

Table 35 results show that HSHE does Granger Cause HSME F-statistics value is 4.221 and p-value is .0195 while HSHE does Granger Cause HSSE F-statistics value is 3.025 and p-value is .056 in this case granger causality in bi-direction. HSHE does Granger Cause MSME F-Statistics value is 5.331 and p-value is .004 in this case granger causality in uni-direction. HSHE does Granger Cause MSME F-Statistics value is 4.548 and p-value is .014, while HSHE does granger Cause SSHE F-Statistics value is 4.264 and p-value is .018 in this case granger causality in bi-direction. HSHE does Granger Cause SSME F-Statistics value is 4.600 and p-value is .014 in this case granger causality in uni-direction. MSME does Granger Cause SSHE F-Statistics value is 3.208 and p-value is .047 in this case granger causality in uni-direction.

Table 36*: Earnings Growth Rates Granger Causality Test*

Lags: 2	F-Stat	P-Value
HEGRHE does not granger cause HEGRME	6.427	.003
HEGRHE does not granger cause HEGRSE	2.699	.076
HEGRHE does not granger cause MEGRHE	6.779	.002
HEGRHE does not granger cause MEGRME	.710	.495
HEGRHE does not granger cause MEGRSE	1.320	.275
HEGRHE does not granger cause SEGRHE	.833	.440
HEGRHE does not granger cause SEGRME	1.649	.201
HEGRHE does not granger cause SEGRSE	.390	.678
HEGRME does not granger cause HEGRSE	20.408	2.00E-07
HEGRME does not granger cause MEGRHE	55.205	7.00E-14
HEGRME does not granger cause MEGRME	.375	.689
HEGRME does not granger cause MEGRSE	.329	.720
HEGRME does not granger cause SEGRHE	.414	.662
HEGRME does not granger cause SEGRME	.640	.530
HEGRME does not granger cause SEGRSE	.150	.860
HEGRSE does not granger cause MEGRHE	1.675	.196
HEGRSE does not granger cause MEGRME	.436	.648
HEGRSE does not granger cause MEGRSE	.435	.649
HEGRSE does not granger cause SEGRHE	.849	.433
HEGRSE does not granger cause SEGRME	.454	.636
HEGRSE does not granger cause SEGRSE	.696	.502
MEGRHE does not granger cause MEGRME	.760	.472
MEGRHE does not granger cause MEGRSE	.188	.829
MEGRHE does not granger cause SEGRHE	.957	.390
MEGRHE does not granger cause SEGRME	.241	.786
MEGRHE does not granger cause SEGRSE	.515	.600
MEGRME does not granger cause MEGRSE	.176	.838
MEGRME does not granger cause SEGRHE	.096	.908
MEGRME does not granger cause SEGRME	.170	.843
MEGRME does not granger cause SEGRSE	.094	.909
MEGRSE does not granger cause SEGRHE	.252	.778
MEGRSE does not granger cause SEGRME	1.213	.305
MEGRSE does not granger cause SEGRSE	.029	.971
SEGRHE does not granger cause SEGRME	.136	.872
SEGRHE does not granger cause SEGRSE	.413	.663
SEGRME does not granger cause SEGRSE	.169	.844

Table 36 results show that HEGRHE does Granger Cause HEGRME F-statistics value is 6.427 and p-value is .003 while HEGRHE does Granger Cause HEGRSE F-statistics value

is 2.699 and p-value is .076 in this case granger causality in bi-direction. HEGRHE does Granger Cause MEGRHE F-Statistics value is 6.779 and p-value is .002 in this case granger causality in uni-direction. HEGRME does Granger Cause HEGRSE F-Statistics value is 20.408 and p-value is 2.00E-07 .HEGRME does granger Cause MEGRHE F-Statistics value is 55.205 and p-value is 7.00E-14 in this case granger causality in bi-direction.

Table 37*: Trading Volumes Granger Causality Test*

Lags: 2	F-Stat	P-Val
HTVHE does not granger cause HTVME	2.776	.071
HTVHE does not granger cause HTVSE	4.189	.020
HTVHE does not granger cause MTVHE	4.202	.020
HTVHE does not granger cause MTVME	1.578	.215
HTVHE does not granger cause MTVSE	1.229	.300
HTVHE does not granger cause STVHE	.550	.579
HTVHE does not granger cause STVME	2.139	.127
HTVHE does not granger cause STVSE	.108	.897
HTVME does not granger cause HTVSE	23.362	5.00^{-08}
HTVME does not granger cause MTVHE	15.446	5.00^{-06}
HTVME does not granger cause MTVME	1.747	.183
HTVME does not granger cause MTVSE	.243	.784
HTVME does not granger cause STVHE	.540	.585
HTVME does not granger cause STVSE	.317	.729
HTVSE does not granger cause MTVHE	.206	.814
HTVSE does not granger cause MTVME	1.155	.322
HTVSE does not granger cause MTVSE	1.988	.146
HTVSE does not granger cause STVHE	4.170	.020
HTVSE does not granger cause STVME	1.603	.210
HTVSE does not granger cause STVSE	.492	.613
MTVHE does not granger cause MTVME	1.294	.282
MTVHE does not granger cause MTVSE	.422	.657
MTVHE does not granger cause STVHE	1.129	.330
MTVHE does not granger cause STVME	.381	.684
MTVHE does not granger cause STVSE	.467	.628
MTVME does not granger cause MTVSE	1.362	.264
MTVME does not granger cause STVHE	9.022	.000
MTVME does not granger cause STVME	8.664	.000
MTVME does not granger cause STVSE	1.238	.297
MTVSE does not granger cause STVHE	47.315	1.00^{-12}
MTVSE does not granger cause STVME	42.825	6.00^{-12}
MTVSE does not granger cause STVSE	.449	.640

STVHE does not granger cause STVME	.788	.459
STVHE does not granger cause STVSE	.921	.403
STVME does not granger cause STVSE	.504	.606

Table 37 results show that HTVHE does Granger Cause HTVME F-statistics value is 2.776 and p-value is .071 while HTVHE does Granger Cause HTVSE F-statistics value is 4.189 and p-value is .020 in this case granger causality in bi-direction. HTVHE does Granger Cause MTVHE F-Statistics value is 4.202 and p-value is .020 in this case granger causality in uni-direction. HTVME does Granger Cause HTVSE F-Statistics value is 23.362 and p-value is 5.00E-08 ,while HTVME does granger Cause MTVHE F-Statistics value is 15.446 and p-value is 5.00E-06 in this case granger causality in bi-direction. HTVSE does Granger Cause STVHE F-Statistics value is 4.170 and p-value is .020 in this case granger causality in uni-direction. MTVHE does Granger Cause STVHE F-Statistics value is 9.022 and p-value is .000 while MTVME does Granger Cause STVME F-statistics value is 8.664 and p-value is .000 in this case granger causality in bi-direction. MTVSE does Granger Cause STVHE F-statistics value is 47.315 and p-value is 1.00E-12 while MTVSE does Granger Cause STVME F-statistics value is 42.825 and p-value is 6.00E-12 in this case granger causality in bi-direction.

Table 38*: Institutional Ownership Ratio Variance Decomposition:*

Period	S.E.	HIORHE	HIORME	HIORSE	MIORHE	MIORME	MIORSE	SIORHE	SIORME	SIORSE
1	.012	100	.000	.000	.000	.000	.000	.000	.000	.000
2	.013	81.408	.006	11.117	.408	3.539	.010	.563	2.510	.434
3	.015	68.824	.079	11.392	2.400	9.688	.659	2.183	2.353	2.418
4	.015	67.466	.177	12.680	2.390	9.485	.778	2.154	2.509	2.358
5	.015	64.876	.494	12.173	4.603	9.103	1.087	2.750	2.496	2.412
6	.015	64.079	.640	12.214	5.143	9.046	1.085	2.793	2.473	2.522
7	.015	63.868	.662	12.442	5.130	9.017	1.083	2.784	2.471	2.541
8	.015	63.775	.677	12.489	5.159	9.010	1.095	2.782	2.473	2.537
9	.015	63.679	.676	12.573	5.173	9.008	1.093	2.785	2.470	2.538
10	.015	63.661	.678	12.568	5.175	9.003	1.101	2.800	2.469	2.540

Table 38 outcomes demonstrate that variance decomposition shows measure of data every factor adds to different factors in the auto regression. It decides the amount of the

estimate forecast difference of every one of the factors can be disclosed by exogenous shocks to alternate factors. The outcome shows that quarter 3 in short-run, impulse or shock to HIORHE represent 81.408 percent deviation of the changeability in HIORHE (own shock), shock to HIORME can cause .079 percent, HIORSE can cause 11.392 percent, MIORHE can cause 2.400 percent, MIORME can cause 9.688 percent, MIORSE can cause .659 percent, SIORHE can cause 2.183 percent, SIORME can cause 2.353 percent and SIORSE can cause 2.418 percent fluctuations in HIORHE. In the long run, that is quarter 10 shocks to HIORHE account for 63.661 percent variation of the fluctuation in HIORHE (own shock), shock to HIORME can cause .678 percent, HIORSE can cause 12.568 percent, MIORHE can cause 5.175 percent, MIORME can cause 9.003 percent, MIORSE can cause 1.101 percent, SIORHE can cause 2.800 percent, SIORME can cause 2.469 percent and SIORSE can cause 2.540 percent fluctuations in HIORHE.

Table 39*: Size Variance Decomposition:*

Period	S.E.	HSHE	HSME	HSSE	MSHE	MSME	MSSE	SSHE	SSME	SSSE
1	.006	100	.000	.000	.000	.000	.000	.000	.000	.000
2	.007	82.700	.044	10.056	.123	.117	2.891	.927	2.184	.953
3	.008	67.218	.417	10.042	.341	5.852	2.467	1.407	11.467	.786
4	.008	65.293	.845	10.355	.888	6.678	2.479	1.403	11.253	.801
5	.008	64.349	1.296	10.219	1.660	6.725	2.451	1.381	11.125	.791
6	.008	64.114	1.321	10.331	1.740	6.698	2.492	1.397	11.085	.819
7	.008	63.869	1.312	10.367	1.747	6.899	2.485	1.404	11.028	.883
8	.008	63.812	1.315	10.359	1.761	6.898	2.537	1.406	11.024	.883
9	.008	63.784	1.324	10.350	1.759	6.928	2.538	1.411	11.016	.885
10	.008	63.778	1.325	10.349	1.761	6.929	2.539	1.415	11.016	.885

Table 39 outcomes demonstrate that variance decomposition shows measure of data every factor adds to different factors in the auto regression. It decides the amount of the estimate forecast difference of every one of the factors can be disclosed by exogenous shocks to alternate factors. The outcome shows that quarter 3 in short-run, impulse or shock to HSHE represent 67.218 percent deviation of the changeability in HSHE (own shock), shock

to HSME can cause .417 percent, HSSE can cause 10.042 percent, MSHE can cause .341 percent, MSME can cause 5.852 percent, MSSE can cause 2.467 percent, SSHE can cause 1.407 percent, SSME can cause 11.467 percent and SSSE can cause .786 percent fluctuations in HSHE. In the long run, that is quarter 10 shocks to HSHE account for 63.778 percent variation of the fluctuation in HSHE (own shock), shock to HSME can cause 1.325 percent, HSSE can cause 10.349 percent, MSHE can cause 1.761 percent, MSME can cause 6.929 percent, MSSE can cause 2.539 percent, SSHE can cause 1.415 percent, SSME can cause 11.016 percent and SSSE can cause .885 percent fluctuations in HSHE.

