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Impact of Cash Flow Volatility on Stock Returns: Evidence from Pakistan Stock Market

by

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(MMS163019)

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Dedication

This thesis is dedicated to my mother Kauser Perveen & my father Mr. Ashfaq Abbas Awan. I am also dedicating this work to my Husband Fahad Latif, daughter Alvina, brothers Mr. Danial Abbas and Mr. Shaheer Latif, Sisters Hadia Ashfaq and Sidra Ashfaq and supervisor Dr. Ahmad Fraz whose categorical encouragement and prop up made it possible for me to finish the work. Thank you so much sir.

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Abstract

This study investigates the impact of cash flow volatility on Pakistan stock market by using the sample of eighty non-financial companies listed on Karachi Stock Exchange for the period of 2005 to 2016. The companies are selected randomly. Panel data regression based on fixed effect model estimation technique is used to examine the impact of cash flow volatility on market returns. This study shows that historically cash flow volatility has a significant power in explaining the stock returns. Cash flow volatility can affect the future stock returns negatively at firm level. This negative association extends over a long period of 9 years as 4 year data is used as a rolling base for the estimation of volatility. Cash flow volatility is detangled into systematic and idiosyncratic volatility to price both these components of cash flow volatility. The pricing of idiosyncratic volatility represents an anomaly against the traditional asset pricing model. This study specifies that systematic risk is considered while idiosyncratic volatility is not responded by market. Furthermore, these results are context in the existence of many return related anomalies. The cash flow volatility and stock return relationship is robust to many return informative variables of size, expected returns, market, illiquidity, value and earning yield.

Key words: cash flow volatility, idiosyncratic volatility, earning yield, expected returns.

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Abbreviations

CAPM	Capital Asset Pricing Model
APT	Arbitrage Pricing Theory
ME	Firm Size
BTM	Book to Market Equity
ER	Expected Returns
ILL	Illiquidity
EY	Earning Yield
CFV	Cash Flow Volatility
CFSALES	Cash Flow to Sales Volatility
CFBE	Cash Flow to Book Equity
KSE	Karachi Stock Exchange

Chapter 1

Introduction

1.1 Introduction of the study

A growing literature is documenting the relationship between volatility and expected stock returns. (Ang et al., 2006a) claims that a significant factor in asset pricing factor is volatility as this anomaly has an important role in describing returns.. The study develops model to explain the expected returns and mentions both systematic and idiosyncratic volatilities of stock returns negatively relates to future stock returns. The model reduces the pricing errors as compared to CAPM and Fama-French model.

During the last few decades the significance of business risk is amplified in modern finance. Business risk is the likelihood that a company's anticipated profits will decrease or it will experience losses. This situation of inadequate profits or losses is due to uncertainties. Various information uncertainty proxies such as size, cash flow volatility, age, analyst dispersion estimate, return volatility are assumed to be significantly related with future returns. The literature focuses on various form of business risk to nullify its impact on returns. (Zhang et al., 2006) measures the information uncertainty using analyst dispersion and return volatility and finds that it induces negative returns. The findings are supported by (Diether et al., 2002).

Under traditional finance, (Markowitz, 1952) put forward the concept of diversification to minimize risk and maximize return in the process of portfolio selection. The main aim of this theory is to diversify risk by not reducing the expected returns.

Cash flow volatility is the fluctuations in the cash flows of companies. Companies experiences cash flow volatility as different financial operations take place. Cash flow volatility consist of two components; systematic and idiosyncratic volatility. In order to study the impact of cash flow volatility on returns, both these components must be priced.

The literature focus on the relationship of cash flow volatility and stock returns. (Pontiff and Irvine, 2009) claims that trend in return volatility is due to major cash flow shocks and increased market wide competition. (Pástor and Pietro, 2003) argues that idiosyncratic return volatility increases when firm is uncertain about future profitability. Idiosyncratic stock volatility raises during 1970 to 1990 as acknowledged by (Campbell et al., 2001) and (Morck et al., 2000) due to which return on equity decreases and return on equity volatility increases. As return volatility positively relates to cash flow volatility, previous literature mentions that a negative relationship between cash flow volatility and stock returns must be expected. This study measures the impact of cash flow volatility on stock returns.

