CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Does Return Dispersion Explain the Accrual and Investment Anomalies? Evidence from Pakistan

by

Panam Saher

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I dedicate my work to my Parents and my family who had been an inspiration for throughout my life

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Abstract

This study is aimed to investigate the further return dispersion on investment anomaly accrual anomaly in Pakistani firms. Empirical analysis is conducted on a sample of 80 non-financial companies listed at Pakistan Stock Exchange (PSX). The sample period is from 2002 to 2016. The companies included in the sample are selected on the basis of market capitalization. Extended Fama and French 3 Factor model in cross section is used to check the influence of return dispersion RD on investment anomaly and accrual anomaly. Result indicates that return dispersion does not influence the return of market accrual sorted portfolio. The two pass regression is applied with Fama and French 3 factor model in cross section it becomes insignificant both accrual and investment anomaly. Because of market efficient theory it is not possible to forecast past data. Relative return dispersion is positively explaining the accrual anomaly and investment anomaly. That accrual anomaly are explained by return dispersion. But in investment anomaly, markets are unable to capture abnormal return by creating arbitrage portfolio. The study concludes that return dispersion explain the accrual anomaly and doesn't influence the investment anomaly in Pakistan Stock Exchange.

Keywords: Size premium, Value premium, Return dispersion, Stock returns.

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Abbreviations

APT	Arbitrage Pricing Theory
B	Big
BH	Big High
BL	Big Low
BLH	Big Low High
BHL	Big High Low
BHH	Big High High
BLL	Big Low Low
BE	Book to Equity
CAPM	Capital Asset Pricing Model
FF	Fama and French
HML	High Minus Low
KSE	Karachi Stock Exchange
ME	Market to Equity
MKT	Market
MTB	Market to Book
P/E Ratio	Price to Earnings Ratio
RM	Market Rate of Return
RF	Risk Free Rate of Interest
S	Small
SH	Small High
SL	Small Low
SHL	Small High Low
SHH	Small High High

SHH	Small High High
SLL	Small Low Low
SMB	Small minus Big

Chapter 1

Introduction

1.1 Theoretical Background

The risk and return risk discussion starts from Markowitz and it is now the foundation of modern finance. Markowitz (1952-1959) states that investors select their portfolios on the criteria of mean variance efficiency because they are risk averse. Systematic risk contributes asset sensitivity to market specific factors. Investors concern is on the return in their investment because portfolio diversification cannot reduce the systematic risk.

In finance and economics literature the concept of return dispersion has become an important attraction for the market analyst. Which is corresponds to the extent that the return of different stock move together over given period. Stock return dispersion has earned the attention of analyst in finance industry. Return dispersion in quantitative finance is most important: It assesses the management of portfolios by explaining the stock returns in cross section. There are many possible causes which generate the dispersion. Christie and Huang (1995) studies that grazing are inverse related to return dispersion because diverse investor behave in different way in market stimuli. Therefore, demand for accruals also change which increases the dispersion in returns. Stivers (2003) report that during recession US stock market is constantly higher due to return dispersion. Gomestel (2003) conclude that business conditions and market volatility has a relationship with

return dispersion. Moreover, Garcia (2011) suggests that macroeconomic variable inflation, volatility, term spread are associated with return dispersion. Return dispersion is a stock for performance of investors as well but it is not limited to a substance of policy maker. Return dispersion is a theme of stock returns. Connolly and Stivers (2003) suggest that equity index return in the United States US, Japan and United Kingdom UK are correlated shocks in return dispersion. Stivers (2003) conclude that there is a positive relationship between return dispersion and equity returns in Japan and United Kingdom. Wei and Zhang (2005) produce the same evidence in the United State market. Zhang (2005) report that in an analysis of the value premium return dispersion and cost of capital is positive correlated. Stivers and Sun (2010) report that return dispersion forecast the value premium in United State. Return Dispersion is related to strategies of accrual and investment. Garcia (2011) conclude that stock returns are explained by return dispersion which is the most important tool. There is also a great deal of research directed towards redefining the performance and evaluation of the portfolio on the basis of portfolio alphas return dispersion. Demirer and Lien (2004) argue, that return dispersion show an inverse relationship with stock returns. De Silva (2001), Ankrim and Ding (2002) report that there is an increase in the performance of fund managers due to return dispersion at the end of 1990. Furthermore, this increase lead to increase in stock returns because return dispersion is international phenomenon. More definitely, De Silva (2001) proposes that return dispersion is not related to Fama and French (2003) results.

There are two primary explanations which literature offers first, accrual and earning. Second, there is a relation between investment and accruals. To understand the investor, use of anomalies and to difference between them is important. Sloan (1996) suggests the idea that accruals in the earning process is injected by transitory distortions. Sloan (1996) studies that accruals behave less significantly than cash flows and earnings; lower subsequent profit tend to have higher accruals of firms.

Accrual are fundamental to financial reporting and are undelaying innovation of accounting. Specifically, when investors value a firm, they should differentiate

between the two components of earnings: Cash flow from operations and accounting adjustments (operating accruals. Because cash flow from operations predict future profitability more strongly than do accruals, a neglect of this differentia would cause investors to be too optimistic about the prospects of firms with high accruals and too pessimistic about the prospects of firms with high accruals and too pessimistic about the prospects of firms with low accruals. Thus, if nave investors influence prices, we expect irrationally high prices for high-accrual firms and low prices for low-accrual firms. High-accrual firms should therefore earn low future abnormal returns and low-accrual firms earn high abnormal returns. Consistent with this hypothesis, past research has found that firms with high accruals underperform firms with low accruals in the United States (Sloan 1996) and in several other countries (Pincus et al. 2007). This pattern, known as the accrual anomaly, presents an important challenge to rational asset pricing theories (Fama and French 2008). In a frictionless rational asset pricing framework, the higher average returns for low-accrual firms would need to reflect compensation for higher systematic risk. For example, in standard multifactor asset pricing models, expected returns increase with the loadings ("betas") on different common risk factors. In such settings the accrual anomaly could be explained if the level of a firm's accruals were associated with its loadings on priced risk factors.

Fairfield, Wiesent, and John (2003) suggest another elucidation, which is based on the relationship between accrual and investment. Sloan (1996) studies that the accrual as a variable is an element of growth in net operating assets while it is not limited to profit. Net operating assets have a divining capacity on the basis of working capital benefits. Thus, the study considers that anomalies on an accrual basis reflect the overall "growth effect" caused by the marginal returns on investment.

Dechow, Richardson and Sloan (2008) provide a conclusion that retention of cash and accruals are similar. Furthermore, suggest that anomalies are driven by investment and marginal returns. Wu Chang (2010) report that there is a relationship between accruals and risk, and also it has a relationship with investment with expected returns.

1.2 Problem Statement

Existing research reveals that cross section of returns are remarkably explained by the multi model factor. CAPM is the most powerful for the calculation of risk and returns on measurement basis. Markets are tested for number of anomalies which include size anomaly, value anomaly, and volatility anomaly. Chichernea (2014) propos that low return dispersion becomes insignificant while explaining the accrual and investment anomalies because it shrinks the magnitude of portfolios. The purpose of the study is to find out whether that return dispersion explain the investment and accrual anomalies.

1.3 Research Questions

1. Does Return dispersion (RD) influence accrual anomaly?
2. What is the role of SMB to explain the return of accrual based strategy?
3. What is the role of HML to explain the return of accrual based strategy?
4. What is the role of Mkt to explain the return of accrual based strategy?
5. Whether Return dispersion explains the investment anomaly?
6. What is the role of SMB to explain the return of investment based strategy?
7. What is the role of HML to explain the return of investment based strategy?
8. What is the role of Mkt to explain the return of investment based strategy?

1.4 Research Objectives

1. To provide insight about the role of return dispersion in explaining return of accrual based strategy.
2. To explain the role of Fama and French three factor in explaining the return of accrual based strategy.

3. To explore the role of return dispersion in explaining return of investment based strategy.

4. To explain the role of Fama and French three factor in explain the return of investment based strategy.

1.5 Research Significance

The behavior of anomalies in financial market is very interesting for the investors. Two anomalies are the focused by the investors and has attracted the debate by the academicism. These two anomalies are investment anomaly and accrual anomaly. Anomalies are often interpreted as an evidence of market inefficiency. If it is considered that market is efficient then yet not defined the priced risk factor which derive the accrual anomaly. Another question which is important to explain in that "Does Fama and French Factors explain the accrual and investment anomalies"? So CAPM cannot fully capture the accrual and investment anomalies but it is explained by Fama and French three factor model.

Pakistan has gained the status of emerging markets. Recently It is included in emerging market index. International investors intensions in this regions for the investment perspective have enhanced. This interest of investors desires additional information. So the study is explaining two anomalies present in market. The focus is return dispersion and other factor include Fama and French three factor.

1.6 Plan of the Study

The study is organized in five chapters. Chapter 1 provides the introduction, background of the study, objective and significance of the research study. Chapter 2 focuses the extensive review of the previous studies. Chapter 3 explains the data employed and methodology used to analyze the data, Chapter 4 present the empirical results and discussions of findings. Conclusion and recommendations are presented in chapter 5.

Chapter 2

Literature Review

2.1 Return Dispersion, Accruals and Investment Anomalies

The one of the important pricing anomalies is accrual anomaly suggested by Kothari (2001) and Richardson (2010). Sloan (1996) documents that abnormally high accrual (low accruals) stock earn low (high) stock returns. The literature makes an effort to explain the pervasiveness of accrual anomaly. Greenetal (2011) offer that two main explanations the persistence of the cash flow and accrual component differs because of fixation in bottom line earnings.

Sloan (1996) and Richardson (2005) propose that accrual capture investment and growth information because it effects the returns and create mispricing effect. Fairfield (2003) report that it is due to rational risk pricing. Khan (2008-2010) state that accrual anomaly is difficult and remains an open debate when separating a mispricing effect from risk pricing, especially when accruals and investment level are internally associated.

Reinganum (1981) concludes that APT reports the difference in return of small and large firms which is not captured through CAPM. Chen (1983) reports the results contrary to Reinganum (1981) findings. Cho (1986) and Korajczyk (1988) employ the principal component and factor analysis model and results support the

arbitrage pricing theory. Cook and Rozeff (1984) report size and P/E effect in US returns. Basu (1977) and Banz (1981) state that size effect has an advantage over the P/E effect and it is not consistent with Reinganum (1981) and Bassu (1981).

The models formulated by Gomes (2003) and Zhang (2005) create a link between stock return and return dispersion and comprehensive state of economy. Return dispersion (RD) is a state variable used by these model. It consists of information that firms display about the condition of general investing. The economic state of high return dispersion that leads to higher discount rates.

Chichernea (2014) demonstrate that high return dispersion is not beneficial for investment and growth while explaining the economic state with high discount rate. Jiang (2010) propose that return dispersion as a variable that captures risk associated with economic growth and economic restructuring by using cross section model. It also contributes in extant literature about economic restructuring and return dispersion.

The efficiency of high risk macroeconomic countries is related to growth risk and it is also linked with accrual based strategy which shows that high (low) return dispersion is corresponded to high (low) returns from accrual based strategies and then strategies predict returns. Additionally, its time series variance show an investment based profitability that is subject to one type of risk associated with growth. All this confirm that return dispersion are captured by macroeconomic variable with both strategies.

On the experimental side, this proposal means that low- and low-performing companies are more exposed to development risk and its expected returns are generated which are high due to reimbursement of risk. It also concludes that these onetime varying profitability strategies which show that return dispersion is positively correlated.

Return dispersion reveals that risk is significantly priced among the cross section of stock returns. Fama and Macbeth (1973) methodology indicate that return dispersion (RD) under different model specifications has a positive and significant premium. Moreover, return dispersion as a variable is significantly priced in the

cross section of investment and accrual portfolios and return dispersion capture the higher risk.

Returns dispersion in the time series variation can explain the profitability of investment and accrual strategies. Chichernea (2014) concludes that return dispersion has a significant link with in accrual and investment hedge portfolio. It means that higher return dispersion loading is significantly related to accrual and investment hedge portfolios. The literature has two distinct contributions offered by accrual and investment anomalies and return dispersion. Wu (2009) suggest that return dispersion does not brief the accrual anomaly because it is explanation of based on risk.

The one of the most robust anomaly which is documented till date is accrual anomaly. Fama and French (2008) conclude that anomalies cannot explain in persistency of all size groups. Avramov (2013) suggest that in all type of credit condition it is robust anomaly. Sloan (1996) provide evidence that accrual has predictive power for stock returns and it controls the beta and other features. The top accrual deciles outperform by the stocks in the bottom accrual deciles roughly 10% annually.

French (1987) explain the risk and return relationship for the period of 1928 to 1984 by using GARCH and ARIMA model and there is inverse relation between volatility and stock returns. Previous study shows that there is no appropriate model which estimate risk effect. In distinction, market risk is positive with beta. Fama and French (1992) state that the book to market and size equally capture the cross section variation in stock returns which is associated with leverage, book to market equity size and EPS ratio. Fama and French (1993) propose three factor models which include market, value factors and size to describe the variation in average returns.

Fama and French (1992) studies the impact of size, market beta, book to market ratio, leverage, and P/E ratio on average stock returns in NYSE, NASDAD and AMEX stocks. The methodology of Fama and Macbeth (1973) is used to test the process of return generation. Book to market equity, leverage, P/E ratio and size have significant relationship with average returns. When beta is included

in model, book to market equity is significant and this comprises that impact of leverage and P/E ratio is absorbed while explaining the average stock returns.