Table 40: *Earnings Growth Rates Variance Decomposition:*

Table 40 outcomes demonstrate that variance decomposition shows measure of data every factor adds to different factors in the auto regression. It decides the amount of the

Period	S.E.	HEGRHE	HEGRME	HEGRSE	MEGRHE	MEGRME	MEGRSE	SEGRHE	SEGRME	SEGRSE
1	.009	100	.000	.000	.000	.000	.000	.000	.000	.000
2	.010	94.512	.551	.064	.379	.166	1.042	3.196	.006	.080
3	.010	88.732	1.058	2.226	1.276	.206	2.577	3.107	.728	.083
4	.010	84.393	3.499	2.262	1.227	.303	4.044	3.385	.764	.118
5	.010	84.250	3.574	2.215	1.194	.361	4.047	3.298	.857	.202
6	.011	83.406	3.939	2.239	1.218	.369	4.128	3.338	1089	.270
7	.011	83.264	3.933	2.273	1.246	.408	4.125	3.374	1.086	.286
8	.011	83.131	3.930	2.287	1.249	.409	4.220	3.378	1.091	.301
9	.011	83.082	3.965	2.286	1.249	.421	4.225	3.377	1.091	.301
10	.011	83.069	3.967	2.289	1.249	.421	4.223	3.381	1.092	.303

estimate forecast difference of every one of the factors can be disclosed by exogenous shocks to alternate factors. The outcome shows that quarter 3 in short-run, impulse or shock to HEGRHE represent 88.732 percent deviation of the changeability in HEGRHE (own shock), shock to HEGRME can cause 1.058 percent, HEGRSE can cause 2.226 percent, MEGRHE can cause 1.276 percent, MEGRME can cause .206 percent, MEGRSE can cause 2.577 percent, SEGRHE can cause 3.107 percent, SEGRME can cause .728 percent and SEGRSE can cause 0.083 percent fluctuations in HEGRHE. In the long run, that is quarter 10 shocks to

HEGRHE account for 83.069 percent variation of the fluctuation in HEGRHE (own shock), shock to HEGRME can cause 3.967 percent, HEGRSE can cause 2.289 percent, MEGRHE can cause 1.249 percent, MEGRME can cause .421 percent, MEGRSE can cause 4.223 percent, SEGRHE can cause 3.381 percent, SEGRME can cause 1.092 percent and SEGRSE can cause .303percent fluctuations in HEGRHE.

Table 41*: Trading Volume Variance Decomposition:*

Period	S.E.	HTVHE	HTVME	HTVSE	MTVHE	MTVME	MTVSE	STVHE	STVME	STVSE
1	.007	100	.000	.000	.000	.000	.000	.000	.000	.000
2	.007	84.255	1.505	4.060	5.610	.617	3.807	.042	.007	.092
3	.008	76.266	2.092	5.819	7.672	1.803	4.178	.233	.363	1.570
4	.008	75.067	2.128	5.722	8.440	1.938	4.500	.228	.362	1.611
5	.008	73.912	2.478	6.008	8.926	1.914	4.450	.248	.470	1.590
6	.008	73.727	2.471	6.000	8.957	1.955	4.550	.247	.482	1.606
7	.008	73.602	2.476	6.027	8.982	2.008	4.559	.247	.481	1.613
8	.008	73.586	2.481	6.028	8.987	2.011	4.561	.247	.481	1.612
9	.008	73.568	2.484	6.028	8.985	2.012	4.567	.257	.483	1.612
10	.008	73.555	2.484	6.028	8.991	2.017	4.569	.257	.483	1.612

Table 41outcomes demonstrate that variance decomposition shows measure of data every factor adds to different factors in the auto regression. It decides the amount of the estimate forecast difference of every one of the factors can be disclosed by exogenous shocks to alternate factors. The outcome show that quarter 3 in short-run, impulse or shock to HTVHE represent 76.266 percent deviation of the changeability in HTVHE (own shock), shock to HTVME can cause 2.092 percent, HTVSE can cause 5.819 percent, MTVHE can cause 7.672 percent, MTVME can cause 1.803 percent, MTVSE can cause 4.178 percent, STVHE can cause .233 percent, STVME can cause .363 percent and STVSE can cause 1.570 percent fluctuations in HTVHE. In the long run, that is quarter 10 shocks to HTVHE account for 73.555 percent variation of the fluctuation in HTVHE (own shock), shock to HTVME can cause 2.484 percent, HTVSE can cause 6.028 percent, MTVHE can cause 8.99 percent, MTVME can cause 2.017 percent, MTVSE can cause 4.569 percent, STVHE can cause .257

percent, STVME can cause .483 percent and STVSE can cause 1.612 percent fluctuations in HTVHE.

Table 42*: Vector Error Correction Model Institutional Ownership Ratio*

Error Correction:	D(HIORHE)	D(HIORME)	D(HIORSE)
CointEq1	-1.062	-.185	.054
	-.217	-.140	-.140
	[-4.884]	[-1.318]	[.386]
D (HIORHE (-1))	.348	.254	.116
	-.188	-.121	-.121
	[1.850]	[2.093]	[.956]
D (HIORHE (-2))	.048	.031	-.035
	-.136	-.088	-.088
	[.354]	[.355]	[-.405]
F-statistic	6.651	4.158	2.241

Table 42 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HIORHE 4.88 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HIORME 1.31 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HIORSE .388 percent in one period of time. Error correction model equation as follows:

D(HIORHE) = C(1)*(HIORHE(-1) + 2.2529710775*HIORME(-1) - 5.46123697155*HIORSE(-1) - .000684682159513) + C(2)*D(HIORHE(-1)) + C(3)*D(HIORHE(-2)) + C(4)*D(HIORME(-1)) + C(5)*D(HIORME(-2)) + C(6)*D(HIORSE(-1)) + C(7)*D(HIORSE(-2)) + C(8)

C (1)-.5618 is negative in sign and significant, at that point we can state that there is a long run causality running from HIORHE and HIORME to HIORSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a short run causality running from HIORHE and HIORME to HIORSE. The F- analytical is equivalent to 4.518, which is bigger than the F-critical value of 3.84. In place of F-analytical is bigger than F-critical, thus the null hypothesis is accepted.

Table 43*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	4.518	(3, 51)	.006
Chi-square	13.554	3	.003

Table 44*: Vector Error Correction Model Medium Institutional Ownership Ratio*

Error Correction:	D(MIORHE)	D(MIORME)	D(MIORSE)
CointEq1	-.131	.362	.177
	-.067	-.090	-.036
	[-1.945]	[4.022]	[4.842]
D (MIORHE (-1))	-.258	-.333	-.204
	-.118	-.158	-.064
	[-2.174]	[-2.105]	[-3.171]
D (MIORHE (-2))	-.324	-.140	-.131
	-.111	-.148	-.060
	[-2.906]	[-.945]	[-2.172]
F-statistic	4.941	5.918	7.837

Table 44 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MIORHE 1.94 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MIORME 4.02 percent in one period of time. The outcomes of VECM display demonstrate

that the short-term disequilibrium is for the most part adjusted MIORSE 4.84 percent in one period of time. Error correction model equation as follows:

D(MIORHE) = C(1)*(MIORHE(-1) - 3.65933778862*MIORME(-1) - 7.4235747335*MIORSE(-1) + .00188223990677) + C(2)*D(MIORHE(-1)) + C(3)*D(MIORHE(-2)) + C(4)*D(MIORME(-1)) + C(5)*D(MIORME(-2)) + C(6)*D(MIORSE(-1)) + C(7)*D(MIORSE(-2)) + C(8)

C (1) -.046 is negative in sign and significant, at that point we can state that there is a long run causality running from MIORHE and MIORME to MIORSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a no short run causality running from MIORHE and MIORME to MIORSE. The F-analytical is equivalent to 1.946, which is lower than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 45*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	1.946	(3, 53)	.133
Chi-square	5.840	3	.119

Table 46: Vector Error Correction Model Small Institutional Ownership Ratio

Error Correction:	D(SIORHE)	D(SIORME)	D(SIORSE)
CointEq1	-.167	1.049	.831
	-.133	-.265	-.241
	[-1.253]	[3.955]	[3.443]
D (SIORHE (-1))	-.463	.110	-.505
	-.172	-.341	-.310
	[-2.692]	[.324]	[-1.627]
D (SIORHE (-2))	-.368	.048	-.470
	-.147	-.292	-.266
	[-2.495]	[.165]	[-1.768]
F-statistic	2.884	8.287	4.728

Table 46 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SIORHE 1.25 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted

SIORME 3.95 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SIORSE 3.44 percent in one period of time. Error correction model equation as follows:

D(SIORHE) = C(1)*(SIORHE(-1) - .570180109382*SIORME(-1) - .772399704766*SIORSE(-1) - .00120349885178) + C(2)*D(SIORHE(-1)) + C(3)*D(SIORHE(-2)) + C(4)*D(SIORME(-1)) + C(5)*D(SIORME(-2)) + C(6)*D(SIORSE(-1)) + C(7)*D(SIORSE(-2)) + C(8)

C (1) -.200 is negative in sign and significant, at that point we can state that there is a long run causality running from SIORHE and SIORME to SIORSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a no short run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to .666, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 47*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	.666	(3, 51)	.576
Chi-square	1.999	3	.572

Table 48*: Vector Error Correction Model Size high*

Error Correction:	D(HSHE)	D(HSME)	D(HSSE)
	-.024	-.039	-.029
	-.007	-.006	-.008
CointEq1	[-3.449]	[-5.759]	[-3.604]
	-.670	.236	.299
	-.137	-.133	-.159
D (HSHE (-1))	[-4.882]	[1.762]	[1.882]
	-.326	.013	.095
	-.139	-.135	-.161
D (HSHE (-2))	[-2.340]	[.097]	[.591]
F-statistic	4.203	15.430	10.493

Table 48 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HSHE 3.44 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted

HSME 5.75 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HSSE 3.60 percent in one period of time. Error correction model equation as follows:

D(HSHE) = C(1)*(HSHE(-1) - 2.77172541206*HSME(-1) + 1.93578568766*HSSE(-1) - .0020265548092) + C(2)*D(HSHE(-1)) + C(3)*D(HSHE(-2)) + C(4)*D(HSME(-1)) + C(5)*D(HSME(-2)) + C(6)*D(HSSE(-1)) + C(7)*D(HSSE(-2)) + C(8)

C (1) .057 is negative in sign and significant, at that point we can state that there is a long run causality running from HSHE and HSME to HSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a no short run causality running from HSHE and HSME to HSSE. The F-statistic is equal to 1.683, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 49*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	1.683	(3, 53)	.181
Chi-square	5.051	3	.168

Table 50*: Vector Error Correction Model Size Medium*

Error Correction:	D(MSHE)	D(MSME)	D(MSSE)
CointEq1	-.485	.751	.476
	-.197	-.259	-.269
	[-2.464]	[2.898]	[1.768]
D (MSHE (-1))	-.362	-.250	-.161
	-.174	-.229	-.238
	[-2.076]	[-1.090]	[-.675]
D (MSHE (-2))	-.156	-.071	-.017
	-.110	-.145	-.151
	[-1.408]	[-.493]	[-.114]
F-statistic	12.804	3.393	2.559

Table 50 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MSHE 2.46 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MSME 2.89 percent in one period of time. The outcomes of VECM display demonstrate that the

short-term disequilibrium is for the most part adjusted MSSE 1.76 percent in one period of time. Error correction model equation as follows:

D(MSHE) = C(1)*(MSHE(-1) + 5.54627944472*MSME(-1) - 4.20450189921*MSSE(-1) - .00158290592666) + C(2)*D(MSHE(-1)) + C(3)*D(MSHE(-2)) + C(4)*D(MSME(-1)) + C(5)*D(MSME(-2)) + C(6)*D(MSSE(-1)) + C(7)*D(MSSE(-2)) + C(8)

C (1) -.165 is negative in sign and significant, at that point we can state that there is a long run causality running from MSHE and MSME to MSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a short run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 4.46, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 51*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	4.460	(3, 53)	.007
Chi-square	13.382	3	.003

Table 52: Vector Error Correction Model Size small

Error Correction:	D(SSHE)	D(SSME)	D(SSSE)
CointEq1	-.792	-.256	-.565
	-.267	-.247	-.275
	[-2.967]	[-1.035]	[-2.050]
D (SSHE (-1))	-.048	.269	.554
	-.237	-.220	-.245
	[-.204]	[1.222]	[2.258]
D (SSHE (-2))	-.108	.181	.413
	-.182	-.169	-.188
	[-.592]	[1.068]	[2.194]
F-statistic	4.448	5.988	3.605

Table 52 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SSHE 2.96 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MSME 1.03 percent in one period of time. The outcomes of VECM display demonstrate that

the short-term disequilibrium is for the most part adjusted SSSE 2.05 percent in one period of time. Error correction model equation as follows:

D(SSHE) = C(1)*(SSHE(-1) -.831057054676*SSME(-1) + .282145132515*SSSE(-1) + .000470336843961) + C(2)*D(SSHE(-1)) + C(3)*D(SSHE(-2)) + C(4)*D(SSME(-1)) + C(5)*D(SSME(-2)) + C(6)*D(SSSE(-1)) + C(7)*D(SSSE(-2)) + C(8)

C (1)-.826 is negative in sign and significant, at that point we can state that there is a long run causality running from MSHE and MSME to MSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 1.54, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 53*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	1.546	(3, 53)	.213
Chi-square	4.640	3	.200

Table 54: Vector Error Correction Model Earnings Growth Rates high

Error Correction:	D(HEGRHE)	D(HEGRME)	D(HEGRSE)
CointEq1	-.151	1.228	-.159
	-.134	-.260	-.164
	[-1.130]	[4.720]	[-.969]
D (HEGRHE (-1))	-.310	-.198	.517
	-.197	-.382	-.241
	[-1.572]	[-.519]	[2.139]
D (HEGRHE (-2))	-.020	-.168	.516
	-.169	-.328	-.207
	[-.122]	[-.511]	[2.483]
F-statistic	2.470	8.468	11.681

Table 54 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HEGRHE 1.13 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted

HEGRME 4.72 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HEGRSE .96 percent in one period of time. Error correction model equation as follows:

D(HEGRHE) = C(1)*(HEGRHE(-1) - 1.33938702161*HEGRME(-1) + .596920039971*HEGRSE(-1) + .002604183926) + C(2)*D(HEGRHE(-1)) + C(3)*D(HEGRHE(-2)) + C(4)*D(HEGRME(-1)) + C(5)*D(HEGRME(-2)) + C(6)*D(HEGRSE(-1)) + C(7)*D(HEGRSE(-2)) + C(8)

C (1) -.117 is negative in sign and significant, at that point we can state that there is a long run causality running from MSHE and MSME to MSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short-run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 1.62, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 55*: Wald Test*

Test Statistic	Value	Df	Probability
F-statistic	1.626	(3, 51)	.194
Chi-square	4.880	3	.180

Table 56: Vector Error Correction Model Earnings Growth Rates Medium

Error Correction:	D(MEGRHE)	D(MEGRME)	D(MEGRSE)
CointEq1	-1.233	-.049	.072
	-.142	-.129	-.226
	[-8.645]	[-.382]	[.318]
D (MEGRHE (-1))	.118	.062	-.100
	-.105	-.096	-.168
	[1.117]	[.652]	[-.600]
D (MEGRHE (-2))	.032	.036	-.089
	-.065	-.059	-.104
	[.500]	[.615]	[-.861]
F-statistic	59.001	4.420	3.185

Table 56 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MEGRHE 8.64 percent in one period of time. The outcomes of

VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MEGRME 0.38 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MEGRSE .31 percent in one period of time. Error correction model equation as follows:

D(MEGRHE)=C(1)*(MEGRHE(-1) + 1.48324872064*MEGRME(-1) - 1.10195607784*MEGRSE(-1) - .00051048851672) + C(2)*D(MEGRHE(-1)) + C(3)*D(MEGRHE(-2)) + C(4)*D(MEGRME(-1)) + C(5)*D(MEGRME(-2)) + C(6)*D(MEGRSE(-1)) + C(7)*D(MEGRSE(-2)) + C(8)

C (1)-1.446 is negative in sign and significant, at that point we can state that there is a long run causality running from MSHE and MSME to MSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is a short-run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 6.54, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 57*: Wald Test*

Test Statistic	Value	Df	Probability
F-statistic	6.540	(3, 51)	.000
Chi-square	19.621	3	.000

Table 58*: Vector Error Correction Model Earnings Growth Rates Small*

Error Correction:	D(SEGRHE)	D(SEGRME)	D(SEGRSE)
CointEq1	-.635	-.168	-.657
	-.298	-.377	-.201
	[-2.131]	[-.445]	[-3.257]
D (SEGRHE (-1))	.168	.207	.406
	-.247	-.313	-.167
	[.678]	[.663]	[2.421]
D (SEGRHE (-2))	-.338	-.138	.236
	-.228	-.288	-.154
	[-1.482]	[-.478]	[1.532]
F-statistic	4.055	2.673	4.735

Table 58 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SEGRHE 2.13 percent in one period of time. The outcomes of VECM

display demonstrate that the short-term disequilibrium is for the most part adjusted SEGRME .44 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SEGRSE 3.25 percent in one period of time. Error correction model equation as follows:

D(SEGRHE) = C(1)*(SEGRHE(-1) - .361750024854*SEGRME(-1) + 1.28961908795*SEGRSE(-1) + .00300438806757) + C(2)*D(SEGRHE(-1)) + C(3)*D(SEGRHE(-2)) + C(4)*D(SEGRME(-1)) + C(5)*D(SEGRME(-2)) + C(6)*D(SEGRSE(-1)) + C(7)*D(SEGRSE(-2)) + C(8)

C (1)-.668 is negative in sign and significant, at that point we can state that there is a long run causality running from MSHE and MSME to MSSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short-run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 1.71, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 59: *Wald Test*

Test Statistic	Value	Df	Probability
F-statistic	1.712	(3, 51)	.176
Chi-square	5.136	3	.162

Table 60: Vector Error Correction Model Trading Volume High

Error Correction:	D(HTVHE)	D(HTVME)	D(HTVSE)
CointEq1	-.6170	-.5416	-.0847
	-.1182	-.1458	-.1096
	[-5.2162]	[-3.7149]	[-.7724]
D (HTVHE (-1))	-.3114	.6467	-.0134
	-.1290	-.1591	-.1196
	[-2.4124]	[4.0650]	[-.1126]
D (HTVHE (-2))	-.0206	.2774	-.2032
	-.1338	-.1649	-.1240
	[-.1542]	[1.6816]	[-1.6378]
F-statistic	7.9003	5.4298	17.1839

Table 60 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HTVHE 5.21 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HTVME 3.71 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted HTVSE .77 percent in one period of time. Error correction model equation as follows:

D(HTVHE) = C(1)*(HTVHE(-1) + 1.18805909197*HTVME(-1) - .689268595235*HTVSE(-1) + .00151567828305) + C(2)*D(HTVHE(-1)) + C(3)*D(HTVHE(-2)) + C(4)*D(HTVME(-1)) + C(5)*D(HTVME(-2)) + C(6)*D(HTVSE(-1)) + C(7)*D(HTVSE(-2)) + C(8)

C (1)-.712 is negative in sign and significant, at that point we can state that there is a long run causality running from HTVHE and HTVME to HTVSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 1.92, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 61*: Wald Test:*

Test Statistic	Value	df	Probability
F-statistic	1.920	(3, 51)	.137
Chi-square	5.762	3	.123

Table 62*: Vector Error Correction Model Trading Volume Medium*

Error Correction:	D(MTVHE)	D(MTVME)	D(MTVSE)
CointEq1	-.095	-.327	-.294
	-.103	-.067	-.114
	[-.922]	[-4.863]	[-2.582]
D (MTVHE (-1))	-.615	.284	.303
	-.124	-.080	-.136
	[-4.958]	[3.520]	[2.220]
D (MTVHE (-2))	-.282	.069	.142
	-.118	-.076	-.130
	[-2.387]	[.905]	[1.089]
F-statistic	5.557	8.164	4.579

Table 62 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MTVHE .92 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MTVME 4.86 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted MTVSE 2.58 percent in one period of time. Error correction model equation as follows:

D(MTVHE) = C(1)*(MTVHE(-1) + 3.48737482295*MTVME(-1) + 1.74713335272*MTVSE(-1) - .00691954003575) + C(2)*D(MTVHE(-1)) + C(3)*D(MTVHE(-2)) + C(4)*D(MTVME(-1)) + C(5)*D(MTVME(-2)) + C(6)*D(MTVSE(-1)) + C(7)*D(MTVSE(-2)) + C(8)