Cash flow volatility is untangled into systematic and firm specific component. The reason is that if cash flow volatility is considered a risk like the risk factor of asset pricing theory, then only systematic cash flow volatility would matters. (Ang et al., 2006a) determines that idiosyncratic return volatility is valued along with systematic return volatility as well. So this study considers how to price both component of cash flow volatility.

It is difficult to define a systematic cash flow component for an individual firm as it requires a benchmark or market cash flow. For defining market cash flow, a broad set of variables are needed to explain the industry condition. Under this observation, industry cash flow is considered as a market cash flow for the firm in this study. Both component of cash flow volatility is explained with the help of

firm's exposure to industry average volatility. Systematic volatility is determined as the cash flow volatility from the exposure to the industry average. In other words industry exposed volatility is the systematic volatility.

According to traditional asset pricing theory idiosyncratic return volatility should not be estimated which is measured using Fama and French three factor model and calculating the standard deviation of the residual from these factors. But (Merton, 1987) is of view that if portfolios are not correctly diversified then idiosyncratic volatility must be positively compensated. In other words specific risk associated with the portfolio is either irrelevant or positively related. Furthermore, idiosyncratic volatility has gained attention recently and its relationship with the stock returns has been discussed. (Campbell et al., 2001) mentions that firm level volatility has increased over the period however the stock market is not volatile as a whole. So it is important to price idiosyncratic component of volatility.

(Goyal and Santa-Clara, 2003) finds a significant positive relation between variance of stock and returns of portfolio. The variance is basically idiosyncratic risk but this return cannot predict market returns. As asset price theories tends to focus on systematic risk that it affect returns only so these findings has no significance. (Bali and Cakici, 2008) find that the (Goyal and Santa-Clara, 2003) result does not support either the sample or portfolio. They state that it is due to small stock or liquidity premium.

This study contributes in the literature that how cash flow volatility is related to the expected stock returns. The capital asset pricing has not given much attention to the cash flow volatility. Previous studies focuses on the change in the earning level as a outcome of changes in seasonal cash flows. As (Haugen et al., 1996) states that earning yield is positively related to expected stock returns. Similarly (Chan and Wei, 1996) establishes long lasting earning phenomena that firm with positive earnings experience positive abnormal returns in the future which is known as earning momentum.

(Haugen et al., 1996) explore the volatilities in earnings and cash flow while measuring the cross sectional regression in return and they mentions that cash flow

yield is negatively related to returns in more than 50 firms. But they didn't explain the relationship between returns and earnings volatilities.

Time to time changes in volatility changes the investment behavior of the investors by changing investment opportunities and expected returns. Now the question arises that how this volatility is going to affect the equity market in Pakistan.

The objective of this paper is to investigate how volatility of cash flow are valued while estimating the expected stock returns cross sectional. The aggregate risk is considered while estimating volatility and measured its effect on market returns.

This study conduct an investigation that how the stochastic cash flow volatility is valued in the cross sectional expected stock returns. Many research studies has been conducted using market index to find whether risk volatility leads to stock market volatility. In this study I would use cross section stock returns to observe stock returns volatility at the individual firm level considering the numerous controls of return informative variables such as factors of market, size, book to market equity, expected returns, and illiquidity and earning yield.

1.2 Theoretical Background

The relationship between stock return and volatility represent a major anomaly in the literature of finance. This anomalous relationship can be linked to Prospect Theory. According to Prospect theory, investors consider the cross-section of stock returns by estimating the risk which they are taking. While considering any stock, some investors keeps the distribution of its past returns. The stocks whose past return have a high prospect theory value will have low returns on average. This fact is supported by U.S and International data.

Many recent researchers have used the prospects theory to estimate the stock's future return distribution. (Barberis et al., 2016) investigate that how investors evaluate stock. The prospect theory is tested under the assumption that investors uses a backward looking representation. The sophisticated investors may try to predict a stock's future return distribution. On the other hand, less sophisticated

investors may satisfy themselves with thinking about a stock in terms of its past returns. In turn investors are able to make sharper prediction about stock returns.