Fama and French (1993) study the five factor model which comprises of size effect, value effect, market effect, default effect and term effect by using time series regression approach. This study is extended to bonds and stocks of listed companies on NYSE and term and default effect are found significant in bonds while market, value and size effect are significant in stocks. Therefore, on the basis of results of this study, Fama and French (1993) propose the three factor asset pricing model for stocks which consists of market, size and value effect. Fama and French (1993) concludes that size effect foresees that firms with low market capitalization earn higher average returns than that of larger size firms and the value effect shows that higher market to book ratio have high returns than that of smaller M/B ratio.

Herrera and Lockwood (1994) finds the negative relationship between size and stock returns in Mexican listed companies. Berk (1997) suggest that when size factor is not considered then small stock may not outperform the big one. Fama and French (1995) finds the difference in low values firms with high values firms and conclude that low book to market firms sustain profit than that of high firms. In three factor model, HML is used as a proxy for distress. Additionally, there is low earning due to weak performing firms that lead to high book to market and have a positive slope on HML while in contrast good performing firms have low book to market and high earning which leads the slope to negative on HML.

Fama and French (1998) tests the three factor model in 13 different markets and finds the evidence that 12 out of 13 markets have an effect of at least 7.68% per annum to value stocks. Seven markets have statistical significant BM/ME betas. Daniel and Titman (1997) finds that expected returns have no function on factor loading of Fama and French risk that's why they do not agree with Fama and French (1992, 1993 and 1998).

Hodoshima (2000) uses cross section regression to find the relationship between risk and stock returns in Japanese equity market. Hodoshima (2000) finds that there is insignificant relationship between risk and return, when regression is applied

on excess returns while in contrast when regression posit separately then there is short term relationship between risk and returns.

Aleati (2000) describes the relationship between risk and return of Italian stock and this study uses time series and factor analysis for the period of 1981-1993. Furthermore, size and value effect are present in return of Italian Stocks. The factors HML and SMB are important for explaining the assets return in Italy. Wang (2000) suggest that beta cannot explain the gap between return when low return is generated by big stocks rather than small stock in AMEX and NYSE of US for the period of 1975-1994.

Liew and Vassalou (2000) describes that the risk factor book to market, size and momentum which are determined that are linked with economic growth. Finding of the study is indicate that HML and SMB can be linked to development and in ten different countries which United states, United Kingdom, Netherlands, Switzerland, Italy, Japan, Canada, Australia, Germany and France for the period of 1978-1996. Fama and Macbeth (1973) use the regression to test the hypothesis that value effect is consistent with Fama and French (1998) and there is additional significance of SMB and HML information about the further growth.

Horowitz (2000) identifies that the large firms are outperforming the smaller caps firms and size anomaly has disappeared in Japan stock market. This study is in contradiction to the study of Chan et al (1991) who report that appearance of size effect in Japanese stock market. Faff (2001) uses the GMM approach to analyze monthly data of 24 industry portfolios in Australian market and results show that size effect is negative and significant and one value and market effect are significant positive.

Faff (2001) studies three factor model of Australian market by using daily and monthly data for the period of 1996 to 1999. This finding indicate that in case of monthly data book to market risk factor is positive and significant and size effect is negative and significant. Lee (2001) find the insignificant relationship between expected return and expected risk by applying GARCH-M for the period of 1990 to 1997. GARCH and EGARCH model is used to examine the persistent nature of time varying volatility. In contrast, Faff (2001) use multivariate test in Australian

market for the period of 1974-1995 and finds a significant relationship between expected return and betas and also find significant relationship between volatility and returns. Elsas (2003) suggest relationship between expected return and beta is significant in German stock market for the period of 1960-1995 by using Pettengill approach.

Griffin and Lemmon (2002) explore the impact of risk and value effect at NASDAQ and NYSE for non-financial firms by using Fama and Macbeth (1973) methodology for the period of 1965-1996. The result of this study indicate that more returns are generated by those firms which have extreme distress risk.

Lam (2002) explain the relationship of stock market and book to market, size, earning to price and leverage in a study conducted in Hong Kong market for the period of 1980-1997 by using Fama and Macbeth (1993) regression. The results show that book to market ratio and earning price ratio explain the variation in returns and size is the most dominated factor. Meanwhile size factor is positive and results are in contradiction to the study of Fama and French (1992). Furthermore, Malin and Veeraraghavan (2004) explain that return variation are better explained by collectively risk factors. This study suggests that in Germany and France small firm effect is identified while big firms are identified in United Kingdom.

Drew, Naughtan and Veeraraghavan (2003) uses three factor model to examine the relationship between risk and return. Risk is measured by beta. The results of this study indicate that larger firms have high returns over time and earlier study of Fama and French (1996) also report the same. This study is conducted in Shanghai Stock market and states that smaller firms have more return than larger firms and beta is not the measure of variation in stock of China.

Ali, Hwang and Trombley (2003) finds the relationship between value and arbitrage risk with stock market return in the AMEX and NYSE for the period of 1976-1997. The results clarify that book to market effect is led by mispricing if the arbitrage and investor risk are considered.

Marshall and Young (2003) use seemingly unrelated regressions (SUR) and cross-sectionally correlated time wise autoregressive models to check the relationship

between stock returns and size, liquidity and beta in Australian market. This study report that size and liquidity home negative link with stock returns. Daniel (2004) study the behavior of size, market and value effect in US stock market in up and down market. Furthermore, this study observe that market effect is insignificant in CAPM setting while by applying cross section regression size and value effect are significant. However, Pettengill (1995) methodology indicate that size effect behaves differently and market effect is significant and value effect remain same.

Tang and Shum (2004) report that beta and expected return are positive and significant in up market while in case of down market it is negative and significant in Singapore market for the period of 1986-1998. Leon (2007) use the mix data sampling technique (MIDAS) to identify the relationship between expected return and risk and find a positive significant relationship between in European market.

Gaunt (2004) report significant and positive relationship between book to market ratio and size with stock return in Australian market for the period of 1991-2000. This study is similar to the study of Fama and French (1993) which suggest that companies have high risk when its book to market and size is low and its outcome of size is also small. In contrast, Halliwell, Heany and Sawicki (1999) propose that book to market has a significant role in asset pricing and three factor model and is more effect than CAPM.

Estrada and Baten (2006) conclude that the most effective factor that effect stock return is downside risk. Rahman and Baten (2006) report that size, book to market ratio and beta are significant in explaining stock return in case of Bangladesh.

Liu (2013) state that variations in return are not a sufficiently explained by market premium and in case of Chinese stock market value and size effect has significant relationship with return.

Frazzini and Pedersen (2014) propose the volatility effect to leverage constraints. The study provide that risk return relation becomes flatter then beta is closed to one. Furthermore, their model indicate that less leveraged investors prefer low beta stock but the preference of leveraged constraint investor is high beta stocks.

Blitz and Van Vliet (2007), Falkenstein (2009), Kumar (2009), Baker, Bradley and Wurgler (2011), Ilmanen (2012) report that low priced volatile stock brings positive skewness. Campbell (1996) finds that there is predictable time variation in abnormal stocks.

Haugen's (2012) report that the existence of low volatility in global equity market. Clark (2014) find that a separate beta factor reduces the low beta (high beta) portfolios. Guner and Onder (2002) report that there is a significant relationship between volatility and trading volume the study also conclude that low volume stock have higher volatility.

Francis, LaFond, Olsson, and Schipper (2005) report that a priced risk factor is accrual quality. Fama and French (1993) find that returns are positively correlated with accrual quality. Fairfield (2003) describe the link between accruals and investment anomalies. Furthermore, Fairfield (2003) propose that Sloan's accrual is not only limited to earning but also growth in net operating assets.

Jiang (2010) report that there are two dimension of return dispersion that capture the systematic risk. One of them is homogenous and the other one is heterogeneous. Homogenous is related to market state and economic growth and heterogeneous links with allocation of resources and associated with future economic growth.

Empirical literature provides a vital role of return dispersion as a variable which capture the risk related to growth. Loungani (1990) report that return dispersion expect high unemployment rates, and propose that it is related to economic restructuring. Christie and Huang (1994) provide evidence that business cycle is associated with return dispersion. Business cycle means that return dispersion is higher during economic recessions.

Connolly and Stivers (2003) report that the link between momentum and return dispersion is positive and in case of reversal return it return dispersion is negative. Connolly and Stivers (2006) find that incremental information that return dispersion contains is related to turnover and macroeconomic news. Demirer and

Jategaonkar (2013) provide evidence of return dispersion which support Jiang's argument who state that return dispersion captures shocks related to fundamental economic restructuring.

Cenesizoglu (2011) report that the reaction of macroeconomic news with firm characteristic is significantly different during the expansion and recession periods. Stivers and Sun (2010) report that there is a link between time variation value and momentum with cross sectional return dispersion and return dispersion is a counter-cyclical phenomenon.

Silva (2001) conclude that return dispersion has main role in a stocks cross sectional variation and find that return dispersion is positively correlated with idiosyncratic volatility. Jiang (2010) find that there is a cross sectional relation between risk and return and it is a pattern of return and factor loading which is associated with exposure to risk. Black (1972) investigate that there is a coexistent relationship between return dispersion factor loadings and average returns.

In asset pricing literature, there are two approaches to documenting the contemporary relationship between return and risk. In the approach taken by Black (1972) and Fama and French (1992), portfolios are formed on the basis of load factor pre-formation, the performance of asset pricing tests is based on load factor after ranking. This approach assumes that exposure to risk remains constant over time. Therefore, the pre-shaping factor of loading candidates is good to serve as tools for post-forming factor loading. However, the use of pre-configuration factor loadings as tools will have less ability to detect relationships between average returns and load factors if pre-formation factor loadings are time-varying and have weak predictions for loading post-forming factor. In contrast from the establishment of portfolios on the basis of pre-formation regression estimates and then the post-formation factor load examination, and the second approach applies risk measures that coincide with returns. Littau and Ludwigson (2001); Pansal (2005); Luellen and Nagel (2006); Ang (2006) suggests that there is a contemporary relationship between expected returns and dispersion, and there is convincing empirical evidence that the loading of factors changes over time.

Chapter 3

Data Description and Methodology

3.1 Data Description

The study explains the relationship between stock returns and return dispersion employing the data of eighty non-financial companies listed at Pakistan stock exchange for the period of 2002 to 2015. The reason of choosing eighty companies is that few companies are traded and large sample leads to selection of inactive companies.

The sample consists of non-financial sector Pakistan. The reason of choosing of non-financial sector is accounting period and capital structure. The accounting year of financial sector closes on December 31, while in case of Non-Financial sector it closes on June 30.

Monthly stock prices of sample companies are obtained from Pakistan Stock Exchange. Index data is also collected from Stock Exchange of Pakistan. Moreover, Risk free rate has been obtained from State bank of Pakistan.

3.2 Model Specification

This study uses multivariate regression in two pass regression setting proposed by Fama and Macbeth (1973).

The relationship among the variables is as follow:

$$\textbf{Return} = \alpha + \beta_1 \text{MKT Premium} + \beta_2 \text{Size Premium} + \beta_3 \text{Value Premium} + \beta_4 \text{Return Dispersion}$$

$$\textbf{Return}_\textbf{t} = \alpha + \beta_1 \text{MKT}_\text{t} + \beta_2 \text{SMB}_\text{t} + \beta_3 \text{HML}_\text{t} + \beta_4 \text{RD}_\text{t} + \mu_\text{t}$$

Where as;

MKT = Market Premium = R_m-R_f

SMB = Size Premium = Small - Big

HML = Value Premium = Return of High BMR Portfolios - Return of Low BMR Portfolios

RD = Return Dispersion = Return of High RD Portfolio - Return of Low RD Portfolio.

$\boldsymbol{\alpha}$ = The Management's impact (Alpha)

$\boldsymbol{\mu}_\text{t}$ = Error term

For two pass cross section regression follows econometrics relationship is used.

$$\mathbf{R_p} = \lambda_0 + \lambda_1 \beta_{(\text{MKT})} + \lambda_2 \beta_{(\text{SMB})} + \lambda_3 \beta_{(\text{HML})} + \lambda_4 \beta_{(\text{RD})} + \mu_\text{t}$$

Where,

$\boldsymbol{\beta}_{\text{MKT}} = \beta$ of Market premium of company's

$\boldsymbol{\beta}_{\text{SMB}} = \beta$ of Size Premium of company's

$\boldsymbol{\beta}_{\text{HML}} = \beta$ of Value Premium of company's

$\boldsymbol{\beta}_{\text{RD}} = \beta$ of Return Dispersion of company's

$\boldsymbol{\mu}_\text{t}$ = Error term

Dependent variable is return of accrual and investment based portfolios. Accrual and investment are calculated by using this formula and after calculation of the accrual and investment. Accrual and investment sorted portfolios are created.

$$\begin{aligned}\textbf{Accural}_{\mathbf{t}} = [&(\Delta\text{Current Asstes}_{\text{t}} - \Delta\text{Cash}_{\text{t}}) \\ &- (\Delta\text{Current Liailities}_{\text{t}} - \Delta\text{Short}_{\text{t}} - \Delta\text{Term Debt}_{\text{t}} - \Delta\text{Taxes Payable}_{\text{t}}) \\ &- \text{Deprection and Amortization Expense}_{\text{t}}]/\text{Total Assets}_{\text{t-1}}\end{aligned}$$

This method is followed by Sloan (1996) and it is reported that only change in current assets minus change in cash minus change in current liabilities divided by lagged value of total assets by excluding other variables in equation which are mentioned.

$$\textbf{Investment} = \frac{\text{I}}{\text{A}_{\text{t}}} = \frac{(\Delta\text{PPE Gross}_{\text{t}} + \Delta\text{Inventories}_{\text{t}})}{\text{Total Assets}_{\text{t-1}}}$$

The same is used by Wu (2010) and Lyanders (2008).