C (1)-.069 is negative in sign and significant, at that point we can state that there is a long run causality running from HTVHE and HTVME to HTVSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to .89, which is less than the F-critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 63*: Wald Test*

Test Statistic	Value	df	Probability
F-statistic	.896	(3, 51)	.449
Chi-square	2.688	3	.442

Table 64: Vector Error Correction Model Trading Volume Small

Error Correction:	D(STVHE)	D(STVME)	D(STVSE)
CointEq1	-.754	-.585	-1.716
	-.266	-.339	-.317
	[-2.828]	[-1.725]	[-5.409]
D (STVHE (-1))	.297	.665	.578
	-.252	-.321	-.300
	[1.176]	[2.068]	[1.922]
D (STVHE (-2))	-.200	.220	.742
	-.221	-.282	-.264
	[-.904]	[.782]	[2.809]
F-statistic	4.284	2.994	6.088

Table 64 outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted STVHE 2.82 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted STVME 1.72 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted STVSE 5.40 percent in one period of time. Error correction model equation as follows:

D(STVHE) = C(1)*(STVHE(-1) - 0.164424262523*STVME(-1) + .620543700564*STVSE(-1) + .0013899613483) + C(2)*D(STVHE(-1)) + C(3)*D(STVHE(-2)) + C(4)*D(STVME(-1)) + C(5)*D(STVME(-2)) + C(6)*D(STVSE(-1)) + C(7)*D(STVSE(-2)) + C(8)

C (1)-.955 is negative in sign and significant, at that point we can state that there is a long run causality running from HTVHE and HTVME to HTVSE. Short run causality C (5) = C (6) =C (7) =0 and now move to Wald test there is no short-run causality running from SIORHE and SIORME to SIORSE. The F-statistic is equal to 2.35, which is less than the F-

critical value of 3.84. In place of F-analytical is lower than F-critical, thus the null hypothesis is rejected.

Table 65*: Wald Test:*

Test Statistic	Value	df	Probability
F-statistic	2.350	(3, 51)	.083
Chi-square	7.052	3	.070

4.2.1 Model 3 Panel Regression Firm Level Return Predictability:

In this study model 3 based on panel regression to predict firm stock returns with the help of firm level predictors including; size, earnings growth rate and institutional ownership ratio, and market level predictors including; trading volume, book-to-market ratio and momentum. In this study unbalanced panel data is used for 363 firms from June 1999 to December 2007 and June 2009 to December 2015. The time period for the panel is divided into pre and post financial crisis sub-samples. During 2008 stock exchange index remained freeze and therefore it is excluded from the analysis. Firstly, in this study applied Redundant Fixed Effects Tests, actually this test useful to select appropriate test technique like common effect or fixed effect. If the chi-square is significant which shows that fixed effect model is more appropriate over common effect. Further, step is taking to use Hausman Test to select appropriate technique like fixed effect is more suitable or random effect. Next, step this study run Correlated Random Effects - Hausman Test. The Hausman test results indicate that p-value is insignificant. Therefore, Pool A (fixed effect model) is more appropriate random effect model. In this study above same test procedure applied to Pool B and Pool C. The value of Hausman test is statistically significant in pool B therefore; random effect model is preferred over fixed effect model. On the other hand, Pool C results indicate that Hausman

test is statistically insignificant therefore fixed effect model is preferred over random effect model.

Table 66: *Redundant Fixed Effects Tests*

Effects Test	Statistic	d.f.	Prob.
Cross-section F	30.489	3,625,800	.000
Cross-section Chi-square	6574.468	362	.000

Table 66 results indicate that p-value of cross-section chi-square is significant at .001 level of significance which show that fixed effect model is preferred over common effect model.

Table 67: Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	41.036	6	.000

Table 67 result shows that the value of Hausman test is statistically significant therefore random effect model is preferred over fixed effect model.

Pool A:

Table 68: *Random effect Model 1999 to 2007*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.103	.007	13.534	.000
BMR	.011	.002	3.981	.000
EGR	.000	5.33^{-05}	2.035	.041
IOR	3.02^{-11}	1.13^{-10}	.266	.789
MOM	.053	.002	25.470	.000
SIZE	-.001	.001	-1.484	.137
TV	.002	.000	4.484	.000
R-squared	.055			
Adjusted R-squared	.055			
F-statistic	120.782	Durbin-Watson stat		2.232
Prob(F-statistic)	.000			

Table 68 shows the result of the random effect model for firm and market level variables on stock returns for the pre-financial crisis period of July1999 to December 2007. The coefficients of book-to-market ratio, institutional ownership ratio, size and trading volume

are statistically insignificant as their p-values are above any acceptable significance level. The coefficients of earnings growth rate and momentum, however, are statistically significant at .01 and .05 level of significance, respectively. The results show that stock returns are significantly positively affected by earnings growth rate while momentum is significantly negatively associated with stock returns.

Table 69*: Redundant Fixed Effects Tests*

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.176933	-3,629,795	0.012
Cross-section Chi-square	432.755	362	0.006

Table 69 result indicate that p-value of cross-section chi-square is significant at .01 level of significance which shows that fixed effect model is preferred over common effect model.

Table 70: *Correlated Random Effects - Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	125.755	6	.000

Table 70 shows that the value of Hausman test is statistically significant therefore random effect model is preferred over fixed effect model.

Pool B:

Table 71*: Random effect 2009 to 2015*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.147	.013	10.547	.000
BMR	-.002	.004	-.501	.615
EGR	.096	.005	18.798	.000
IOR	.049	.003	15.702	.000
MOM	-.144	.013	-10.744	.000
SIZE	-.001	.001	-.962	.336
TV	.002	.000	3.601	.000
R-squared	.076			
Adjusted R-squared	.076			
F-statistic	139.873	Durbin-Watson stat		1.496
Prob(F-statistic)	.000			

Table 71 shows the result of the random effect model for firm and market level variables on stock returns for the post financial crisis period of July 2009-December 2015. The coefficients of book-to-market ratio, and size are statistically insignificant as their p-value are above any acceptable significance level. The coefficients of institutional ownership ratio, momentum and trading volume; and earnings growth rate, however, are statistically significant at 0.01 and 0.05 level of significance, respectively. The results show that stock returns are significant positively affected by earnings growth rate while momentum is significantly negatively associated with stock returns.

Table 72*: Redundant Fixed Effects Tests*

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.610	-36,221,765	.000
Cross-section Chi-square	1635.298	362	.000

Table 72 result shows that p-value of cross-section chi-square is significant at .01 level of significance which shows that fixed effect model is preferred over common effect model.

Table 73*: Correlated Random Effects - Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.40	6	.445

Table 73 shows that the value of Hausman test is statistically insignificant therefore fixed effect model is preferred over random effect model.

Pool C

Table 74*: Fixed effect model 1999 to 2015*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.096	.008	10.994	.000
BMR	.013	.003	3.837	.000
EGR	.000	6.72^{-05}	2.721	.006
IOR	5.14^{-11}	1.43^{-10}	.359	.719
MOM	.053	.002	21.705	.000
SIZE	-.004	.001	-3.326	.000
TV	.005	.000	8.288	.000
R-squared	.026			
Adjusted R-squared	.010			
F-statistic	1.639	Durbin-Watson stat		2.198
Prob(F-statistic)	.000			

Table 74 shows the result of the fixed effect model for firm and market level variables on stock returns for the entire period of July 1999-December 2007 and July 2009-Decemebr 2015. The coefficients of book-to-market ratio and trading volume are statistically insignificant as their p-values are above any acceptable significance level. The coefficients of size and earnings growth rate; momentum, and institutional ownership ratio however, are statistically significant at .01, .05 and .1 level of significance, respectively. The results show that stock returns are significantly positively affected by earnings growth rate while momentum is significantly negatively associated with stock returns.

Panel A

Table 75 Wald Test: 1999 to 2007

Test Statistic	Value	df	Probability
F-statistic	697.878	(2, 12233)	0
Chi-square	1395.756	2	0

Table 76 Panel Generalised Method of Moment 1999 to 2007

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.103	.007	13.713	.000
BMR	.011	.002	4.034	.000
EGR	.000	5.26^{-05}	2.062	.039
IOR	3.02^{-11}	1.12^{-10}	.270	.787
MOM	5.33^{-02}	2.07^{-03}	25.808	.000
SIZE	-.001	1.12^{-03}	-1.503	.132
TV	.002	.000	4.543	.000
R-squared	.055			
Adjusted R-squared	.055			
Durbin-Watson stat	2.232	J-statistic		1.48^{-22}
Instrument rank	7			

Table 76 presents results from the estimation of the competing models within the GMM framework. In panel A we report the results for the proposed predictor of firm level portfolio model. The coefficients of BMR, MOM, EGR and TV are statistically significant, which suggests that these investment growth rates can help explain the test assets. The only factor IOR and size that do not receive either a significant level. The coefficient of IOR, and SIZE are negative and insignificant, whereas that of BMR, EGR and TV coefficient are positive and significant level of .005 and .001. The coefficient of MOM is negative but statically significant at .001 level. The *J*-statistic has an associated *p*-value of 1.48^{-22}, which indicates that the model cannot be rejected. The Panel A Wald test results indicate that F-stat 697.878 and p-value .000.Table the key empirical results based on the estimation of a system GMM model for panel data. The system GMM yields the best overall results because the lagged dependent variable is significantly dependent variables. The predictive capacity of some financial and economic factors has found supportive evidence in the academic research outcome. The result indicates that when last year stock prices (t-1) increased by ten percent, this increases current year's stock prices by .05 percentage points. This reveals that investor's expectation of current prices based on earlier prices is rational.

PANEL B

Table 77 Wald Test:2009 to 2015

Test Statistic	Value	df	Probability
F-statistic	76.09017	(2, 10071)	0
Chi-square	152.1803	2	0

Table 78 Panel Generalised Method of Moment 2009 to 2015

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.147	.013	10.672	.000
BMR	-.002	.004	-.507	.611
EGR	.096	.005	19.019	.000
IOR	.049	.003	15.887	.000
MOM	-.144	.013	-10.870	.000
TV	.002	.000	3.643	.000
SIZE	-.001	.001	-.973	.330
R-squared	.076			
Adjusted R-squared	.076			
Durbin-Watson stat	1.496	J-statistic		4.63^{-21}
Instrument rank	7			

Table 78 presents results from the estimation of the competing models within the GMM framework. In panel A we report the results for the proposed predictor of firm level portfolio model. The coefficients of EGR, IOR, MOM, and TV are statistically significant, which suggests that these investment growth rates can help explain the test assets. The only factor BMR and SIZE that do not receive either a significant level. The coefficient of BMR and SIZE are negative and insignificant, whereas that of EGR, IOR, MOM, and TV coefficient are positive and significant level of .005 and .001. The *J*-statistic has an associated *p*-value of 4.63^{-21}, which indicates that the model cannot be rejected. The Panel B Wald test results indicate that F-stat 76.090 and p-value .000.Table the key empirical results based on the estimation of a system GMM model for panel data. The system GMM yields the best overall results because the lagged dependent variable is significantly dependent variables. The predictive capacity of some financial and economic factors has found supportive

evidence in the academic research outcome. The result indicates that when last year stock prices (t-1) increased by ten percent, this increases current year's stock prices by .076 percentage points. This reveals that investor's expectation of current prices based on earlier prices is rational.