In combination with mental accounting, Prospect theory suggests that when unrealized capital losses incur on stocks, disposition-prone investors tends to hold these stock too long until they become overpriced. Mostly the investors who are in loss domain are risk averse. They are willing to accept stocks having large idiosyncratic volatility, which eventually leads to overpricing of these stocks in equilibrium. The low average returns with high idiosyncratic volatility stocks would be observed in stocks with unrealized capital loses.

(Bhootra and Hur, 2015) finds negative relationship between idiosyncratic volatility and returns of the stock with unrealized capital losses but no such relationship is found in stocks with unrealized gains. This relationship also works with stocks having ownership of investors who have strong affinity to trade in and hold high volatility stocks. The negative relationship of volatility and returns in stocks with capital losses is stronger than the stocks having greater ownership of individual investors.

Prospect theory also works along with arbitrage limitation. (Pontiff, 2006) claims that high idiosyncratic volatility discourages arbitrage and it causes greater overpricing and ultimately lower returns among high volatile stocks. However it does not explains that anomaly only occur with stocks having unrealized losses. It is present on the basis of overpricing only.

According to (Grinblatt and Han, 2005) overpricing of stocks with unrealized losses occurs due to risk seeking behavior of the investor in loss domain. (Pontiff, 2006) point out that high idiosyncratic volatility deters arbitrage due to arbitrageurs' risk aversion. This is an alternative explanation that how overpricing of unrealized loss stocks limits to arbitrage.

The possibility of short sale restricts deter correction of overpricing among high volatility stocks. But the effect of short sale diminishes when the stock is priced below $5. (Diether et al., 2009) mentions that rate of short selling is higher in stocks which are priced below $5. This is the reason that high collateral cost is associated with stock which are priced below $5.

(Barberis et al., 2016) hypothesize that when investors thinks about allocating their money, they mentally consider the stock by the distribution of the stock's past returns. This distribution is assessed by using the prospect theory. According to this theory, any stock whose past returns are high, prospect theory value earns a low consequent return in the future. This evidence is provided by the cross-sectional stock returns of the U.S market and 46 other national markets.

1.2.1 Fundamentals of returns

A set of common factors can explain the individual stock returns. Stock returns has been explained by many models in the past literature. Firstly the risk-return relationship was explored by Harry Markowitz in 1952. Markowitz portfolio theory is based on the assumption of diversification. Fama and French introduces the three factor model in (1992) to explain the stock returns. The model includes the market, size and value factor in portfolio management. Stock returns are described by market, size and value premium. For measuring size, Fama and French uses SMB (small minus big market capitalization). It measure the returns of small minus big caps. For value, they uses HML (high minus low book to market ratio). It processes the returns which are excess over the value and growth stocks.

(Jegadeesh and Titman, 1993) presents the momentum as the fourth factor to effect the stock returns. (Carhart, 1997) expand the Fama and French model by adding momentum to their model. This factor is important mostly when investors deals in buying and selling stocks. Carhat suggest that investor needs to buy stock that lost its value and sell the stock which has increased in order to get best result. The reason of this strategy is that there is always a correction in market. When a stock is overpriced, people tends to sell it in order to get profit, thus lowering its value. This procedure makes the stock to return to its original value.

CAPM model is developed by William Sharpe in 1964. Under this model we can diversify our investment to minimize the risk but the risk cannot be totally avoided. The CAPM model is based on systematic risk. It helps to calculate the expected return and systematic risk associated with an investment. A risk free rate (Rf)

is used to compensate the investors who have invested in the portfolio. Investors will be compensated for the risk they have taken and for time value of money. Systematic risk cannot be reduced due to macro-economic factors that effects the entire stock market so CAPM model use a beta for measuring systematic risk.