3.3 Measurement of Variables

The variables size, MBR, Volatility, return Dispersion (RD) and Relative return dispersion (RRD) are measured to sort the companies for construction of various factor premium.

3.3.1 Size

The literature provide that size can be measured by using Total Asset, Market Capitalization or sales. In this study size is measured by using following formula.

$$\textbf{Size} = \text{No. of share} \times \text{MPS}$$

Fama and French (1992, 1993, 1996) also use the same proxy for size.

3.3.2 Market to Book Ratio

Market to Book ratio is needed for capturing value premium. The book to market ratio is calculated as under:

$$\textbf{MBR} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}}$$

$$\textbf{Market Value of Equity} = \text{No. of share} \times \text{MPS}$$

$$\textbf{Book Value of Equity} = \text{Total Equity on Balance Sheet Date}$$

3.3.3 Return Dispersion

Return dispersion for individual stock as under.

$$\textbf{Book Value of Equity}_{\mathbf{t}} = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\mathrm{R_{i,t}} - \mathrm{R_{M,t}})^2}$$

$\mathbf{n}$ = Number of stock in Market

$\mathbf{R_{(i,t)}}$ = $\mathrm{R_{(i,t)}}$ return of individual stock I in month

$\mathbf{R_{(M,t)}}$= Weighted average market return.

Jiang (2010) propose the similar measurement. Stivers and Sun (2010) also use similar measurement with small difference. Stivers and Sun (2010) measure Return Dispersion portfolios while Jiang (2010) uses individual stock which are listed on NYSE and AMEX.

The Return Dispersion are regressed against monthly market return and absolute market return. Stivers and Sun (2010) uses the same as under.

$$\mathbf{RD_t} = \gamma_0 + \gamma_1 \mathrm{R_{(M,t)}} + \gamma_2 |\mathrm{R_{(M,t)}}| + \epsilon_t$$

$\mathbf{RD_t}$ = Monthly Return Dispersion

$\mathbf{R_{(M,t)}}$ = Current Market Stock

$|\mathbf{R_{(M,t)}}|$ = Absolute Market Return

$\boldsymbol{\epsilon}_t$ = Error term

3.4 Methodology

According to the Capital Asset Pricing Model (CAPM), the single factor that is market premium is used to explain the returns but according to the Arbitrage pricing theory (APT) many factors affect the returns. Correspondingly, three factor model proposed by Fama and French (1992, 1993) with market premium, value premium and size premium is used to explain the returns.

3.5 Portfolio and Variables Construction

Average returns of all portfolios such as P, S, B, B/H, B/L, S/H, S/L, B/H/HV, B/H/LV, B/L/HV, B/L/LV, S/L/HV, S/L/LV, S/H/HV, S/H/LV are calculated and then these averages are used to construct size premium, value premium and volatility premium. The scheme of construction is as follows.

3.5.1 Size Sorted Portfolios

For the size sorted portfolios, market capitalization of eighty companies is calculated. Then these companies are sorted on the basis of market capitalization.

Largest forty companies are grouped as B and smallest forty are grouped as S. Average returns for both big (B) and small (S) companies are calculated as under.

$B = \sum \frac{R_i}{n}$ where R_i = Return of big companies

$S = \sum \frac{R_i}{n}$ where R_i = Return of small companies

$$\text{Size Premium (SMB)} = \text{Small Size Companies} - \text{Big}$$

$$\begin{aligned}\textbf{Size Companies} = \frac{1}{4}\{&(\text{S/H/HV} - \text{B/H/HV}) + (\text{S/H/LV} - \text{B/H/LV}) \\ &+ (\text{S/L/HV} - \text{B/L/HV}) + (\text{S/L/LV} - \text{B/L/LV})\}\end{aligned}$$

3.5.2 Value Sorted Portfolio

The sample of forty companies are then sorted on the basis of high and low market to book ratio to generate market to book ratio sorted portfolio. Twenty big companies with high market to book ratio are named as B/H and twenty big companies are sorted on the basis of low market to book ratio are named as B/L. After grouping average returns are calculated for both B/H and B/L.

Moreover, forty small companies are sorted on the basis of high and low market to book ratio to create value sorted portfolios. Portfolio comprising of twenty small companies with high to low market to book ratio are named as S/H and portfolio comprising of twenty small companies with low market to book ratio is named as S/L.

$$\begin{aligned}\textbf{Value Premium (HML)} &= \text{High Market to Book} - \text{Low Market to Book} \\ &= \frac{1}{4}\{(\text{S/H/HV} - \text{S/L/HV}) + (\text{S/H/LV} - \text{S/L/LV}) \\ &+ (\text{B/H/HV} - \text{B/L/HV}) + (\text{B/H/LV} - \text{B/L/LV})\}\end{aligned}$$

3.5.3 Return Dispersion Sorted Portfolio

The sample of twenty big companies with high market to book ratio is sorted to create return dispersion sorted portfolios with high and low Return dispersion. Portfolio of ten big companies with high market to book ratio and high return dispersion are named as B/H/HV and portfolio of ten big companies with high market to book ratio and low return dispersion is named as B/H/LV. Portfolio of ten big companies with low market to book ratio and high return dispersion is named as B/L/HV and portfolio of ten big companies with low market to book ratio with low return dispersion is termed as B/L/LV. Each portfolio of average returns of each portfolio is calculated.

The sample of twenty small companies with high market to book ratio are sorted on the basis of high and small return dispersion. Portfolio of ten small companies with high market to book ratio and high return dispersion is termed as S/H/HV and portfolio of ten small ‘companies with high market to book ratio and low dispersion

is sorted is termed as S/H/LV. Portfolio of ten small companies with low market to book ratio with high return dispersion is termed as S/L/HV and portfolio of ten small companies with low market to book ratio and low return dispersion is termed as S/L/LV. The average returns of each portfolio are calculated.

This method is repeated from 2002 to 2015 and is that sorting is done on June 30 each year.

$$\begin{aligned}\textbf{Return Dispersion} &= \text{High Return Dispersion and Low Return Dispersion} \\ &= \frac{1}{4}\{(\text{S/H/HV} - \text{S/H/LV}) + (\text{S/L/HV} - \text{S/L/LV}) \\ &+ (\text{B/H/HV} - \text{B/H/LV}) + (\text{B/L/HV} - \text{B/L/LV})\}\end{aligned}$$

Where,

$$\text{R}_\text{m} = \ln\left[\frac{I_t}{I_{t-1}}\right]$$

R_m stands for the market returns for month "t" and I_t and I_{t-1} are closing value.

$$\text{Market Premium} = \text{MKT} = (\text{R}_\text{m} - \text{R}_\text{f})$$

Table 3.1 report the statistical behavior of portfolio by using descriptive statistic. Descriptive statistic consists of measure of central tendency and measure of dispersion.

Table 3.1 illustrate that portfolio of big stocks has higher return then the small stocks. Risk of big stock is 7.8% which is lower than the small stocks which display a risk 8.0% in variations. The Big stock are negatively skewed whereas small stocks are positively skewed. Kurtosis have positive values for small as well as big stock. Big stocks report maximum returns of 31% while small stock report maximum return of 45.8% in a month. Furthermore, big stock reports a maximum loss 29.9% while in small stocks repot a maximum loss 19.3%.

When sorting of value portfolio are scrutinized, it is observed that small stock with low market to book earn higher returns than the small stock with high market to book. The observed results are inconsistent with theory that show that small stock with low market to book (SL) has higher risk 10.6% while in case of small stock

with high market to book (SH) earn risk 7.8%. Return of Small stock with high market to book and small stock with low market to book are positively skewed. Kurtosis of (SH) and (SL) are positive with value greater than 3. Small stock with low market to book earn higher returns with percentage of 53.1 while small stock with high market to book (SH) earn 38.5%. Additionally, there is a maximum loss of small stock with low market to book (SL) is 50.1% while small stock with high market to book (SH) report a maximum loss 25.1% in a month.

TABLE 3.1: Descriptive Statistic of All Portfolios.

	Mean	**Median**	**St. Dev.**	**Kurtosis**	**Skewness**	**Min.**	**Max.**
P	0.008	0.004	0.063	0.027	0.072	-0.150	0.185
S	0.008	-0.002	0.080	5.601	1.285	-0.193	0.458
B	0.009	0.014	0.078	3.076	-0.213	-0.299	0.310
SH	0.006	0.000	0.078	3.712	0.576	-0.251	0.385
SL	0.010	0.001	0.106	6.556	0.545	-0.501	0.531
BH	0.007	0.011	0.088	8.834	0.056	-0.421	0.448
BL	0.010	0.009	0.082	1.003	-0.554	-0.272	0.202
SHH	0.008	-0.004	0.123	8.854	0.813	-0.473	0.749
SHL	0.004	-0.002	0.053	1.739	0.490	-0.146	0.216
SLH	0.013	-0.002	0.185	15.267	0.565	-1.104	1.032
SLL	0.008	0.003	0.066	2.499	-0.264	-0.283	0.206
BHH	0.008	0.019	0.154	14.428	-0.235	-0.912	0.784
BHL	0.007	0.008	0.054	1.688	-0.862	-0.180	0.115
BLH	0.012	0.009	0.119	23.088	-1.953	-0.906	0.562
BLL	0.008	0.008	0.089	1.844	-0.181	-0.252	0.361

Big stock with high market to book (BH) earn lower returns than the big stock with low market to book (BL). The risk of big stock with high market to book (BH) is 8.8% which is higher than the big stock with low market to book (BL). The skewness of Big stock with low market to book (BL) is negative while big stock with high market to book (BH) report positive. Kurtosis have a value is greater than 3 for big stock with high market to book (BH) and Big stock with

low market to book (BL). Big Stock with high market to book (BH) has earn higher return with percentage of 44.8% while big stock with low market to book (BL) earn 20.2% Therefore, a maximum loss of big stock with high market to book is 42.1% while Big stock with low market to book earn a maximum loss of 27.2%.

The brief view of return dispersion sorted portfolio provide evidence that SHHV describes higher risk and return which is consistent with theory that small stock with high market to book and high return dispersion offer a maximum return. Big stock with low market to book with low return dispersion assume a risk of 8.9%. So there is inconsistency in results between BLHV and BLLV. Similar behavior is also reported by other researcher studies like (Hassan & Javed, 2011 and Mirza 2008).

Table 3.2: Correlation Matrix .

	R_m-R_f	**RD**	**SMB**	**HML**
R_m-R_f	1.000			
RD	0.015	1.000		
SMB	-0.230	0.136	1.000	
HML	-0.144	-0.176	-0.490	1.000

Table 3.2 reports result of correlation analysis. Return dispersion is positive and statistically significant while the other MKT, SMB, HML have a statistically insignificant relationship with market return.

Chapter 4

Empirical Results and Discussion

This chapter comprise of two sections. Section one deals with accrual based strategy. Section two cover investment based strategy.

4.1 Stylized Factor Premium and Return of the Accrual Based Strategies

This study examines the impact of Fama and French three factor model and Relative Return Dispersion on return of accrual sorted portfolios. Twenty portfolios are formed on the bases of the accrual. First portfolio ACC-1 comprises of the companies with lowest accrual where as a ACC-20 comprise of the companies with the highest accrual.

The statistical behaviour of the accrual based portfolio is reported as Table 4.1.

TABLE 4.1: Descriptive Statistics on Accrual Sorted portfolio.

	Mean	**Std. Dev.**	**Kurtosis**	**Skewness**	**Min.**	**Max.**
ACC-1	0.0140	0.1488	13.9387	-0.3822	-0.8601	0.8566
ACC-2	0.0128	0.1356	21.7670	1.5810	-0.6848	1.0158
ACC-3	0.0121	0.0836	2.3708	0.1416	-0.3242	0.3407
ACC-4	0.0075	0.1508	16.2404	-1.6847	-0.9625	0.6649
ACC-5	0.0188	0.1394	3.9621	0.3146	-0.4972	0.6026
ACC-6	0.0093	0.1408	11.0674	0.0395	-0.8129	0.7106
ACC-7	0.0106	0.1370	20.8759	2.2186	-0.5589	1.0547
ACC-8	0.0089	0.1190	5.5521	-0.6489	-0.6045	0.4562
ACC-9	0.0070	0.1710	20.4073	0.4799	-1.0372	1.1727
ACC-10	0.0074	0.1379	14.0469	-0.8340	-0.8836	0.6062
ACC-11	0.0013	0.1317	23.0457	-0.2608	-0.9116	0.8501
ACC-12	0.0015	0.1011	2.7322	0.7635	-0.3351	0.4080
ACC-13	0.0099	0.1561	28.3229	-1.6782	-1.2120	0.9235
ACC-14	0.0130	0.2048	30.4680	-1.1259	-1.5896	1.2468
ACC-15	0.0110	0.1298	4.6134	0.5089	-0.4421	0.6373
ACC-16	-0.0029	0.1126	7.4778	0.4937	-0.4481	0.6412
ACC-17	0.0053	0.1607	14.8192	-1.0443	-1.0193	0.7009
ACC-18	0.0073	0.1456	19.4923	-1.2038	-1.0162	0.8046
ACC-19	0.0071	0.1244	13.7366	-1.8016	-0.7588	0.5278
ACC-20	0.0063	0.1017	3.2155	-0.6038	-0.4571	0.2779