PANEL C

Table 79 Wald Test: 1999 to 2015

Test Statistic	Value	Df	Probability
F-statistic	543.8876	(2, 22313)	0
Chi-square	1087.775	2	0

Table 80 Panel Generalised Method of Moment 1999 to 2015

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.094	.007	13.273	.000
BMR	.009	.002	3.431	.000
EGR	.000	6.62^{-05}	2.742	.006
IOR	5.13^{-11}	1.41^{-10}	.364	.715
TV	.002	.000	5.819	.000
SIZE	-.002	.001	-2.462	.013
MOM	.054	.002	22.050	.000
R-squared	.024			
Adjusted R-squared	.024			
Durbin-Watson stat	2.194	J-statistic		2.05^{-21}
Instrument rank	7			

Table 80 presents results from the estimation of the competing models within the GMM framework. In panel A we report the results for the proposed predictor of firm level portfolio model. The coefficients of BMR, EGR, MOM, SIZE and TV are statistically significant, which suggests that these investment growth rates can help explain the test assets. The only factor IOR that do not receive either a significant level. The coefficient of IOR is negative and insignificant, whereas that of BMR, EGR, MOM, SIZE and TV coefficient are positive and significant level of .005 and .001. The *J*-statistic has an associated *p*-value of

2.05^{-21}, which indicates that the model cannot be rejected. The Panel C Wald test results indicate that F-stat 543.887 and p-value .000.Table the key empirical results based on the estimation of a system GMM model for panel data. The system GMM yields the best overall results because the lagged dependent variable is significantly dependent variables. The predictive capacity of some financial and economic factors has found supportive evidence in the academic research outcome. The result indicates that when last year stock prices (t-1) increased by ten percent, this increases current year's stock prices by .024 percentage points. This reveals that investor's expectation of current prices based on earlier prices is rational.

Table 81: Mean Square of Error Regression Results

Variable	Coefficient	Std.	t-Statistic	Prob.
C	3.266	.216	15.056	.000
BMR	.642	.197	3.246	.001
EGR	.062	.040	1.544	.127
IOR	-.140	.105	-1.328	.189
MOM	.677	.133	5.077	.000
SIZE	-.037	.270	-.145	.871
TV	-.020	.099	.201	.841
R-squared		.274		
Adjusted R-squared		.249		
F-statistic		11.147	Durbin-Watson stat	2.305
Prob. (F-statistic)		.000		

Dependent variable: Stock returns

Table 81 shows the result of the mean square of error for firm and market level variables on stock returns for the entire period of July 1999-December 2007 and July 2009-Decemebr 2015. The coefficients of earnings growth rate, size, institutional ownership ratio and trading volume are statistically insignificant as their p-values are above any acceptable significance level. The coefficients of momentum, and book-to-market ratio however, are statistically significant at .01, .05 and .1 level of significance, respectively. The results show that stock returns are significantly positively affected by momentum and book-to-market ratio as well as significantly positive associated with stock returns.

4.3 Summary of the Chapter

In this chapter first of all provide descriptive statistics after that correlation matrix show the degree of association between variables. In descriptive statistics our results indicate that series are not normal distributed. Further step is taken rule of thumb if the series are stationary at level so move ordinary least square. Our unit root results show that all series are stationary at level. This study uses ordinary least square method for model 2. Model 2 based on three and four factor model. The three factor model variable consist of R_m-R_f, SMB and HML. The four factor model variables consist of Rm-R_f, SMB, HML and Momentum.

Further, step to take Model 1 empirically applied to get desire output. The variables include in Model 2 size, trading volume, institutional ownership ratio and earnings growth rate. Firstly, series take unit root, our results indicate that all series stationary at first difference. Further, step to take VAR model to select lead-lag criteria. Our results show that our series 3, and 4 lags to select optimal lag. The selection criteria use Schwartz Bayesian Criteria (SBC) to select the optimal lag. After that use Granger Causality Test.Our results show that series are uni-bi direction. Further, Variance decomposition test indicates the amount of information each variable contributes to the other variables in the auto regression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. VECM model show that the short-term disequilibrium is mostly adjusted in one period of time. Wald test there is a short run and long run causality.

Next, this study explain model 3 based on unbalance panel regression to predict firm stock returns with the help of firm level predictors including; size, earnings growth rate and institutional ownership ratio, and market level predictors including; trading volume, book-to-market ratio and momentum. Firstly, in this study applied Redundant Fixed Effects Tests,

actually this test useful to select appropriate test technique like common effect or fixed effect. If the chi-square is significant which shows that fixed effect model is more appropriate over common effect. Further, step is take to use Hausman Test to select appropriate technique like fixed effect is more suitable or random effect. Next, step this study run Correlated Random Effects - Hausman Test. The Hausman test results indicate that p-value is insignificant. Therefore, Pool A (fixed effect model) is more appropriate over random effect model. In this study above same test procedure applied to Pool B and Pool C. The value of Hausman test is statistically significant in pool B therefore; random effect model is preferred over fixed effect model. On the other hand, Pool C results indicate that Hausman test is statistically insignificant therefore fixed effect model is preferred over random effect model.

4.4 DISSCUSION AND ANALYSIS

The discussion of results, its analysis and findings have discussed in this chapter. The results and findings of this study compare and contrast of current study with previous studies, either its different or same in area of traditional finance. The outcome of the study identified whether it is same or different in previous study, after that critically evaluated and concluding possible causes for contradictory results. Based on the three factor modes of the study, the discussion and analysis of results have divided into three categories. Model 1 based on earnings growth rate, size, institutional ownership ratio and trading volume. Model 2 based on R_m-R_f, SMB, HML and Momentum. Model 3 based on firm and market level return predictability variables include size, trading volume, institutional ownership ratio, earnings growth rate, book-to-market ratio and momentum.

4.4.1 Model 1 Based on Three and Four Factor Model

Riskier assets should earn higher returns as per suggest asset pricing theory. On the other hand, a very hot debate have left both theories like asset pricing theory and arbitrage pricing theory why stock returns pattern deviate from theory. Similar patterns are call as anomalies. Specially, the literature chapter 2 has revealed that in the cross section, future stock returns are positive related to past returns (Jegadeesh & Titman, 1993), unexpected earnings (Ball & Brown, 1968), and book-to-market (BM) (Fama & French, 1992) value effect. In addition to it, stock returns are negative related to the firm size (Avramov 2012; Fama & French, 1992). Model 1 is sub divided into two parts, first part three factor model and second part fourth factor model. Firstly, this study discusses three factor's model to justify our results.

4.4.2 Three factor supporting argument

Chan *et al.* (1982) argues that the size-effect is perfectly compatible with a multifactor pricing equation based on the Arbitrage Pricing Theory as the higher average returns of smaller firms are compensation for the additional risk borne in an arbitrage free market. Fama & French (2011) examines four major geographical regions in search of empirical evidence of the size-effect. They conclude that in North America, Europe and Asia Pacific there is no pronounced size-effect, apart from that the value premiums for all regions which is negatively correlated with the size. In Japan however, the same observations were not find. Our result align with above findings because Pakistani is developing economy small firms are not as riskier as developed markets like U.S. England etc.

A negative coefficient for the SMB factor would indicate that the excess return is in part, due to the size of the company. In particular, it would indicate that the excess return was achieved because the company was large. This result is not generally consistent with the theory which claims that portfolios of properties of a large size on the average tend to have

lower risks than small portfolios. Similarly, a large, positive coefficient for the HML factor would indicate that the excess return is due to the company's high book-to-market equity value.

The results contradict most studies done at the subject proposing either no observable size-effect or a negative relationship between size and expected return. One of the theories is that the size-effect is a compensation for illiquidity and transaction costs. Our results are clearly not in line with the illiquidity theory. Regarding the transaction cost premium proposed, this theory assumes that household investments are tilted toward small stocks, which had previously been observed. With the financial crisis as well as the Euro-crisis being recent, it is possible that the risk-appetite of these investments has been mitigated and that more investments go into the safer big stocks. B-H a negative coefficient for the SMB factor would indicate that the excess return is in part, due to the size of the firm. In particular, it would indicate that the excess return is achieved because the company was large. This result is not generally consistent with the theory, which claims that portfolios of a large size on the average tend to have lower risks than small portfolios. Similarly, a positive coefficient for the HML factor would indicate that the excess return is due to the company's high book-to-market equity value. it is trading cheaply in the market compared to its book value. So Value stock outer perform compare to a growth stock. There is strong evidence that the size effect is not prevalent in Pakistan equity market. Same results prevailing some European markets and country like Germany (Fama& French, 2017; Hanauer et al 2013; Halliew et al 1999); who find small firms to have low betas. A negative coefficient for the HML factor would indicate that the low return is due to the company's low book-to-market ratio. In this situation growth stock outer, perform compare to value stock. The HML result indicates that B-L firms are undervalued.S-L a positive SMB coefficient is often interpreted as signalling a portfolio weighted toward small-cap stocks. A negative coefficient for the HML factor would indicate

that the low return is due to the company's low book-to-market equity value. It indicates value stock outer perform compare growth stock.

Many investors avoid small-cap firm thinking that this sort of company would not generate much return. However, a small-cap company can turn out to be the biggest advantage for investors who have a small capital to invest in a company. Here's why. Small-cap companies are not as famous as large or middle cap companies. Thus, their share price is usually much cheaper than the middle cap and large-cap companies. And small-cap companies have much greater growth potential. So if you invest in small-cap companies, you would yield better returns even in the economic downturn. Large-cap companies are the safest company to invest in because they usually pay dividends to shareholders and if any economic downturn affects the whole economy, they would be able to handle it much better than mid or small-cap companies. But large-cap companies have limited or no growth potential because they have already grown so much that their share price has increased a lot more. So nobody would buy a large number of shares from them at a hefty price. Another disadvantage of large-cap companies is that – investors can rarely get an edge in their investment while investing in large-cap companies because so much information is available to the public. To get an edge in purchasing shares of large-cap companies, you need to do in-depth analyses of their financial statements and balance sheet to be able to understand whether there the companies are undervalued or not to fetch an opportunity.