Ross introduced the Arbitrage Pricing Theory in 1976. He believes that the return of an asset is determined by a number of factors. CAPM was criticized by many researchers who believes that a single factor cannot explain the risk and return relationship. APT theory is applicable in one period where investors invest in an asset and estimates that return is influenced by the covariance of factors known as 'factor loading' or beta. The model drives a rate of return which is exactly equal to the discounted price of that asset. If the prices of the assets moves opposite to price predicted by model, arbitrage moves the price back as predicted by model. Arbitrage means taking advantage in the form of positive returns if any security is over or under priced. APT introduces a number of factors that effects the returns which are not explained by CAPM. It explain the portfolio's returns along with many risk factors. So it can explain many anomalies better than CAPM.

1.3 Problem Statement

The subject of interest is to explore the cash flow volatility impact on stock returns at firm level on the equity market of Pakistan. The pricing of cash flow volatility represent an anomaly against the traditional asset pricing as it has significant impact on the stock returns. Pricing of cash flow volatility including its both components is important while estimating the future stock returns. Both systematic and idiosyncratic volatilities are related to stock returns of a firm. It is necessary to price the idiosyncratic volatility along with systematic volatility to subsume cash flow volatility in predicting stock returns in the equity market of Pakistan. If cash flow volatility is treated a risk factor like the risk factor of asset pricing then only systematic volatility would matters. It is common practice to consider only the systematic volatility while making any investment. But it is necessary to compensate investors for the idiosyncratic volatility as well yet it

is generally ignored. Investors' needs to consider firm level volatility along with industry exposed volatility to estimate the level of risk which they are considering. This study focus on both systematic and idiosyncratic volatility the capture the true picture of the economy. A multifactor model including many return informative variables is adopted to explain the variations in stock returns in an emerging economy of Pakistan.

1.4 Research Gap

My findings adds to the growing literature in a manner that pricing of cash flow volatility includes both systematic and idiosyncratic volatility while measuring the expected stock returns. Many forms of information uncertainty such as age, size and cash flow volatility falls under the domain of business risk and can strongly effect the performance of firm. This study has been conducted to nullify the impact of business risk on stock returns. (Huang, 2009) shows that information uncertainty and its various proxies can negatively affect the future stock returns. According to him the pricing of systematic volatility is important while measuring stock returns. Previous studies focuses on the systematic volatility and ignored the idiosyncratic component of volatility. (Ang and Bekaert, 2006a) states that both systematic and idiosyncratic return volatility are related to future returns. The pricing of idiosyncratic volatility is an anomaly against the traditional asset pricing theories. So this research has been conducted to explore the effect of both component of cash flow volatility on stock market of Pakistan.

1.5 Research Questions

- Does cash flow volatility effect the equity market of Pakistan?
- Whether cash flow volatility effect the stock returns at the firm level?
- Does idiosyncratic cash flow volatility matters and how to price it?
- Does systematic risk nullify the importance of idiosyncratic risk?

- Does cash flow to sales volatility effect the stock returns?
- How cash flow to sales volatility effect the stock returns?

1.6 Research Objectives

- To explore the role of cash flow volatility in effecting the stock returns.
- To investigate the impact of cash flow to sales volatility on stock returns.
- To investigate the impact of cash flow to book equity volatility on stock returns.
- To explore the impact of idiosyncratic cash flow volatility on stock returns.
- To investigate the impact of systematic cash flow volatility on stock returns.

1.7 Significance of the Study

Now a days investors want to know about the interaction of different equity market around the world. Investors discovers the different equity markets to learn about return and risk conditions. This knowledge about various equity markets and volatility help investors to avoid market imperfections. Due to this asset pricing theory has gained a lot of attention. A lot of work has been done on the multifactor model especially in advance market. But unfortunately it has gained a very little attention in emerging market like in our country. In the emerging countries although foreign direct investment has started and investors want to invest. Investor must consider volatility while selecting any portfolio or making any investment. They must know whether volatility is a systematic or idiosyncratic and how to price it. Investor's needs to consider the volatility at the firm level and industry level to avoid market imperfections But the concept of idiosyncratic volatility is not clear in their minds as not much work is done in the regard of this anomaly. The focus of this study is to link both idiosyncratic and systematic volatility to stock returns.