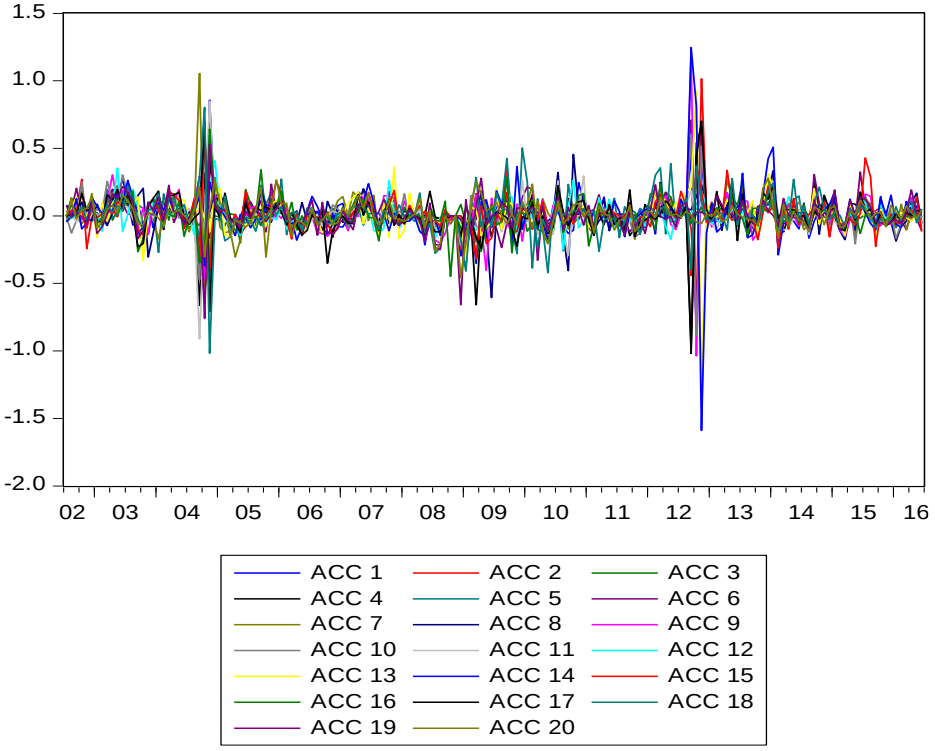

FIGURE 4.1: Accrual sorted portfolios.

The mean of ACC-1 is 0.0140 and standard deviation is 0.1488 and its minima (-0.8601) and maxima 0.8566. The accrual sorted portfolio of ACC-2 mean is 0.0128 and its standard deviation is 0.1356, the minima of ACC2 (-0.6848) and maxima is 1.0158. The portfolio of ACC-3 mean is 0.0121 and its standard deviation consists of 0.0836, minima and maxima of ACC-3 is (-0.3242) and 0.3407. ACC-4 has mean of 0.0075 and its standard deviation is 0.1508 and its minima is (-.9625) and its maxima is 0.6649. ACC-5 has mean value of 0.0188 and its standard deviation is 0.1394 with minima (-0.4972) and maxima 0.6026. ACC-6 has mean value of 0.0O93 and its standard deviation is 0.1408 with minima (-0.8129) and maxima is 0.7106. ACC-7 has mean value of 0.0106 and its standard deviation is 0.1370 with minima (-0.5589) and maxima is 1.0547. ACC-8 accrual portfolio has mean value of 0.0089 and its standard deviation is 0.1190 with minima (-0.6045) and maxima 0.4562. ACC-9 has mean value of 0.0070 and its standard deviation is 0.1710 with minima (-1.0372) and maxima is 1.1727. The portfolio of accrual ACC-10 has mean value of 0.0074 and its standard deviation is 0.1379 with minima (-0.8836) and maxima is 0.6062. ACC-11 has mean value of 0.0013 and its standard deviation is

0.1317 with minima (-0.9116) and maxima is 0.8501. ACC-12 has mean value of 0.0015 and its standard deviation is 0.1011 with minima (-0.3351) and maxima is 0.4080. ACC-13 has mean value of 0.0099 and its standard deviation is 0.1561 with minima (-1.2120) and maxima 0.9235. The portfolio of ACC-14 has mean value 0.0130 and its standard deviation is 0.2048 with minima (-1.5896) and maxima is 1.2468. The portfolio of ACC-15 is 0.0110 and its standard deviation is 0.1298 with minima (-0.4421) and maxima is 0.6313. The portfolio of ACC-16 has mean value of (-0.0029) and its standard deviation is 0.1126 with minima (-0.4481) and maxima 0.6412. ACC-17 has mean value of 0.0053 and its standard deviation is 0.1607 with minima (-1.0193) and maxima is 0.7009. ACC-18 mean value is 0.0073 and its standard deviation is 0.1456 with minima (-1.0162) and maxima is 0.8046. ACC-19 has mean value of 0.0071 and its standard deviation is 0.1244 with minima (-0.7588) and maxima is 0.5278. ACC-20 has mean value of 0.0063 and its standard deviation is 0.1017 with minima (-0.4571) and maxima is 0.2779.

The Impact of MKT premium and Relative Return Dispersion on accrual based portfolio is reported as Table 4.2.

For the more clear justification Figure 4.2 also illustrate the positive and statistically significant results for market premium and insignificant bars for RRD with accrual sorted portfolios.

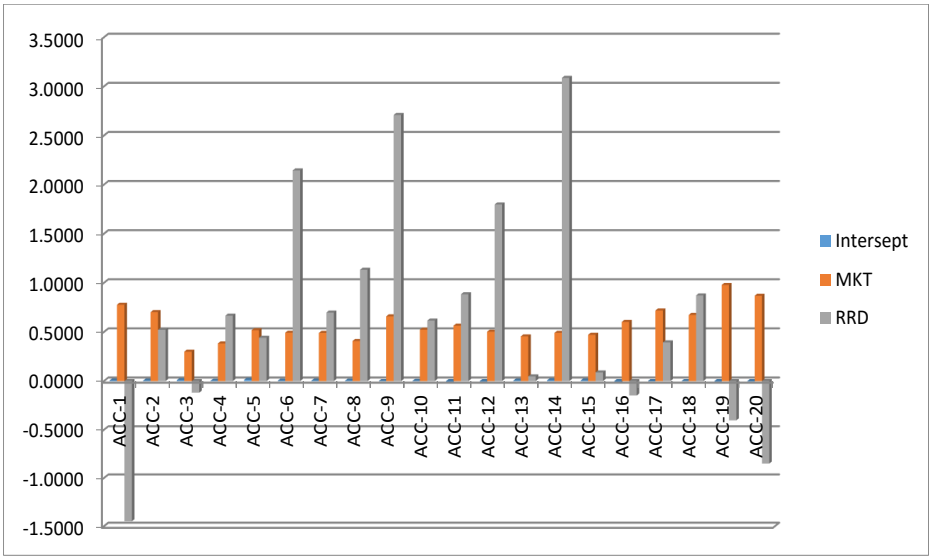

FIGURE 4.2: Factor relationship for Accrual sorted portfolios.

TABLE 4.2: Impact of Market premium and Relative Return Dispersion on Return of Accrual Sorted Portfolio.

	ACC-1	ACC-2	ACC-3	ACC-4	ACC-5	ACC-6	ACC-7	ACC-8	ACC-9	ACC-10
Intercept	0.0055	0.0052	0.0089	0.0034	0.0131	0.0040	0.0052	0.0045	-0.0001	0.0017
t-stat	0.5164	0.5309	1.4029	0.2915	1.2512	0.3756	0.5070	0.4977	-0.0103	0.1630
MKT	0.7771	0.7022	0.2991	0.3834	0.5188	0.4926	0.4910	0.4083	0.6592	0.5235
t-stat	5.45***	5.38***	3.56***	2.48**	3.71***	3.50***	3.57***	3.41***	3.89***	3.80***
RRD	-1.4478	0.5227	-0.1178	0.6663	0.4408	2.1452	0.6978	1.1336	2.7100	0.6163
t-stat	-1.0073	0.3974	-0.1391	0.4280	0.3131	1.5103	0.5028	0.9392	1.5845	0.4434
Adj. R	0.1471	0.1400	0.0603	0.0255	0.0667	0.0698	0.0619	0.0594	0.0857	0.0705
Significance F	0.0000	0.0000	0.0022	0.0441	0.0012	0.0009	0.0019	0.0024	0.0002	0.0009
	ACC-11	ACC-12	ACC-13	ACC-14	ACC-15	ACC-16	ACC-17	ACC-18	ACC-19	ACC-20
Intercept	-0.0048	-0.0040	0.0050	0.0077	0.0059	-0.0095	-0.0025	0.0000	-0.0036	-0.0031
t-stat	-0.4921	-0.5423	0.4185	0.4885	0.6046	-1.1676	-0.2070	-0.0043	-0.4499	-0.5127
MKT	0.5642	0.5032	0.4554	0.4916	0.4718	0.6025	0.7190	0.6737	0.9788	0.8689
t-stat	4.34***	5.19***	2.86***	2.35**	3.62**	5.60***	4.55***	4.73***	9.33***	10.68***
RRD	0.8845	1.7986	0.0481	3.0877	0.0883	-0.1462	0.3940	0.8721	-0.4017	-0.8495
t-stat	0.6748	1.8406	0.030*	1.4661	0.0672	-0.1346	0.2473	0.6074	-0.3796	-1.0349
Adj. R	0.0941	0.1454	0.0359	0.0330	0.0625	0.1497	0.1012	0.1108	0.3381	0.4041
Significance F	0.0001	0.0000	0.0181	0.0232	0.0018	0.0000	0.0001	0.0000	0.0000	0.0000

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

Table 4.2 report that market premium has significant and positive relationship with return of accrual based portfolio. RRD have insignificant impact on return of accrual sorted portfolio. The results indicate that market premium has significant high impact on extreme portfolio. It means the marginal effect of market premium is high on ACC-1 and ACC-2 which are portfolio of low accrual stock, and ACC-19 and ACC-20 which are portfolio companies of higher accrual stock.

The betas of twenty portfolio estimated in above regressed again the average return of accrual based sorted portfolios. The results of the cross sectional two pass regression are reported in Table 4.3.

The βetas of twenty portfolio estimated in above regressed again the average return of accrual based sorted portfolios. The results of the cross sectional two pass regression are reported in Table 4.3.

TABLE 4.3: Impact of Market Premium and RRD β on Return cross sectional Two Pass Regression.

β_0	0.0121
t-stat	2.5557
β_{MKT}	-0.0058
t-stat	-0.7849
β_{RRD}	-0.0005
t-stat	-0.4746
Adj. R	-0.0761

Table 4.3 report that the model of cross section regression is misspecified due to negative adjusted R^2. All the variables are insignificant. This mean that it is not to possible to forecast portfolio return by past β. The results of 1^{st} pass regression is significant but when we apply 2^{nd} pass regression all variables become insignificant. These are consistent with market efficiency theory that it is not possible to forecast portfolio return by past β.

Table 4.4 report the results of the extended Fama and French three factor model by considering Mkt, SMB, HML and RRD.

TABLE 4.4: Impact of Mkt, SMB, HML and RRD on return of accrual sorted portfolio.

	ACC-1	ACC-2	ACC-3	ACC-4	ACC-5	ACC-6	ACC-7	ACC-8	ACC-9	ACC-10
Intercept	0.0080	0.0072	0.0089	0.0053	0.0114	0.0037	0.0038	0.0038	0.0004	0.0020
t-stat	0.8910	0.8053	1.4145	0.5130	1.1408	0.4265	0.3843	0.4282	0.0427	0.2207
MKT	1.0566	0.8130	0.3750	0.1439	0.4481	0.8936	0.5659	0.4063	1.2175	0.8712
t-stat	8.19***	6.32***	4.18***	0.97***	3.12**	7.10***	3.98***	3.16**	8.60***	6.68***
SMB	0.3610	0.0220	0.1779	-0.7790	0.0338	0.9614	0.3417	0.0692	1.2370	0.7732
t-stat	3.17**	0.1939	2.25**	-6.0022	0.2675	8.67***	2.73**	0.6116	9.91***	6.73***
HML	1.3725	0.8307	0.1843	-0.0667	-0.6428	0.9222	-0.2109	-0.1798	1.5230	0.9417
t-stat	8.28***	5.02***	1.6019	-0.3524	-3.49***	5.70***	-1.1571	-1.0899	8.37***	5.62***
RRD	-0.0215	1.7503	-0.1663	2.0092	-0.6033	1.7705	-0.2578	0.7307	2.7415	0.6203
t-stat	-0.0175	1.4282	-0.1949	1.4318	-0.4416	1.4769	-0.1907	0.5970	2.03**	0.4997
Adj. R	0.3980	0.2792	0.0788	0.2352	0.1514	0.3602	0.1398	0.0660	0.4511	0.2840
Significance F	0.0000	0.0000	0.0016	0.0000	0.0000	0.0000	0.0000	0.0044	0.0000	0.0000
	ACC-11	ACC-12	ACC-13	ACC-14	ACC-15	ACC-16	ACC-17	ACC-18	ACC-19	ACC-20
Intercept	-0.0029	-0.0039	0.0026	0.0050	0.0048	-0.0081	-0.0034	-0.0028	-0.0025	-0.0034
t-stat	-0.3236	-0.5352	0.2328	0.3475	0.5041	-1.0527	-0.3074	-0.3016	-0.3251	-0.5534
MKT	0.6998	0.5753	0.4476	0.7263	0.3617	0.6543	0.4029	0.4659	0.9945	0.8802
t-stat	5.43***	5.53***	2.83**	3.55***	2.65**	5.91***	2.56**	3.57***	9.05***	10.02***
SMB	0.0955	0.1605	0.2651	0.8631	-0.1263	-0.0334	-0.6302	-0.1694	-0.0863	0.0565
t-stat	0.8410	1.7524	1.90*	4.79***	-1.0502	-0.3432	-4.55***	-1.4727	-0.8922	0.7299
HML	0.8545	0.1951	-0.6878	-0.1697	-0.5778	0.4907	-1.0279	-1.2543	0.3289	-0.0434
t-stat	5.1634	1.46*	-3.38***	-0.6471	-3.29**	3.45***	-5.09***	-7.48***	2.33**	-0.3846
RRD	2.0121	1.7989	-1.4937	1.2281	-0.5597	0.6650	-0.0066	-0.7289	0.2605	-1.0206
t-stat	1.6388	1.81*	-0.9920	0.6313	-0.4303	0.6313	-0.0044	-0.5861	0.2490	-1.2194
Adj. R	0.2323	0.1529	0.1784	0.2032	0.1138	0.2272	0.2344	0.3557	0.3751	0.4018
Significance F	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

The results indicate that market premium has significant positive relationship with return of accrual sorted portfolios. Marginal effect in relatively higher on extreme portfolio and moderate on other.