The positive correlations suggest that the value stock move in similar directions with growth stocks. This means that during the times of value stock and the growth stocks are also likely to experience high value stock and vice versa. Correlation among explanatory variables is also calculated to explore the possibility of multicolinearity problem and is found within permissible limit. The insignificant negative value of -.075 SMB mean suggest that in the

period 1999 to 2015 there is no visible size effect of psx.it is line with literature that documented weakening size effect since its discovery in the early 1980s e.g Fama & French (2012). The significantly negative value of SMB mean (−.075) indicates that the stocks with low S-H are responsible for the negative value of SMB mean. Negative average HML indicates that value stocks outperformed growth stocks. Negative SMB indicates that average of big stocks is higher than small stocks. There is a strong evidence that the size affect is not prevalent in integrated European markets and also reversed in some countries like Germany (Fama& French, 2017; Hanauer *et al* 2013; Halliew et al 1999) who find small firms to have low betas.

The descriptive results in a significant negative value of -.075 SMB mean to suggest that in the period 1999 to 2015 there is no visible size effect of PSX.it in line with literature that documented weakening size effect since its discovery in the early 1980s e.g Fama & French (2012). The significantly negative value of SMB means (−.075) indicates that the stocks with low S-H are responsible for the negative value of SMB means. Negative average HML indicates that value stocks outperformed growth stocks. Negative SMB indicates that average of big stocks is higher than small stocks. There is strong evidence that the size effect is not prevalent in integrated European markets and also reversed in some countries like Germany (Fama& French, 2017; Hanauer *et al* 2013; Halliew et al 1999) who find small firms to have low betas. Moreover, our result shows negative average value premium is -.075. This negative value shows that maybe the average value premium on our small stocks (S/L.048) is lower than the big stocks (B/L.096). It is essential for the reason that of the higher average returns association through in case by small stocks with low book-to-market ratios. As a result, it can be certain that on average, the growth stocks-.122 outperform the value stocks-.075. On the other hand, the size higher price is negative presenting that small stocks reason lower average returns, in addition to as a result the large caps outperformed the

small caps. B-H, B-M and B-L is the positive mean value. It's mean value stock outer perform compare to growth stocks. Mean value of S-H negative Its mean growth stock outer performs compare to value stock. The results R_m-R_f-.145 indicate the risk is low, the rate of return is also lower, the estimated rate of return on investment less than the risk-free rate that's why a result is the negative risk premium. The result of Mom positive mean value indicating that stock with positive return outer performs stock with negative return in the market. The standard deviation results show that investment risk takes place B-H .146 to get expected return. Our results indicate that the series is not normally distributed. A further step is taken if series are stationary at a level so move to ordinarily least square method. Next step is to take the series' unit root.

According to our results SMB positive coefficients of S_M.599 and S_L.643 signifies more returns for small cap stock than big cap stocks. A significant negative coefficient *HML o*f B_L-.101, S_H.811, S_M.330 and S_L-.369 returns specify less returns for value stocks than growth stocks. First, outcomes specify that the prices of high book-to-market and small size stocks be likely to move up and down composed in a way that is indicative of a common risk factor. Secondly, portfolios based on size (SMB) significant positive coefficient value of S_H .759, S_L .643 and book-to-market ratios (HML) significant negative coefficient B_L -.101, S_L-.369 along with a market premium (R_m-R_f) explicate the excess returns of a full set of book-to-market and size-sorted portfolios. Our results of market premium (R_m-R_f) negative coefficient and insignificant value of B_H.567, B-L.595 specify that market premium is not best proxy for non-diversifiable risk factor as well as market premium is not a good proxy for returns predictor.

The association among the features of size, book to market ratio and returns a number of scholars argue that the reason the above characteristics are proxies for non-diversifiable risk factors. Fama & French (1992) describe the significant association among firm size,

book-to-market ratios, and security returns for nonfinancial firms. The book-to-market ratio outcome is well supported in the field of finance. In overall, high book to market stocks, referred as value stocks, earn significant positive excess returns. Both Fama & French (1992) and Lakonishok, Shleifer & Vishny (1994) stated that book to market ratio is strongly associated to the stocks' future performance and it is carefully thought about as a significant return predictor for stocks and portfolios. DeBondt & Thaler (1985, 1987) describe book-to-market effects as a one of the reasons to investors' overreaction to firms' past performance. In contrast, Fama & French (1993) concluded that past performance and systematic risk are negatively associated with each other. High BM firms are expected to be riskier by this means requiring higher expected returns. Specifically, the researchers argue that the observed poor past performance of high book-to-market firms mean that they are more expected to be distressed, in addition therefore, more possible to be visible to a priced systematic risk factor. On the other hand, behavioural and risk-based point of view is opposites separately. The point of views are based on the premise that there is a link between high returns earned by high BM firms and a firm's economic fundamentals such as earnings performance and poor sales.

Fama & French (1993) examined that SMB slope capture the size effect in stock returns were establish toward be present higher for small stocks than for big stocks. On the other hand, positive average SMB returns clarify the higher returns on small stocks along with variation in the SMB slope for small and big stocks. Traditional finance size effect very debateable phenomena it refers to the stock portfolio of smaller firms on average, earns higher returns than the portfolio of larger firms over long time period. Banz (1981) introduced first time the phenomena and discover significant relationship between size and returns further discuss the relationship between total market value of common stock of a firms and effect its returns. On the other hand, one of the causes that common stock of a

small size firm had higher returns than the common stock of large firms is the higher risk of such firms. The emphasis at that point shifted to risk-adjusted returns earned by small size firms. It is, afterward, measured that firm size might be a proxy for risk in addition to, for that reason, a possibly significant return predictor (Crain, 2011). Moreover, overall, smaller firms are riskier than that of larger firms, leading to lower prices and higher returns. Crain (2011) found that size effect, which was focused in smaller listed firms too smooth; it was not consistently distributed through all firms.

4.4.3 Four Factor Supporting Argument

The fact that the momentum effect did not disappear may suggest that the factors involved in its creation are an indispensable part of the market, and this seems to undermine the commonly accepted hypothesis about the efficiency of capital markets. Our results align with the literature Merło & Konarzewski (2015). This dissertation results a negative coefficient for the SMB factor would indicate that the excess return is in part, due to the size of the company. A negative momentum coefficient is telling you that for this timeframe the winners of the last period are not the winners in this period.In particular, it would indicate that the excess return was achieved because the company was large. Fama & French (2016b) reported that the five-factor model performs better in North America and Europe and for big stocks. Cakıci (2015) reports similar results. Similarly, a large, positive coefficient for the HML factor would indicate that the excess return is due to the company's high book-to-market equity value. Positive returns demonstrated for investment strategies based on the momentum effect were unexplainable by the classical theory of finances. In fact that the momentum effect did not disappear may suggest that the factors involved in its creation are an indispensable part of the market, and this seems to undermine the commonly accepted hypothesis about the efficiency of capital markets.

A stock's recent history of performance is called momentum effect. The results of momentum coefficient positive significant BHW .349, BMW.353, BLW.600, SHW.575, SMW.451, SLW.300, BHL-.414 and SHL-.867 are aligned with the literature on momentum studies as discussed in chapter 2. Traditional finance debate momentum is very popular phenomena to predict returns. Many researchers debate momentum is relating to market efficiency but on the other hand, some researchers argue that it's related to market inefficiency. Further, debate carries on some researcher and practioners argue that momentum as a central point of asset pricing in addition to evaluate its predictive power isolated from market efficiency. Cochrane (2007) find that risk is complex multidimensional problem. In practically may possibly some fundamental risks that related for compensation as well as no compensation regarding by reason of market inefficiency. Carhart (1997) claims that the four-factor model may possibly considered as a performance attribution model. Avramov & Chordia (2006) examine that the momentum strategy of buying winners and selling losers as represented by Jegadeesh & Titman (1993). It is well-known the theoretic base for with WML remains a risk factor.

Moreover, the important question to ask, whether the widely used momentum phenomena can estimate the effect of past returns on the cross-section of returns. The predictability of stock returns increasing literature available but some researcher argue that stock returns grounded on information limited in past returns. Further, discuss price levels are vital role play to determinant of momentum effects after that past prices change (George & Hwang, 2004). Momentum profits discussion investors from trading sufficiently to drive away the actual profits because without explaining risk premium create a main query whether there are close substantial phenomena limits to arbitrage (Shleifer & Vishny, 1997). On the other hand, limits to arbitrage do not describe the essential reasons for the presence of apparently profitable momentum strategies. This is for the reason that they may possibly be

adequate for their persistence (Korajczyk & Sadka, 2004).Our results indicate that momentum positive coefficient and significant value explain existence of momentum in Pakistan stock market for the reason that traders possibly overreact to prior information when new information confirm. Consequently, our results are aligned with literature as a number of studies talk about existence of momentum like (Huang 2015; Czapkiewicz & Wójtowicz2014; Abbas *et al*. 2015; Cakici & Tan 2012). On the other hand, previous literature indicates that four factor model is not enough to predict returns. On the other hand twelve out of four portfolios of our results that momentum is not exist. Therefore, this study adds up variables like earnings growth rate, institutional ownership ratio, momentum, trading volume, size and book-to-market ratio as briefly described in chapter 2.

4.4.4 Model 2 Based on Earnings Growth Rate

On the basis of our results, earnings growth rate, institutional ownership ratio, size and trading volume have lead-lag relationship. (*HIOR*), the quarterly return of *HIORHE* is affect by its own return t-value 2.357 in the previous first period. For the *HIORME* portfolio, separately from being affected by its own return in the previous first period t-value 2.429, it is also affected by the return of *HIORHE* in the previous first period.

Granger causality results show unidirectional and bidirectional series. HEGRHE does Granger Cause HEGRME F-statistics value is 6.427 and p-value is .003 while HEGRHE does Granger Cause HEGRSE F-statistics value is 2.699 and p-value is .076 in this case granger causality in bi-direction. HEGRHE does Granger Cause MEGRHE F-Statistics value is 6.779 and p-value is .002 in this case granger causality in uni-direction.

Our variance decomposition results show that forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. In the short run, that is quarter 3, impulse or shock to HTVHE account for 76.266 percent variation of the fluctuation

in HTVHE (own shock), shock to HTVME can cause 2.092 percent, HTVSE can cause 5.819 percent, MTVHE can cause 7.672 percent, MTVME can cause 1.803 percent, MTVSE can cause 4.178 percent, STVHE can cause .233 percent, STVME can cause .363 percent and STVSE can cause 1.570 percent fluctuations in HTVHE.