The size premium has significant and positive impact on low accrual portfolio expect ACC-2, ACC-5 and ACC-8. However, in for high accrual portfolio, SMB premium influence return of ACC-13 and ACC-14 only. The impact on return of ACC-16 is significant but in contradict with theory.

HML has significant influence on return of various accrual based portfolios. In most of the cases the impact is positive for low accrual portfolio and negative in high accrual portfolio. This behaviour is inconstant and indicate that low accrual are considered positively and high accrual are discounted by the market.

Scarce evidence of significant relationship is found between RRD and return of accrual sorted portfolios. The positive relationship is observed for return of ACC-9 and ACC-12 portfolios. Figure 4.3 also depicts a positive significant relationship for all factors except for RRD, which is negatively significant for all the accrual sorted portfolios, but positive for ACC-9 and ACC-12 only.

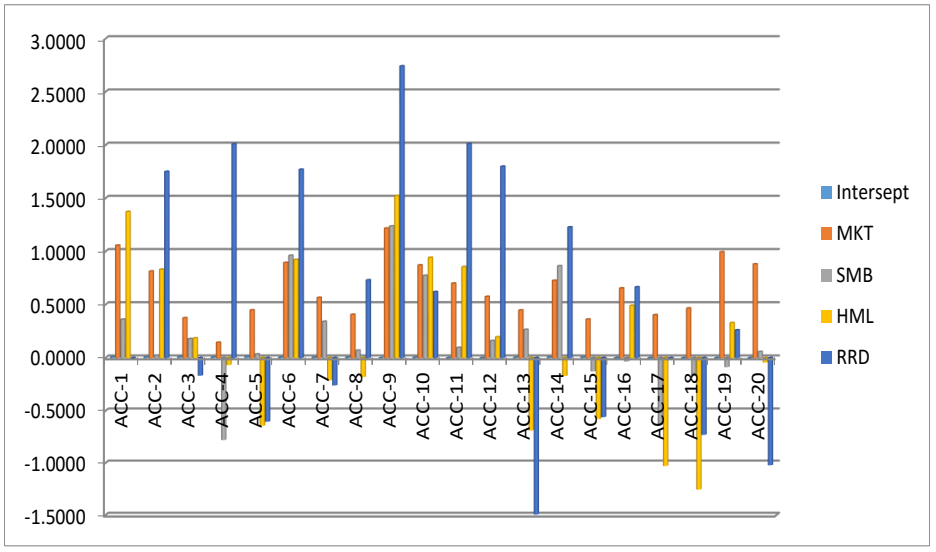

FIGURE 4.3: FF3 and RRD relationship for Accrual sorted portfolios.

The betas of twenty portfolio estimated in above regressed again the average return of accrual based sorted portfolios. The results of the cross sectional two pass regression are reported in Table 4.5.

TABLE 4.5: Impact of factor β on return of Accrual based portfolio cross-sectional Two Pass Regression.

β_0	0.0119
t-stat	2.5357
β_{MKT}	-0.0053
t-stat	-0.7147
β_{SMB}	0.0043
t-stat	1.3546
β_{HML}	0.0006
t-stat	0.2222
β_{RRD}	-0.0017
t-stat	-1.2760
Adj. R	-0.0151

Table 4.5 report that the model of cross section regression is misspecified because of negatively of adjusted R2. All the variables are insignificant. This mean that it is not to possible to forecast portfolio return by past β. The results of 1^{st} pass regression is significant but when we apply 2^{nd} pass regression all variables become insignificant. These are consistent with market efficiency theory that it is not possible to forecast portfolio return by past β.

4.2 Robustness of Check

The robustness of results has also been tested by using five Accrual based portfolios.

Five accrual based portfolio are formed. ACC-1 indicates the portfolio of companies with lowest stock and ACC-5 indicates the portfolios of the companies with highest accrual. At the same time arbitrage portfolio is created by taking short position in high accrual companies and taking long position in low accrual companies that reported as accrual hedge. The descriptive of portfolio are reported below.

Descriptive statistic on Accrual based portfolio is reported as Table 4.6.

TABLE 4.6: Descriptive Statistic.

	Mean	**Std. Dev.**	**Kurtosis**	**Skewness**	**Min.**	**Max.**
ACC-1	0.0116	0.0875	9.4960	1.4027	-0.2372	0.5377
ACC-2	0.0091	0.0831	0.3457	0.2106	-0.2409	0.2657
ACC-3	0.0020	0.0917	9.2570	0.5922	-0.4654	0.4976
ACC-4	0.0058	0.0976	15.2555	-0.7523	-0.6398	0.5332
ACC-5	0.0049	0.0855	3.6783	-1.1048	-0.3620	0.1959
ACC_Hedge	0.0067	0.0020	5.8176	2.5074	0.1248	0.3417
Accrual Strategies by Sub Period						
	2002-2005		2002-2010		2002-2016	
ACC_Hedge						
Mean	-0.0003		0.0076		0.0067	
t-statistics	-0.0136		0.6971		0.9006	

Table 4.6 report that the average return of ACC-1 is 0.0116 that highest average return earned by any accrual based portfolio. Its minimum return is -0.2372 and its maximum return is reported by 0.5377. The average return of ACC-2 is 0.0091. Its minimum return is -0.2409 and maximum return earn by 0.2657. The average return of ACC-3 is 0.0020 and its maximum return is 0.4976 and its minimum return is -0.4654. The average return of ACC-4 is 0.0058. Its maximum return is 0.5332 and its minimum return is -0.6398. The average return of ACC-5 is 0.0049 and its minimum return is -0.3620 and its maximum return is 0.1959. The arbitrage portfolio return is 0.0067 and its maximum return reported by 0.3417 and its minimum return is 0.1248.

Impact of stylized pattern on accrual based strategy is examined by using five accrual based portfolios and arbitrage portfolio is created by taking short position in high accrual stock and taking long position in low accrual stock. The results for Fama and French three factor are reported in Table 4.7.

TABLE 4.7: Impact of Fama and French three factor on return of Accrual sorted portfolio.

	ACC-1	**ACC-2**	**ACC-3**	**ACC-4**	**ACC-5**	**ACC_Hedge**
Intercept	0.0075	0.0034	-0.0031	-0.0005	-0.0042	0.0117
t-stat	1.4158	0.6324	-0.5800	-0.0730	-0.9277	2.02**
MKT	0.5791	0.5283	0.7941	0.4984	0.6434	-0.0643
t-stat	7.63***	6.7700	10.64***	5.14***	10.03***	-0.77
SMB	-0.0538	0.3339	0.5233	0.1882	-0.2309	0.1772
t-stat	-0.8059	4.8600	7.976***	2.2**	-4.09***	2.43**
HML	0.5708	-0.0333	0.8306	-0.2485	-0.4909	1.0617
t-stat	5.89***	-0.3300	8.72***	-2.01**	-6.00***	10.07***

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

Table 4.7 report that the results indicate that market premium has significant positive impact on Accrual sorted portfolio. However, no effect is observed on hedge portfolio. SMB has significant positive impact on ACC-2, ACC-3 and ACC-4 where as significant negative effect is observed on ACC-5. So for as Arbitrage portfolio is calculated, SMB is found to influence to return positively. No effect is observed on ACC-1. Therefore, inconsistent response is observed with reference to size premium, value premium have significant positive impact on ACC-1 and ACC-3 Similar results are found for Arbitrage portfolio. The results are in line with theory that require positive relationship between HML and return. Impact of HML on ACC-4 and ACC-5 is negative which is in contradiction of theory. However, similar results are reported by Hassan and Javed (2008).

Figure 4.4 also illustrate that market premium has significant positive impact on Accrual sorted portfolio. However, no effect is observed on hedge portfolio.

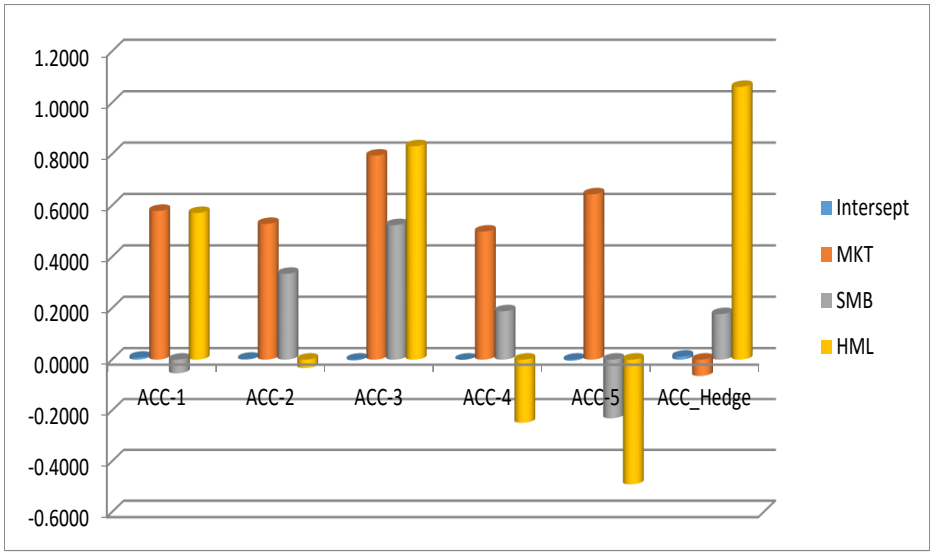

FIGURE 4.4: Impact of Hedge portfolio on Accrual sorted portfolios.

The impact of return dispersion is the captured by using examined Fama and French model and results are reported in Table 4.8.

TABLE 4.8: Impact of Mkt, SMB, HML and RRD on Return of Accrual Sorted Portfolio.

	ACC-1	**ACC-2**	**ACC-3**	**ACC-4**	**ACC-5**	**ACC_Hedge**
Intercept	0.0076	0.0035	-0.0030	-0.0005	-0.0042	0.0117
t-stat	1.4273	0.6359	-0.5781	-0.0724	-0.9292	2.03**
MKT	0.5793	0.5284	0.7946	0.4985	0.6433	-0.0640
t-stat	7.65***	6.76***	10.85***	5.12***	10.01***	-0.77**
SMB	-0.0589	0.3312	0.5126	0.1880	-0.2292	0.1703
t-stat	-0.8831	4.80***	7.94***	2.19**	-4.04***	2.34**
HML	0.5847	-0.0260	0.8596	-0.2477	-0.4956	1.0803
t-stat	6.01***	-0.2590	9.14***	-1.98**	-6.00***	10.22***
RRD	0.8993	0.4740	1.8732	0.0489	-0.3011	1.2005
t-stat	1.2400	0.6365	2.68*	0.0500	-0.49	1.5300

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

Table 4.8 report that the market premium is significantly influencing the portfolio ACC-1, ACC-2, ACC-3, ACC-4 and ACC-5 while Arbitrage portfolio has negative relationship with market premium. Size premium has positive significant relationship with ACC-2, ACC-3 and ACC-4 while size premium has significant negative

relationship with ACC-5. HML has positive significant relationship ACC-1 and ACC-3 while accrual insignificant relationship with ACC-2. HML has negative impact on ACC-4 and ACC-5. So far the arbitrage portfolio is concerned, and it is observed that SMB and HML have significant positive relationship with returns while market premium is significant negative relationship with arbitrage. Relative return dispersion has significant and positive relationship with portfolio of ACC-3. However, it is not found to effect other portfolios.

The results of RRD indicate the possibility that Fama and French three factor may explain the RRD premium. Therefore, impact of Mkt, SMB and HML on RRD return are examined. Following the pattern of Petkova and Zhang 2005, Four states are defined. State 1 correspond to 10% low observation of RRD while State 2 correspond to low observation excluding 10% lowest observation. State 3 correspond to excluding 10% highest observation. State 4 correspond to 10% high observation. We then conclude that risk adjusted returns in accrual portfolio strategy.

Figure 4.5 also shows that Relative return dispersion has significant and positive relationship with portfolio of ACC-3. However, it is not found to effect other portfolios.

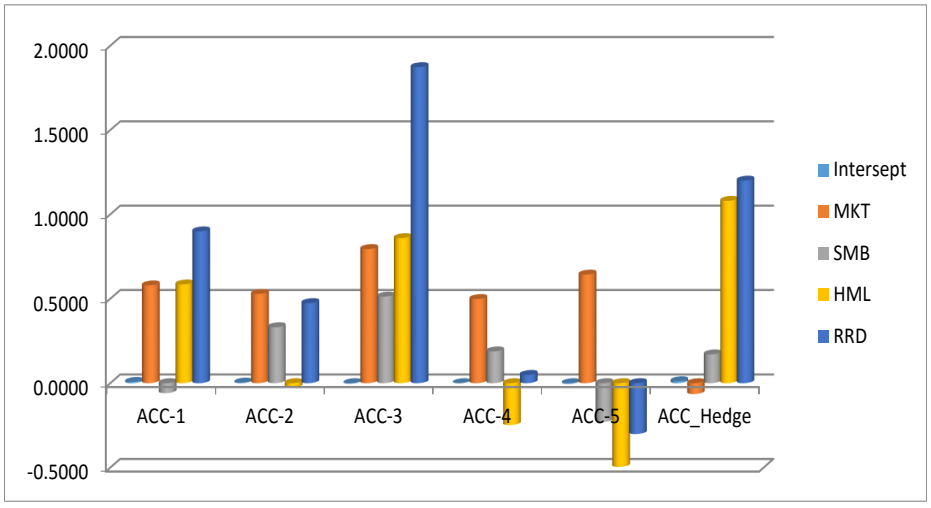

FIGURE 4.5: Impact of all factors on Accrual sorted portfolios.

Impact of Mkt, SMB and HML on Accrual based portfolio under various strategy are reported in Table 4.9.

TABLE 4.9: Impact of MKT, SMB and HML of Accrual Sorted Portfolio under various stages.

	State 1 (Low)	**State 2**	**State 3**	**State 4 (High)**	**High-Low**
ACC_Hedge	0.0076	0.0011	0.0088	0.0094	0.0018
t-stat	1.2041	0.1993	1.0830	0.3370	-0.8671
Intercept	0.0026	0.0021	0.0059	0.0381	0.0354
t-stat	0.3817	0.3080	0.7177	2.24**	1.8641
MKT	-0.0419	-0.1118	-0.1791	-0.1001	-0.0582
t-stat	-0.3344	-0.9363	-1.5852	-0.5291	-0.1947
SMB	-0.2630	-0.1243	0.0550	0.3114	0.5744
t-stat	-1.4296	-0.7844	0.2908	2.57**	4.0012
HML	0.1907	-0.0856	0.1173	1.4830	1.2923
t-stat	1.0713	-0.4265	0.4794	8.08***	7.0103

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

We create the stages on the monthly base of RRD that method follow by Petkova and Zhang (2005) we define that four states. State 1 (Low) corresponds to the 10% lowest observations for RRD; State 2 corresponds to below-average RRD, excluding the 10% lowest observations; State 3 corresponds to above-average RRD excluding the 10% highest observations; and State 4 (High) corresponds to the 10% highest observations for RRD.

Mkt, SMB and HML insignificant is does not explain RRD premium in various states. only one three of significant positive relationship is observed between HML and RRD in state 2. Therefore, it can be inferred that RRD is independent of Mkt, SMB and HML.

Figure 4.6 depicts that value premium found to be highly positive and statistically significant in state 4.

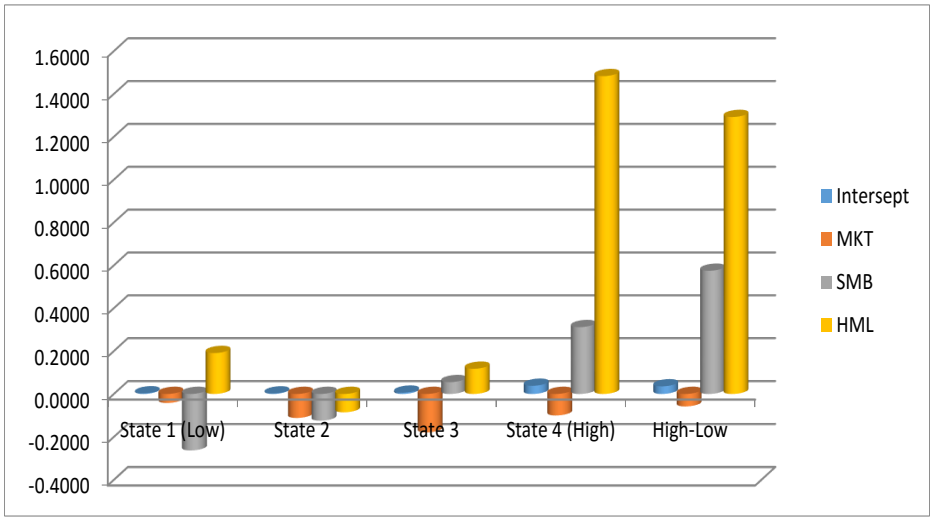

FIGURE 4.6: Impact of all factors under various states.

4.3 Stylized Factor Premium and Return of the Investment Based Strategy

This study examines the impact of Fama and French three factor model and Relative Return Dispersion on return of investment sorted portfolios. Twenty portfolios are formed on the bases of the investment. First portfolio IA-1 comprises of the companies with lowest investment where as a IA-20 comprise of the companies with the highest investment.

The statistical behavior of the Investment based portfolio is reported as Table 4.10.

The mean of IA-1 is 0.0041 and standard deviation is 0.1822 and its minima (-0.9272) and maxima 1.2386. The investment sorted portfolio of IA-2 mean is 0.0048 and its standard deviation is 0.1368, the minima of IA-2 (-0.4870) and maxima is 0.8874. The portfolio of IA-3 mean is 0.0096 and its standard deviation consists of 0.1557, minima and maxima of IA-3 is (-1.0200) and 0.6532. IA-4 has mean of 0.0049 and its standard deviation is 0.0956 and its minima is (-.3182) and its maxima is 0.2612. IA-5 has mean value of 0.0164 and its standard deviation is 0.0997 with minima (-0.2660) and maxima 0.3369. IA-6 has mean value of 0.0113 and its standard deviation is 0.1459 with minima (-1.0238) and maxima is 0.6046. IA-7 has mean value of 0.0009 and its standard deviation is 0.1515 with minima

TABLE 4.10: Descriptive Statistics of Investment Sorted Portfolio.

	Mean	**Median**	**Std. Dev.**	**Kurtosis**	**Skewness**	**Min.**	**Max.**
IA-1	0.0041	0.0001	0.1822	23.4762	1.5779	-0.9272	1.2386
IA-2	0.0048	0.0026	0.1368	13.1147	1.3893	-0.4870	0.8874
IA-3	0.0096	0.0000	0.1557	14.7769	-0.9045	-1.0200	0.6532
IA-4	0.0049	0.0011	0.0956	0.4991	-0.0890	-0.3182	0.2612
IA-5	0.0164	0.0113	0.0997	1.0560	0.3896	-0.2660	0.3369
IA-6	0.0113	0.0126	0.1459	15.9020	-1.6022	-1.0238	0.6046
IA-7	0.0004	0.0038	0.1515	10.9473	0.7712	-0.6800	0.9172
IA-8	0.0101	0.0065	0.1427	31.5696	-2.5809	-1.1787	0.7088
IA-9	-0.0003	-0.0002	0.1040	1.7659	0.4216	-0.2682	0.4328
IA-10	0.0119	0.0111	0.0916	4.3788	-0.5154	-0.4015	0.3665
IA-11	0.0139	0.0051	0.1646	26.2329	0.2465	-1.1099	1.1593
IA-12	0.0125	0.0026	0.1336	9.2907	1.4335	-0.4598	0.7944
IA-13	0.0061	0.0070	0.1091	13.0925	-0.9118	-0.6971	0.5647
IA-14	0.0172	0.0207	0.0963	0.7085	-0.3996	-0.3003	0.2383
IA-15	0.0028	0.0084	0.1151	5.6653	0.5589	-0.3957	0.6239
IA-16	0.0078	0.0025	0.1337	22.0209	-1.9582	-1.0065	0.6198
IA-17	0.0140	0.0134	0.1382	20.4596	2.4223	-0.5124	1.0234
IA-18	0.0070	0.0000	0.2224	28.1545	1.6379	-1.1663	1.7390
IA-19	0.0099	0.0130	0.1060	4.1305	0.0496	-0.4301	0.5073
IA-20	0.0019	0.0009	0.1373	7.1052	-0.4268	-0.7435	0.5611

(-0.6800) and maxima is 0.9172. IA-8 accrual portfolio has mean value of 0.0101 and its standard deviation is 0.1427 with minima (-1.1787) and maxima 0.7088. IA-9 has mean value of 0.0003 and its standard deviation is 0.1046 with minima (-0.2682) and maxima is 0.4328. The portfolio of investment IA-10 has mean value of 0.0119 and its standard deviation is 0.0916 with minima (-0.4015) and maxima is 0.3665. IA-11 has mean value of 0.0139 and its standard deviation is 0.1646 with minima (-1.1099) and maxima is (1.1593). IA-12 has mean value of 0.0125 and its standard deviation is 0.1336 with minima (-0.4598) and maxima is 0.7944. IA-13 has mean value of 0.0061 and its standard deviation is 0.1091 with minima (-0.6971) and maxima 0.5647. The portfolio of IA-14 has mean value 0.0127 and its standard deviation is 0.0963 with minima (-0.3003) and maxima is 0.2383. The

portfolio of IA-15 is 0.0028 and its standard deviation is 0.1151 with minima (-0.3957) and maxima is 0.6239. The portfolio of IA-16 has mean value of 0.0078 and its standard deviation is 0.1337 with minima (-1.0065) and maxima 0.6198. IA-17 has mean value of 0.0140 and its standard deviation is 0.1382 with minima (-0.5124) and maxima is 1.0234. IA-18 mean value is 0.0070 and its standard deviation is 0.2224 with minima (-1.1663) and maxima is 1.7390. IA-19 has mean value of 0.0099 and its standard deviation is 0.1060 with minima (-0.4301) and maxima is 0.5073. IA-20 has mean value of 0.0019 and its standard deviation is 0.1373 with minima (-0.735) and maxima is 0.5611.

Table 4.11: Impact of Mkt Premium and RRD on Return of Investment Sorted Portfolio.

	IA-1	IA-2	IA-3	IA-4	IA-5	IA-6	IA-7	IA-8	IA-9	IA-10
Intercept	-0.0009	-0.0016	0.0032	-0.0017	0.0094	0.0024	-0.0040	0.0045	-0.0067	0.0068
t-stat	-0.0676	-0.1574	0.2768	-0.2521	1.3778	0.2328	-0.3402	0.4211	-0.9116	1.0287
MKT	0.4643	0.5886	0.5871	0.6078	0.6503	0.8237	0.4015	0.5158	0.5953	0.4667
t-stat	2.49**	4.40***	3.78***	6.93***	7.19***	5.98***	2.59**	3.60***	6.07***	5.29***
RRD	-1.2384	2.5567	1.3019	-0.0859	1.0016	-0.8539	0.1766	0.5140	0.3442	-0.4932
t-stat	-0.6591	1.89*	0.8304	-0.0971	1.0976	-0.6144	0.1130	0.3557	0.3481	-0.5540
Adj. R	0.0271	0.1118	0.0721	0.2162	0.2338	0.1699	0.0276	0.0624	0.1735	0.1361
Significance F	0.0382	0.0000	0.0008	0.0000	0.0000	0.0000	0.0367	0.0018	0.0000	0.0000
	IA-11	IA-12	IA-13	IA-14	IA-15	IA-16	IA-17	IA-18	IA-19	IA-20
Intercept	0.0094	0.0094	-0.0011	0.0091	-0.0033	0.0009	0.0071	0.0007	0.0031	-0.0053
t-stat	0.7469	0.9078	-0.1459	1.4772	-0.3952	0.0920	0.7021	0.0440	0.4100	-0.5251
MKT	0.4146	0.2908	0.6680	0.7533	0.5601	0.6320	0.6335	0.5802	0.6340	0.6594
t-stat	2.48**	2.12**	6.61***	9.24***	5.03***	4.85***	4.69***	2.56**	6.4***	4.93***
RRD	2.8585	1.2483	0.6255	-0.1067	1.3915	0.7487	0.9453	2.3191	0.0184	-0.0943
t-stat	1.69*	0.9022	0.6134	-0.1297	1.2391	0.5697	0.6932	1.0138	0.0184	-0.0700
Adj. R	0.0404	0.0195	0.2014	0.3335	0.1297	0.1159	0.1092	0.0324	0.1899	0.1183
Significance F	0.0123	0.0731	0.0000	0.0000	0.0000	0.0000	0.0000	0.0245	0.0000	0.0000

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

The Impact of MKT premium and Relative Return Dispersion on investment based portfolio is reported as Table 4.11. The table reports that market premium has positive and significant relationship with return of investment based portfolio. Relative return dispersion has positive but insignificant relationship with return of investment based portfolio. The marginal impact of market premium is high on IA-5 and IA-4.

Figure 4.7 also illustrate that that market premium has positive and significant relationship with return of investment based portfolio.

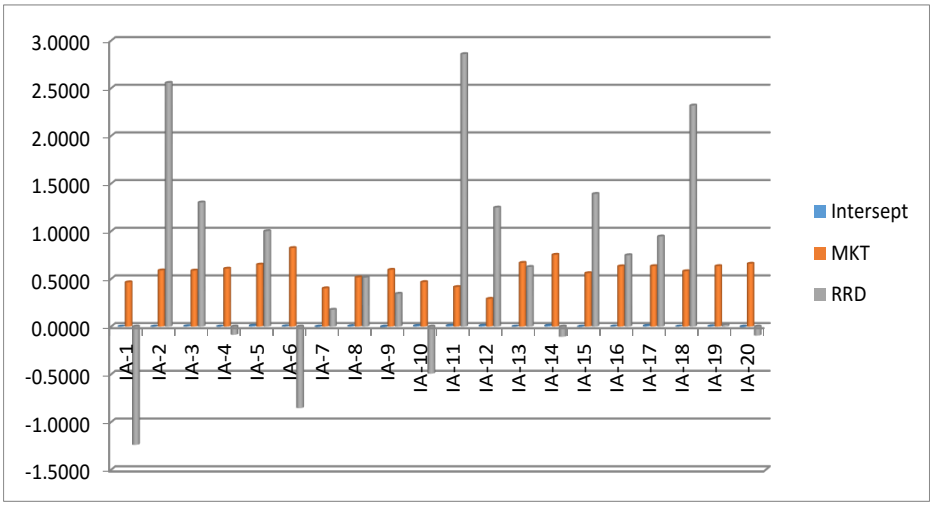

FIGURE 4.7: Impact MKT and RRD on of Investment Sorted Portfolio.