VAR results are mix result show some values are lack dependent while other lack independent. The results of VAR size table 27 indicate that t-value of HSHE, HSSE, SSHE and SSSE lag independent but HSME, MSHE, MSME, MSSE and SSME t-value indicate that lag dependent. VAR results are mix result show some values are lack dependent while other lack independent. The results of VAR earning growth rates table 29 indicate that t-value of HEGRSE, and SEGRSE lag independent but HEGRHE, HEGRME, MEGRHE, MEGRSE, SEGRHE and SEGRME t-value indicate that lag dependent. VAR results are mix result show some values are lack dependent while other lack independent. The results of VAR institutional ownership ratio table 31 indicate that t-value of HIORSE, MIORME, MIORSE, MIORHE, SIORME,and SIORSE lag independent but HIORHE,HIORME and MIORHE, t-value indicate that lag dependent. VAR results are mix result show some values are lack dependent while other lack independent. The results of VAR trading volume table 31 indicate that t-value of HTVHE, MTVSE, MTVME, STVHE, STVME and STVSE lag independent but HTVME, HTVSE and MTVSE t-value indicate that lag dependent. The overall results indicate that our results supporting the theory the variables are lag dependent Lo & Mackinaly (1979).

In the long run, that is quarter 10 shocks to HTVHE account for 73.555 percent variation of the fluctuation in HTVHE (own shock), shock to HTVME can cause 2.484 percent, HTVSE can cause 6.028 percent, MTVHE can cause 8.99 percent, MTVME can cause 2.017 percent, MTVSE can cause 4.569 percent, STVHE can cause .257 percent, STVME can cause .483 percent and STVSE can cause 1.612 percent fluctuations in HTVHE.

Error correction model results show that both long as well as short term causality exists. The short term disequilibrium has mostly been adjusted and is shown by the VECM model SSHE 2.96 percent in one period of time. The result of VECM model shows that the short term disequilibrium is mostly adjusted MSME 1.03 percent in one period of time. The outcomes of VECM display demonstrate that the short-term disequilibrium is for the most part adjusted SSSE 2.05 percent in one period of time.

Our outcomes indicate that in Pakistan stock market, the returns of portfolios thru greater earnings growth rates meaningfully lead the returns of portfolios thru lesser earnings growth rates when size, trading volume, and institutional ownership ratio are used, respectively. Regarding this our results are aligned with (Chen *et al*., 2014; Jegadeesh & Livnat 2006). Further, suggests that institutional investors may well trade on the basis of past price paths, as well as they possibly will excessively influence prices with their reactions to consistency (Watkins, 2006). Moreover, Lo & Mackinlay (1990) claim a particular ambiguity returns proceeding about stocks analytically lead or lag those of others, a portfolio strategy implements the lead-lag association can produce positive expected returns.

Pakistan capital market has the main role of allocating the ownerships of an economy's capital stock. According to Fama (1988), the ideal market is when the prices provide accurate signals meant for resource allocation, in which the market with the aim of firms can make production decision investment and investors are able to choose among securities that represent ownership of the firm's activities. Fama also stated the general term of market that considered being efficient is at what times the prices are always fully reflect the available information. But unfortunately Pakistani capital market are not provide accurate signal because of its foreign debt. Furthermore, investor are hesitate to invest, because of political situation of the country. Most of the politician has arrested and National Accountability Bureau investigate money laundering cases. These scenario investor hesitate

to invest to Pakistani stock market that's why market are crash several times. Additionally, random walk theory confirmed by Bachelier in 1964 is consistent with EMH. The empirical study about this theory was verified in 1960s and many times since. Presently after the empirical evidence appeared, the EMH was projected based on the overwhelming logic by means if returns were forecast able, many investors would use them to produce unlimited profits. Furthermore, they propose in the short-run stock prices are able to gain momentum for investors as they see several consecutive periods of same direction price movement with particular stock. "The dot-com boom" enthusiasm is believed derived from this effect (Shleifer, 2000). This phenomenon occurred derived from four main reasons. The first reason is it caused by time-variation in expected returns for different stocks. Conrad & Kaul (1988) state that the different expected returns may happen from stocks having time-varying and dissimilar sensitivities to common fundamental risk factors. This also supported by Mech (1993) who argues that lead-lag effects have been recognized from stocks with different time-varying expected returns. An alternative of this explanation is that lead–lag relationships arise due to high contemporaneous correlation between leader and follower portfolios and, at the same time, strong auto- correlation in follower portfolios (Boudoukh et al., 1995). The second motivation for lead-lag effects is the existence of non-synchronous or thin trading in some stocks (Boudoukh et al., 1995). Moreover, Hou (2007) noted that thin trading and bid-ask bounce is expected to affect estimated lead–lag effects in daily returns and therefore used weekly returns in his analysis. The third reason for lead-lead effects may come about due to the differential response of some stocks to newly released information. International studies of lead-lag effects in the markets of various phases of development can help economists gain important insights that may encourage efficient outcomes. The efficient market hypothesis, also known as random walk theory, is a dominant theoretical perspective that relates to the existence of lead-lag effects. Lead-lag phenomenon contravenes the basic nature of the EMH.

Our results relates to the existence of lead-lag effects align with theory of efficient market hypothesis.

4.4.5 Model 3 Based on Firm and Market Level Return Predictability

On the basis of our results earnings growth rate, institutional ownership ratio and momentum are statically significant and better return predictors. Size and book-to-market ratio are statically insignificant in the overall period of 1999-2015 while trading volume is statistically significant in 2009-2015 period but insignificant otherwise. The findings of the study matches with the results of (Chen *et al*. 2013). Our results also support the historical literature that firms with high institutional ownership have significantly higher stock returns as compared to those firms with low institutional ownership ratios. The results of institutional ownership ratio, however, are not robust across all time periods. The results are significant in 2009-2015 and overall sample periods but it is insignificant in 1999-2007 period. Watkins (2006) finds that stock returns for firms with higher institutional ownership are significantly higher than firms with lower institutional ownership ratio. This is consistent with the view that institutional investors are more knowledgeable and have more expertise than individual investors and therefore, the stocks they select for their portfolio are earning significantly higher returns than the stocks of firms with lower institutional ownership ratio. On contrary, the beta coefficients for institutional ownership are negative in all three cases of this study. The beta coefficient for the period July 1999-December 2007 is, though insignificant while for the period of July 2009-December 2015 and the entire sample period beta coefficients are significantly negative. Our findings are consistent with risk taking behaviour of institutional owners. With the background of better performance in the period of 2003-2007, institutional investors become more overconfident and therefore invest heavily in risky stocks increasing their institutional ownership ratios. Due to financial crisis of 2007-08, the prices of such stocks decreased significantly and thus the beta coefficients are significantly negative. The

findings are also consistent with the view that institutional ownership is high for liquid stocks Liang, Lin &Huang (2011) and as such stocks are traded more and more in crisis situation hence they are losing more value. Individual investors hold on to their portfolios (disposition effect, Odean 1998, Nofsinger & Sias1999) and therefore decrease the trading volume (decrease overreaction, Jegadeesh & Titman (1995b) in crisis situation. On the other hand, at the point when a firm reports income, financial specialists may acquire incremental facts in the result that they can assessment whether the earnings surprise is driven by changes in incomes or changes in costs (Jegadeesh & Livnat 2006; Aboody *et al*. 2008).

There is a developing literature on the consistency of stock returns based for the data contained in past returns. The genuine discussion encompassing the idea of momentum returns, in any case, presumably emerged when Fama & French (1996) conceded that their three-factor pricing model was not able clarify momentum returns. This reality set off various theories withdrawing from the conventional asset pricing models and agent rationality framework to discover conceivable clarifications for momentum returns inside the back ground of the behavioural finance theory.

Momentum results of this study are consistently significant throughout the period. To explain the reasons, we argue that due to the presence of different type of investors in the market leads to a stock price overreaction which often end in long term reversal (Barberis *et al*., 1998; Daniel *et al*., 1998; Hong & Stein 1999). Be that as it may, different concepts demonstrate that the existence of disposition investors, who naturally hold on failure stocks longer than winner stocks, drive, within the sight of an imperfectly elastic demand function,, produce a price under reaction to public information(Grinblatt & Han 2005; Muga & Santamaria 2009)**.**

According to our results of mean square of error both firm and market level variables predict the stock returns. On the basis of our results coefficient of book-to-market ratio .642,

p-value .001, coefficient of momentum.677, p-value .000 are significant at .001 level best predictors of stock returns. However, book-to-market ratio and momentum are market level variable so our results are aligned with the historical literature provided in chapter 2. Previous literature supports our results because some studies concluded that market level variables are best return predictors (Haung 2015; Czapkiewicz & Wójtowicz 2014; Marx2012). But on the other hand some studies results show that firm level variables are best return predictors of stock returns (Cakici & Topyan, 2013; Nguyen, 2012; McLean, 2010; Zaremba & Konieczka, 2015).

4.5 Summary paragraph

In this chapter first of all provide descriptive statistics after that correlation matrix show the degree of association between variables. In descriptive statistics our results indicate that series are not normal distributed. Further step is taken rule of thumb if the series are stationary at level so move ordinary least square. Our unit root results indicate that all series are stationary at level. This study use ordinary least square method for model 2.Model 2 based on three and four factor model. The three factor model variable consists of R_m-R_f, SMB and HML. The four factor model variables consist of Rm-R_f, SMB, HML and Momentum. Firstly, model 1 portfolio construct after that ordinary least square method applied to desire outcomes.

Further, step to take Model 1 empirically applied to get desire output. The variables include in Model 1 size, trading volume, institutional ownership ratio and earnings growth rate. Firstly, series take unit root, our results indicate that all series stationary at first difference. Further, step to take VAR model to select lead-lag criteria. Our results show that our series 3, and 4 lag to select optimal lag. The selection criteria use Schwartz Bayesian Criteria (SBC) to select the optimal lag. After the use Granger Causality Test. Our results

show that series are uni-bi direction. Further, Variance decomposition test specifies the number of info separately variable enhances in the direction of the further variables in the auto regression. The aforementioned evaluations the total of the estimate error variance of each one of the factors could revealed thru external shocks to substitute factors. The VECM results specify short-term disequilibrium is adjusted in one period of time. Further, Wald technique results specify short and long run causality. Our results specify a particular feedback to peripheral variation, the Impulse response confirmation response of slightly dynamic system.

Next, this study explain model 3 based on unbalance panel regression to predict firm stock returns with the help of firm level predictors including; size, earnings growth rate and institutional ownership ratio, and market level predictors including; trading volume, book-to-market ratio and momentum. Firstly, in this study applied Redundant Fixed Effects Tests, actually this test useful to select appropriate test technique like common effect or fixed effect. In case that chi-square is significant which specify a certain fixed effect technique is extra suitable over common effect. Further, step is taken to use Hausman Test to select appropriate technique like fixed effect is more suitable or random effect. Next, step this study run Correlated Random Effects - Hausman Test. The Hausman test results indicate that p-value is insignificant. Therefore, Pool A (fixed effect model) is more appropriate over random effect model. In this study above same test procedure applied to Pool B and Pool C. The value of Hausman test is statistically significant in pool B therefore; random effect model is preferred over fixed effect model. Instead, Pool C outcomes show that Hausman test is statistically insignificant therefore fixed effect model is preferred over random effect model.