The betas of twenty portfolio estimated from above model are used to explain the average return of investment based sorted portfolios. The results of the cross sectional two pass regression are reported in Table 4.12.

TABLE 4.12: Impact of Market Premium and Relative Return Dispersion β on Return Cross Sectional Two Pass Regression.

β_0	0.0036
t-stat	0.5730
β_{MKT}	0.0073
t-stat	0.7079
β_{RRD}	0.0008
t-stat	0.6479
Adj. R	-0.0715

Table 4.12 report that the model of cross section regression is misspecified as adjusted R^2 is negative. All the variables are insignificant. This mean that it is not to possible to forecast portfolio return by past β. The results of 1^{st} pass regression is significant but when we apply 2^{nd} pass regression all variables become insignificant. These are consistent with market efficiency theory that it is not possible to forecast portfolio return by past β.

Table 4.13 report the results of the extend Fama and French three factor model by considering Mkt, SMB, HML and RRD premium. The results indicate that market premium has significant positive relationship with return of investment sorted portfolios. Marginal effect in relatively higher on extreme portfolios. The size premium has significant and negative impact on low investment portfolio IA-3 and it has positive and significant relationship with portfolio IA-12, IA-13, IA-16, IA-18 and IA-20 there is positive and significant relationship with SMB.

Table 4.13: Impact of Mkt, SMB, HML and RRD on return of Investment sorted portfolio.

	IA-1	IA-2	IA-3	IA-4	IA-5	IA-6	IA-7	IA-8	IA-9	IA-10
Intercept	0.0037	-0.0039	0.0022	-0.0017	0.0098	0.0022	-0.0049	0.0061	-0.0061	0.0068
t-stat	0.3534	-0.4394	0.2158	-0.2644	1.4448	0.2327	-0.4272	0.5871	-0.8334	1.0337
MKT	0.7431	0.4779	0.2220	0.6463	0.6760	0.4951	0.4465	0.5938	0.6381	0.5262
t-stat	4.96***	3.72***	1.4888	6.82***	6.95***	3.74***	2.70***	3.99*	6.10***	5.55***
SMB	0.1093	0.0166	-0.7362	0.0998	0.0087	-0.7358	0.2175	-0.0001	0.0262	0.1364
t-stat	0.8286	0.1467	-5.60***	1.1955	0.1021	-6.3061	1.49***	-0.0010	0.2848	1.6324
HML	1.9617	-0.9204	-1.1679	0.0710	0.1840	-0.8785	-0.1553	0.6213	0.2786	0.1519
t-stat	10.20***	-5.58***	-6.09***	0.5839	1.4735	-5.1667	-0.73***	3.2536	2.07**	1.24**
RRD	1.5542	1.1205	0.8840	-0.1625	1.2663	-0.8309	-0.4639	1.4630	0.7210	-0.5142
t-stat	1.0899	0.9164	0.6220	-0.1801	1.3670	-0.6587	-0.2948	1.0326	0.7235	-0.5691
Adj. R	0.4588	0.2944	0.2637	0.2135	0.2376	0.3395	0.0477	0.1297	0.1894	0.1406
Significance F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0174	0.0000	0.0000	0.0000
	IA-11	IA-12	IA-13	IA-14	IA-15	IA-16	IA-17	IA-18	IA-19	IA-20
Intercept	0.0095	0.0078	-0.0012	0.0089	-0.0047	0.0020	0.0083	-0.0044	0.0029	-0.0043
t-stat	0.9102	0.8938	-0.1572	1.4404	-0.5993	0.2115	1.0371	-0.3189	0.3899	-0.4852
MKT	0.9003	0.5796	0.6951	0.7641	0.5894	0.7030	1.0541	0.5339	0.6588	0.9894
t-stat	6.03***	4.67***	6.35***	8.67***	5.20***	5.12***	9.15***	2.69**	6.16*	7.85***
SMB	1.1209	0.8612	0.0740	0.0467	0.2350	0.0342	0.8400	0.4946	0.0737	0.6519
t-stat	8.5273	7.87***	0.76***	0.6007	2.3558	0.28**	8.2781	2.82***	0.7822	5.87***
HML	1.2198	0.2656	0.0412	-0.0244	-0.3215	0.4845	1.3643	-1.5362	0.0236	1.0876
t-stat	6.3674	1.66***	0.29*	-0.2151	-2.2115	2.74**	9.22*	-6.02***	0.1717	6.72***
RRD	2.6423	0.0567	0.5511	-0.2304	0.4649	1.4251	1.4708	-0.9438	-0.0823	0.3575
t-stat	1.8593	0.04*	0.5289	-0.2743	0.4311	1.0894	1.3406	-0.4991	-0.0808	0.2980
Adj. R	0.3414	0.3081	0.1946	0.3284	0.2249	0.1542	0.4432	0.3615	0.1835	0.3252
Significance F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

HML is formed significant influence on return of various investment portfolios. In most of the cases the impact is positive for low investment portfolio and negative in high investment portfolio except IA-18. This behaviour is inconsistent and indicate that low investment are considered positively and high investment are discounted by market.

Figure 4.8 also shows that market premium has significant positive relationship with return of investment sorted portfolios. Marginal effect in relatively higher on extreme portfolios.

Scarce evidence of significant relationship is found between RRD and return of investment sorted portfolios. The positive relationship is observed for return of IA-9 and IA-12 portfolios.

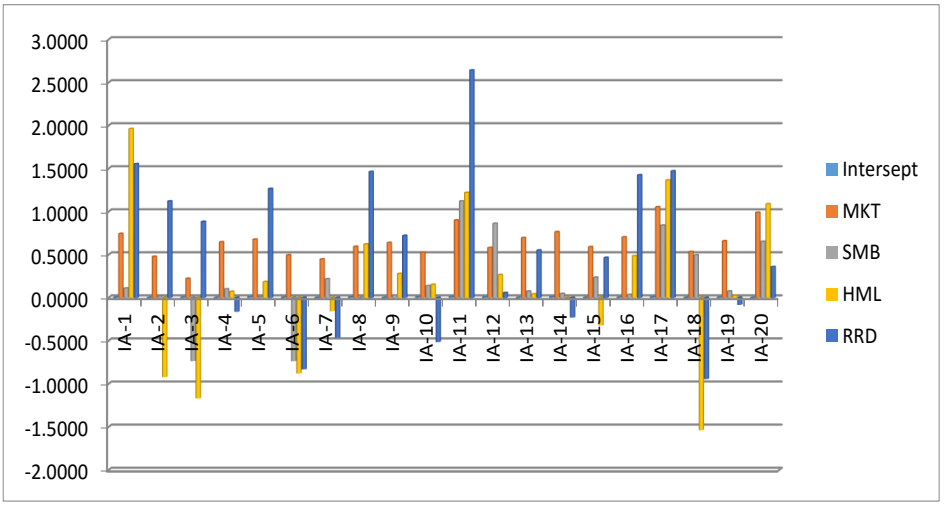

FIGURE 4.8: Impact all Factors on of Investment Sorted Portfolio.

The betas of twenty portfolio estimated above are regressed against the average return of investment based sorted portfolios. The results of the cross sectional two pass regression are reported in Table 4.14.

Table 4.14 report that the model is misspecified of adjusted R^2 is negative. All the variables are insignificant. This mean that it is not to possible to forecast portfolio return by past β. The results of 1^{st} pass regression is significant but when we apply 2^{nd} pass regression all variables become insignificant. There are constant with market efficiency theory that it is not possible to forecast portfolio return by past β.

TABLE 4.14: Impact of Factor β on Return of Investment Based Portfolio Cross Sectional Two Pass Regression.

β_0	0.0012
t-stat	0.1652
β_{MKT}	0.0112
t-stat	0.9361
β_{SMB}	-0.0010
t-stat	-0.2753
β_{HML}	-0.0025
t-stat	-0.9477
β_{BRD}	0.0014
t-stat	1.0424
Adj. R	-0.1265

4.4 Robustness of Results

The robustness of results has also been tested by five Investment based portfolios.

Five investment based portfolio are formed. IA-1 indicates the portfolio of companies with lowest stock and IA-5 indicates the portfolios of the companies with highest investment. At the same time arbitrage portfolio is created by taking short position in high investment companies and taking long position in low investment companies that reported as investment hedge. The descriptive of portfolio are reported below.

Descriptive statistic on Investment based portfolio is reported as Table 4.15.

Table 4.15 report that the average return of IA-1 is 0.0059 that highest average return earned by any investment based portfolio. Its minimum return is -0.2473 and its maximum return is reported by 0.3834. The average return of IA-2 is 0.0096. Its minimum return is -0.3033 and maximum return earned is 0.4624. The average return of IA-3 is 0.0095 and its maximum return is 0.4337 and its minimum return is -0.3021. The average return of IA-4 is 0.0085. Its maximum return is 0.1769 and its minimum return is -0.2533. The average return of IA-5 is

TABLE 4.15: Descriptive Statistic of Investment Sorted Portfolio.

	Mean	**Median**	**Std. Dev.**	**Kurtosis**	**Skewness**	**Min.**	**Max.**
IA-1	0.0059	0.0028	0.0791	2.5679	0.4443	-0.2473	0.3834
IA-2	0.0096	0.0031	0.0872	4.4603	0.4862	-0.3033	0.4624
IA-3	0.0095	0.0054	0.0816	5.1620	0.4482	-0.3021	0.4337
IA-4	0.0085	0.0045	0.0717	0.4148	-0.3165	-0.2533	0.1769
IA-5	0.0082	0.0010	0.0928	6.0875	0.5810	-0.3458	0.4928
IA_Hedge	-0.0024	0.0017	-0.0137	-3.5196	-0.1367	0.0985	-0.1094
Investment Strategies by Sub Period							
	2002-2005		2002-2010		2002-2016		
IA_Hedge							
Mean	-0.0059		0.0014		-0.0024		
t-Statistic	-0.4591		0.1967		-0.3094		

0.0082 and its minimum return is -0.3458 and its maximum return is 0.4928. The arbitrage portfolio return is -0.0024 and its maximum return reported by -0.1094 and its minimum return is 0.0985.

Impact of stylized pattern on investment based strategy is examined by using five investment based portfolios and arbitrage portfolio is created by taking short position in high investment stock and taking long position in low investment stock. The results for Fama and French three factor are reported in Table 4.16.

TABLE 4.16: Impact of MKT, SMB and HML of Investment Sorted Portfolio.

	IA-1	**IA-2**	**IA-3**	**IA-4**	**IA-5**	**IA_Hedge**
Intercept	0.0000	0.0033	0.0045	0.0012	0.0006	-0.0006
t-stat	0.0030	0.5500	0.9200	0.2900	0.1100	-0.11
MKT	0.5221	0.5528	0.6609	0.6878	0.8090	-0.2869
t-stat	7.00***	6.6***	9.57***	11.77***	10.55***	-3.54**
SMB	-0.1228	-0.1253	0.5404	0.1006	0.5162	-0.6390
t-stat	-1.87*	-1.70*	8.89***	1.95*	7.65***	-9.52***
HML	-0.0270	-0.0627	0.4677	0.0364	0.2317	-0.2588
t-stat	-0.28	-0.58	5.3***	0.4800	2.36**	-2.65**

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

Table 4.16 reports that the results indicate that market premium has positive and significant impact on all investment based five portfolios IA-1, IA-2, IA-3, IA-4, IA-5. There is negative but significant effect is observed in Hedge portfolio. SMB has significant and positive relationship with return of investment based portfolio IA-3, IA-4 and IA-5. On the other side, SMB has negative but significant relationship with investment based portfolio of IA-1 and IA-2. So far as Arbitrage portfolio is consistent, it is negatively insignificant by SMB. HML also has positive and significant relationship with IA-3 and IA-5. So far the investment portfolios of IA-1, IA-2 and IA-4 concerns there is positive insignificant relationship. Arbitrage portfolio is negatively affected by HML.

Figure 4.9 is illustrating the graphical explanation of the above mentioned results.

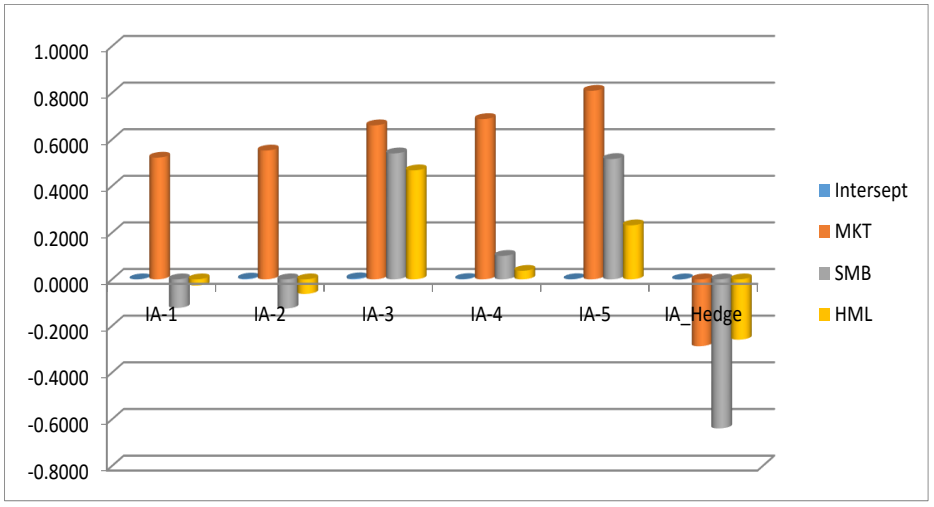

FIGURE 4.9: Impact all Factors on Hedge Investment Sorted Portfolio.