CHAPTER 5
CONCLUSION AND FUTURE RESEARCH DIRECTION

5.1 CONCLUSION AND FUTURE RESEARCH DIRECTION

5.1.1 Conclusion

The results of the study prove the three-factor model true for the Pakistani equity model. The three-factor model is much better than CAPM when it comes to explaining cross-sectional variations in average stock returns (Fama & French, 1992, 1993). The three factor model of Fama and French uses two additional risk factors (i.e. risk related to firms' size and firms' book-to-market equity) to explain excess stock returns as compared to only market risk factor of CAPM. This dissertation uses data taken from companies listed on Pakistan Stock Exchange from July 1999 to December 2015 to check whether the model is applicable in the Pakistani equity market. The construction of portfolio based on six portfolio two size and three books to market ratio portfolio by using intersection. After that equally weighted portfolio is regressed in contrast to market premium, size premium and value premium. The assessment results specify particular model dominance accurate for stocks registered on Pakistan Stock Exchange from July 1999 to December 2015 for non-financial sector. The results of the study are similar to the Fama & French (1992, 1993) study results, which proves a certain deviation thru positive average return on small and big stocks explicates the greater return on small stocks. The outcomes of this dissertation describe average return on SMB in the direction of remain positive to a certain the slope of small stocks is greater than the slope of oversize stocks in addition this dissertation reputable a certain value stocks (High B/M stocks) have higher return than growth stocks (low B/M stocks). The outcomes of the base on wholly the three-factors are significant in amplification cross-sectional difference in

average stock returns then from now the three-factor is well by clarifying cross-sectional average returns (Table 4 to 9).

Secondly, the validity of the four-factor model in the Pakistani Stock Exchange over the period from July 1999 to December 2015 has also be examined by this study. The four-factor includes market premium (R_m-Rf), size factor SMB, B/M factor HML and momentum factor WML. This study allows to try investigating the four-factor model in Pakistani stock market. The results of the study and the one documented in documented in Carhart (1997) are consisted with each other. Carhart (1997) claimed a particular the four-factor model could observe in place of a performance attribution model, wherever the premiums and coefficients for SMB, HML, and WML factors portion the comparative control of taking the variability of mean excess return attributable to the four factor representing portfolios. The results of the dissertation reliable a certain the four-factor model has a significant control to capture the deviation of average returns. The outcomes impervious of significant coefficients on the four factors as well insignificant intercepts (Table 17, 18, 20, 21) offers support to the applicability of the four-factor model to the Pakistani stock market. The supportive evidences about the four-factor model's validity are provided by the practically greater values of adjusted R^2 also the insignificant of a further explanatory variable of residual standard deviation (Table 10 to 21).

Thirdly, consequently, this dissertation studied the leading and lagging portfolios in stock returns intended for listed firms through changed earnings growth rates. The empiric outcomes specify a certain, Table (22 to 65) greater earnings growth rates lead the returns of the portfolios through lesser earnings growth rates. This technique a particular firm through greater earnings growth rates effect increase the devotion of investors to change their investing behaviours. These dissertation outcomes indicate that earnings growth rate is a

significant factor of the lead-lag patterns detected in quarterly stock returns. The granger causality test (Table 34 to 37), the variance decomposition analysis (Table 38 to 41), vector error correction model (Table 42 to 65) and impulse response function (Figure 1 to 4) are completed, in addition the outcomes are reliable through the particular of VAR models (Table 26 to33). This research concludes that lead-lag effects do exist in certain high, medium and low size firms. It may assist investors in managing the trading strategy. Pakistani capital market is not efficient since lead-lag effects is one of the phenomenon, which against the EMH Rusmanto *et al*., (2016).

Fourthly, stock returns predictability is a much debateable phenomenon in finance research. Based on our panel regression results the earnings growth rate and momentum are almost uniformly positive and statistically significant in all years. Furthermore, our results indicate that institutional ownership ratio and trading volume are statically significant post-financial crisis period while in pre-financial crisis period earnings growth rate and momentum are statically significant. (Table 66 to 74).

Fifthly, the mean square of errors results show that (Table 75) book-to-market ratio, momentum, and size are significant predictors of stock returns in Pakistani context. However, size is firm level variable while book-to-market ratio and momentum are market level variables so our results indicate that both firm and market level variables predict firm stock returns.

The key finding in this thesis is that there are significant momentum profits in the highest asset growth rate group and frequently in the low asset growth rate groups as well. This is in line with Nyberg & Pöyry (2014), who find that the large changes in firm total assets enhance short-term return momentum even when controlling for other firm-level drivers of momentum. The fact that the momentum effect did not disappear may suggest that the factors

involved in its creation are an indispensable part of the market, and this seems to undermine the commonly accepted hypothesis about the efficiency of capital markets. Our results align with the literature Merło & Konarzewski (2015).Momentum is driven by rapid, rather than slow, changes in the assets of firms Nyberg & Pöyry (2014). The durations of lead-lag effects help investors to know when the best time to invest in particular sector is. In quarterly returns, it shows investors on which quarter after the size shock that make significant contribution in the raising of the higher, medium and low stocks. The current study may be beneficial to many parties such as, investors, stockholders, and managers, because this study provides the opportunity to each of these parties to avoid some of unexpected negative results. Moreover, because stock exchanges are necessary for the economic growth in our modern economies, this study can consider important, because it investigates one important economic aspect.

5.2 Practical Applications

Findings of this study may possibly bring some implications for investors who are eager to take additional risk with gain of extra returns. This study proposes that asset Management Companies, as well as investors, are recommended to consider the firm size and book to market equity ratio to forecast returns anticipation on all portfolios (S/L, S/M, S/H, B/H, B/M and B/H) in Pakistan stock exchange. As found in this study, the market beta alone is not adequate to describe the variation in average equity returns for Pakistan stock exchange. Thus, understanding of two additional factors that can affect the stock's return may possibly support the asset management firms and individual investors to more efficiently strategy in addition to select their investment portfolios. On the other hand, including the fourth factor, momentum, can more improve their forecasting and predicting ability of future stock returns. One of the suggestion to academicians be able to explain the CAPM by way of

an introductory lesson to teach the fundamental models of portfolio theory as well as asset pricing On the other hand, they have to advise their students that although it's completed easiness, the CAPM's realistic difficulties possibly overthrow its apply in uses. For that reason, they are powerfully suggested to present further methodologies designed for creating portfolio return expectation, for instance further teach to Fama & French three factor and Carhart four-factor models. The upcoming time possibly will bring even more complex economic situation. Where even these models may possibly inadequate to justify the stock returns. Furthermore, if policy makers would decide to establish stock markets, they may not be able to sustain their viability if the institutions and companies are not adequate or compatible with the functioning of modern capital markets. Therefore, this study factored into the regression equations company's specific fundamentals as well. For that reason, the gap for five-factor, six-factor, and so on, models is open. Future studies may possibly propose added factors to the current models or different factors to the current models, as per the situation may possibly demand.

5.3 Managerial implication of research

The research outcomes have significant suggestions for global fund managers who effort to improve trading strategies that make available positive abnormal returns. Specially, this dissertation perceive that momentum-based trading strategies are extremely profitable even after risk variations (Table 10 to 21).On the other hand, portfolio manager viewpoint this study propose that they implement momentum-trading strategy in the Pakistan setting by means of it is the most profitable on risk-adjusted basis. Moreover, this study recommends a particular four-factor model containing momentum factor must use by way of a benchmark for performance valuation.

5.4 Future Research Directions

Further research on issues discussed in this paper can follow in numerous ways. Firstly, pricing models could be applicable to other emerging countries may be build a paradigm for future studies but simultaneously as their particular features. Secondly, to some extent future research, relations between factors should be analysed with the use of numerous weighting schemes of the evaluated portfolios. In the current study, equal weighted portfolios are use while in future value weighted and/ or price weighted portfolio may be use to calculate portfolio returns. Similarly, in the current study, quarterly data are used while in future weekly and/ or daily data can be used. Thirdly, there is a need to examine additional risk factors in the direction of detention the inexplicable deviation in the stock/ portfolio returns like leverage, E/P ratio, CF/P (cash flow to price) ratio, dividend yield, turnover, etc.

Finally, the most important issue for further analysis is possibly the effect of liquidity on factor premiums. Such analysis should concentrate on the question of whether liquidity is the omitted relationship that could completely or at least incompletely describe the phenomena of value and size premiums in emerging markets. Future direction can discover further stock markets in other nations to check the lead-lag associations of the stock returns for firms through changed earnings growth rates.

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Appendix

HIORSE= Higher institutional ownership ratio small earnings

HSHE=Higher size higher earnings

HSME= Higher size medium earnings

HSSE= Higher size small earnings

HTVHE=Higher trading volume higher earnings

SSHE=Small size higher earnings

SSSE=small size small earnings

STVHE=Small volume higher earning

STVSE=small volume small earning

MSHE=Medium size higher earnings

MSSE=Medium size small earnings

HTVSE=Higher trading volume small earnings

MTVHE= Medium volume higher earnings

MTVSE= Medium volume small earnings

MIORHE= Medium institutional ownership ratio higher earnings

MIORSE= Medium institutional ownership ratio small earnings

HIORHE=Higher institutional ownership ratio higher earnings

S/H= Small divided by High book-to-market ratio

S/L= Small divided by Low book-to-market ratio

S/M= Small divided by Medium book-to-market ratio

SIORHE= Small institutional ownership ratio higher earnings

SIORSE= Small institutional ownership ratio small earnings

SL=Small Loser

SL=Small Loser

SMB= small stocks - large stocks.

SN=Small Neutral

SW=Small winner

VAR=Vector-Auto regressive

WML=Winner minus Loser

WML=Winner's minus Losers

B^{size}= the sensitivity of security i to movements in small stocks.

ME=Market-to-equity

IOR= Institutional Ownership Ratio

TV= Trading Volume

EGR=Earnings Growth Rate

APT= Arbitrage Pricing Theory

CAPM= Capital Asset Pricing Model

B/H= Big divided by High book-to-market ratio

B/L= Big divided by Low book-to-market ratio

B/M= Big divided by Medium book-to-market ratio

BE=Book-to-equity

BMR=Book-to-market ratio

HML= value stocks - growth stocks

BL=Big Loser

BN =Big Neutral

BW=Big Winner

B^{value}=the sensitivity of security i to movements in value stocks.