The impact of return dispersion is the captured by using examined Fama and French model and results are reported in Table 4.17.

Table 4.17 reports that the market premium has positive and significant relationship with all investment based portfolios IA-1, IA-2, IA-3, IA-4 and IA-5. While arbitrage portfolio has negative but significant relationship with MKT premium. SMB has positive and significant relationship with investment based portfolio IA-3, IA-4 and IA-5 and IA-1 and IA-2 has negative and significant relationship with SMB has significant and negative relationship with Hedge portfolio. HML has

TABLE 4.17: Impact of MKT, SMB, HML and RRD on Return of Investment Sorted Portfolio.

	IA-1	**IA-2**	**IA-3**	**IA-4**	**IA-5**	**IA_Hedge**
Intercept	0.0001	0.0030	0.0045	0.0012	0.0006	-0.0006
t-stat	0.0100	0.5600	0.9300	0.3000	0.1100	-0.107
MKT	0.5223	0.5500	0.6610	0.6879	0.8091	-0.2867
t-stat	7.01***	6.59***	9.58***	11.77***	10.5***	-3.50**
SMB	-0.1277	-0.1300	0.5362	0.0975	0.5150	-0.6427
t-stat	-1.94*	-1.72*	8.81***	1.89*	7.59***	-9.54***
HML	-0.0140	-0.0600	0.4790	0.0450	0.2348	-0.2487
t-stat	-0.1400	-0.5300	5.4***	0.5900	2.37**	-2.52**
RRD	0.8500	0.3600	0.7265	0.5527	0.2005	0.6485
t-stat	1.1970	0.4500	1.1000	0.9900	0.2700	-0.9200

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

positive significant relationship with IA-3 and IA-5. Relative return dispersion has no effect on any of the investment based portfolio.

The results of RRD indicate the possibility that Fama and French three factor may explain the RRD premium. Therefore, impact of Mkt, SMB and HML on RRD return are examined. Following the pattern of Petkova and Zhang 2005, Four states are defined. State 1 correspond to 10% low observation of RRD while State 2 correspond to low observation excluding 10% lowest observation. State 3 correspond to excluding 10% highest observation. State 4 correspond to 10% high observation.

Figure 4.10 also illustrate that market premium has positive and significant relationship with all investment based portfolios IA-1, IA-2, IA-3, IA-4 and IA-5.

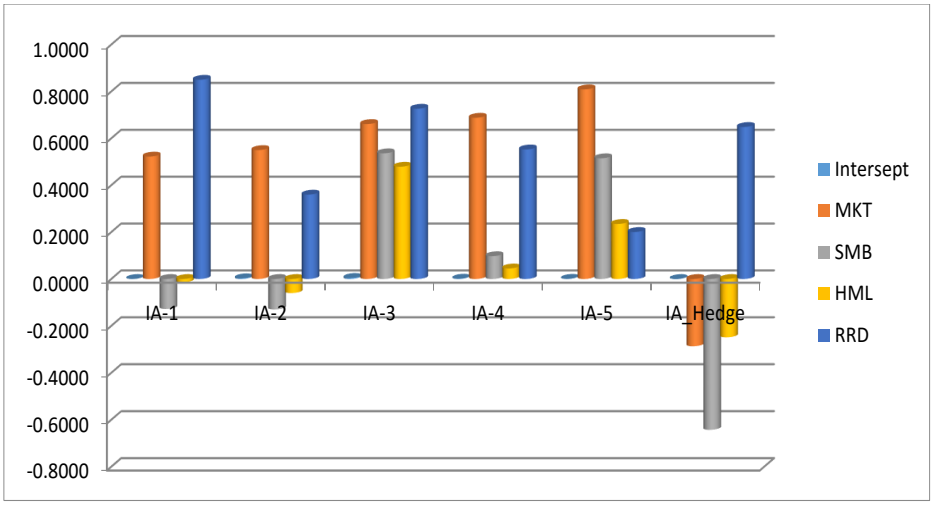

FIGURE 4.10: Impact of all Factors on Investment Sorted Portfolio.

Impact of Mkt, SMB and HML on Investment based portfolio under various stages are reported in Table 4.18.

TABLE 4.18: Impact of MKT, SMB and HML of Investment Sorted Portfolio under various stages.

	State 1 (Low)	**State 2**	**State 3**	**State 4 (High)**	**High-Low**
IA_Hedge	-0.0056	-0.0045	-0.0010	0.0017	0.0073
t-stat	-0.7914	-0.7468	-0.1304	0.0598	0.8512
Intercept	-0.0036	-0.0079	0.0008	0.0113	0.0148
t-stat	-0.4583	-1.0777	0.0936	0.4946	-0.0256
MKT	0.0173	0.0682	-0.0409	-0.5641	-0.5815
t-stat	0.1228	0.5389	-0.3673	-2.21**	-0.8704
SMB	0.3050	-0.1409	-0.2128	-0.8376	-1.1425
t-stat	1.4713	-0.8381	-1.1409	-5.14***	-0.1494
HML	0.2363	-0.0256	0.0368	-0.4577	-0.6940
t-stat	1.1781	-0.1201	0.1524	-1.85*	-0.1749

*Note; *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.*

Table 4.18 indicate that return of investment based portfolio are not significant different during various state of RRD. Mkt, SMB and HML are insignificant and does not explain RRD premium in various states. HML and RRD in state 4 has

significant impact. Therefore, it can be said that RRD is independent of Mkt, SMB and HML.

Figure 4.11 is the graphical illustration of the mentioned results.

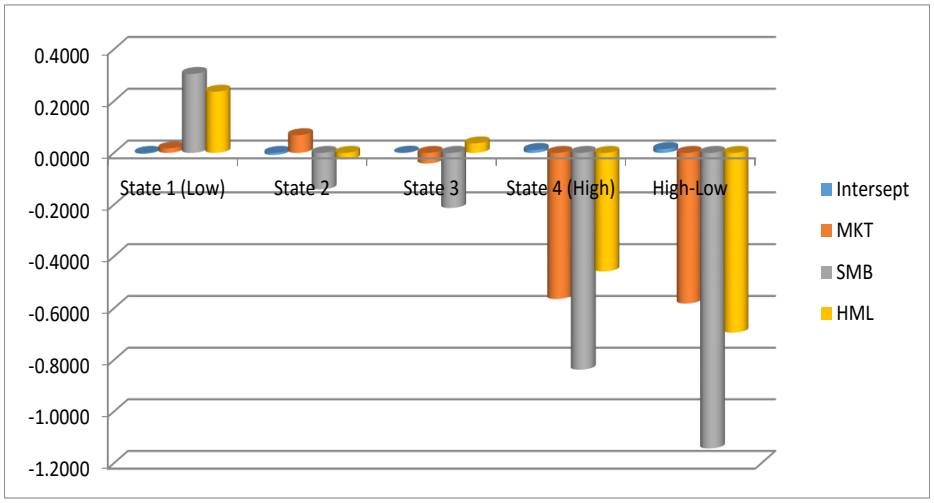

FIGURE 4.11: Impact of all Factors under various States.

Chapter 5

Conclusion and Recommendation

5.1 Conclusion

In the real world, firms cannot perfectly forecast the future. The business environment is continuously changing and firms must make investment decisions in the face of volatility. In this study return dispersion is used as a firm specific factor to examine whether return dispersion provides useful information about future excess stock returns at the accrual and investment level.

In this study accrual and investment anomaly has been discussed individually. The following discussion highlights the role of return dispersion in explaining accrual anomaly and then investment anomaly in latter stage.

This study examines the impact of Fama and French three factor model and Relative Return Dispersion on return of accrual sorted portfolios. Initially twenty accrual portfolio has been constructed. The return of low accrual portfolio is generally higher in comparison to high accrual sorted portfolio. However, no systematic pattern of risk is observed in accrual sorted portfolio. Market factor is found to influence the return of all accrual sorted portfolio. The impact is significant and positive and it is consistent with theory. The result of return dispersion is not found significantly influencing the return of accrual sorted portfolios. The two pass regression prove that model of cross section regression is misspecified due to negative adjusted R^2.

Similarly, the extended Fama and French three factor model by considering Mkt, SMB, HML and RRD is applied. The results indicate that market premium has significant positive relationship with return of accrual sorted portfolios. The size premium has significant and has positive impact on low accrual portfolio. HML has significant influence on return of various accrual based portfolios. Thus the finding suggests that there is positive and significant impact of these factor and results are supported by theory. Scarce evidence of significant relationship is found between RRD and return of accrual sorted portfolios. The study suggests that return dispersion remains inefficient to explain return of accrual sorted portfolios. The two pass regression also provide that model of cross section regression is misspecified. Thus it proves that it is not possible to predict future on the basis of past.

The robustness of results has also been tested by using five Accrual based portfolios. The five portfolios are also to create the hedge portfolio. Accrual hedge portfolio return are not significantly different from the other accrual portfolio return.

Fama and French three factor model is also used to explain the five accrual sorted portfolios, again the result are found consistent. The results of extended Fama and French model are also same as relative return dispersion has little power the explain return of accrual sorted portfolios. The results of RRD indicate the possibility that Fama and French three factor may explain the RRD premium. Therefore, impact of Mkt, SMB and HML on RRD return are examined. On the bases of return dispersion four stages are created. The results show that Mkt, SMB and HML does not explain RRD premium in various states. Market premium, size premium and value premium are insignificantly related and does not explain relative return dispersion premium in the first three states. While on the contrary in the fourth state only value premium seems to show positive impact on relative return dispersion. Therefore, it can be inferred that RRD is independent of Mkt, SMB and HML.

This study examines the impact of Fama and French three factor model and Relative Return Dispersion on return of investment sorted portfolios. Initially twenty

investment portfolio has been constructed. The return of low investment portfolio is generally higher in comparison to high investment sorted portfolio. However, no systematic pattern of risk is observed in investment sorted portfolio. Market premium has positive and significant relationship with return of investment based portfolio. Relative return dispersion has positive but insignificant relationship with return of investment based portfolio. The two pass regression prove that model of cross section regression is misspecified due to negative adjusted R^2.

In second step, return dispersion is regressed with market premium size premium and value premium to explain return of investment sorted portfolios. The results report that market premium has significant positive relationship with return of investment sorted portfolios. Marginal effect is relatively higher on extreme portfolios. The size premium has significant and negative impact on low investment portfolio. HML is found to significantly influence the return of various investment portfolios. Market premium, size premium and value premium also seems to influence the return of all investment sorted portfolios. Scarce evidence of significant relationship is found between RRD and return of investment sorted portfolios. Thus, impact is statistically significant and positive for all factors in first pass regression. Moreover, when two pass regression is applied on market premium and relative return dispersion, it also reports the misspecification of the model. Thus its gives a clear justification that future forecasting is not possible through past data. However, the impact of return dispersion is positive and significant in first past regression while it is insignificantly related to all variables in the second pass regression. Thus return dispersion is not found to explain return of investment sorted portfolio. In addition, again two pass regression is run to regress Fama and French three factor model with relative return dispersion. Where Fama and French factors found to be significantly related while relative return dispersion remain unchanged. Model is misspecified as adjusted R^2 is negative.

The robustness of results has also been tested by five Investment based portfolios. Further five portfolios and hedge portfolio is created. Investment hedge portfolios are not significantly different from other investment sorted portfolios. Here

also Fama and French factors are significantly effecting return while no change is observed in case of relative return dispersion.

Fama and French three factor model is also used to explain the return of five investment sorted portfolios, again the result are found consistent. Then extended the Fama and French three factor model with relative return dispersion is applied. Then the results of market premium has positive and significant relationship with all investment based portfolios. While arbitrage portfolio has negative but significant relationship with MKT premium. SMB has positive and significant relationship with investment based portfolio. HML has positive significant relationship. Relative return dispersion has no effect on any of the investment based portfolio. Then in the last stage the study created the different states on the bases of return dispersion for each variable on the basis of relative return dispersion. The results show that market premium, size premium and value premium are insignificant and does not explain relative return dispersion premium in the first three states. While in the fourth state only value premium seems to show positive impact on relative return dispersion. Therefore, finding suggests that relative return dispersion is independent of market premium, size premium and value premium.

5.2 Recommendation Policy

The multivariate analysis for the Fama and French factor contributed significantly in explaining the return of accrual and investment base strategy. Hence investor should appreciate and encourage using multivariate analysis for making investment decision. Return dispersion does not significantly effect on accrual and investment. For the further research return dispersion perspective should be tested with other variable. For the further research some more variables should be included for further reinvestigation.

In determination of the average return investors can use the strategies based on size premium, value premium and the return dispersion. It is recommended that in Pakistan stock market, investors can not generate any gain by creating arbitrage portfolio.

5.3 Future Research Direction

Existing study on accrual and investment anomaly in return dispersion perspective conducted in developed countries and emerging market of Pakistan. The results still unable to capture the systematic risk in four factors model which open the future domain to explain the determinants of return of stylized portfolios.

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