The recent studies ((Ilmanen and Kizer, 2012), (Chow et al., 2011) and (Kim et al., 2014)) focuses on determinants of volatility but could not justify the importance of idiosyncratic volatility. This study determines the role of idiosyncratic volatility as an anomaly in the emerging market of Pakistan and also mentions how to price it.

Managers and the speculator have to focus on the important factors that affect the stock returns and must value systematic and idiosyncratic cash flow volatility to build the hedging strategies to maximize the economic growth. Policy makers must also consider the idiosyncratic volatility to control the important factors that are effecting cash flow volatility.

1.8 Organization of Study

This study has been represented in five chapters. Chapter 1 is about the introduction of the study. Literature review on the basis of empirical evidence is presented in Chapter 2. Chapter 3 represents the Methodology used in the study. Results, Analysis and discussion is comprised in Chapter 4. Chapter 5 summarizes the conclusion, recommendation and direction related to future research.

Chapter 2

Literature Review

2.1 Literature Review

There is an increasing discussion on the cash flow volatility and stock returns relationship. Under asset pricing theory, the concept holds that when investors bear risk then they get reward. Thus volatility factor may not be priced in the cross section of returns. But many studies have been conducted to measure the relationship of volatility and returns. (Ang et al., 2006a), Jiang, Xu, and Yao (2007), (Brockman and Yan, 2008) and (Guo and Savickas, 2010) measures a negative relationship in the US stock market. A similar relation holds in other markets according to (Ang et al., 2009). On the other hand (Campbell et al., 2001), (Spiegel and Wang, 2005) and (Fu, 2009) mentions a positive relationship between volatility and stock returns.

(Huang, 2009) describes that cash flow volatility is inversely related to future returns. This negative relationship lasts up to five year. (Huang, 2009) is of view that cash flow volatility is due to both systematic and idiosyncratic volatility. The volatility of both these returns have a negative impact on future returns. The strong return fundamentals used in the study effect both the systematic and idiosyncratic cash flow volatility. These results are long lasting under the effect of size and price factors. The scale of this inverse association between cash flow volatility and expected returns is strong and continuing. (Huang, 2009) measure

the cash flow volatility using the proxies such as standard deviation of ratio of cash flow to sales or cash flow to book equity. He observes that relationship of cash flow volatility and idiosyncratic returns is different at portfolio and firm level. High cash flow volatility causes high idiosyncratic volatility at portfolio but at firm level only 30% firms' reports high idiosyncratic volatility when the cash flow volatility is high. The portfolios which are less volatile perform better on Fama & French four factor model than more volatile portfolio by 13% in a year. However when portfolios are sorted on both cash flow and return volatility, they neither drive out or dominate each other.

(Ang and Bekaert, 2006a) states that both systematic and non-systematic return volatilities are negatively related to future returns. (Fu, 2009) discovers the positive association of expected returns and idiosyncratic volatility at the cross sectional examination of data. (Jiang et al., 2005) and (Jiang et al., 2005) are of view that high uncertainty in the information regarding stock volatility leads to negative returns in the future. This consistency in findings is due to two reasons. First traditional asset pricing model propose that a positive relation between idiosyncratic volatility and return exist. ((Merton, 1987), (Malkiel and Xu, 2002)). Secondly trading opportunities increases with any predictable relation.

One of the major issue under debate in the equity markets is the set of common factors that explain the individual stock returns. Stock returns has been explained by many models in the past literature. Capital Asset Pricing Model, Fama and French Three Factor Model, Carhat Four Factor Model, and finally by Fama and French Five Factor Model.

The foundation of Modern Portfolio theory is put forward by Harry Markowitz in 1952. Markowitz portfolio theory is based on two main assumptions of maximizing the mean return and minimizing the risk in the process of portfolio selection. The main aim of this theory is to diversify risk by not reducing the expected returns. Diversification is the major influence of this theory.

Fama and French introduces the three factor model in (1992) to explain the stock returns. These factors includes the market, size and value factor in portfolio management. Stock returns are explained by market premium, size premium and

value premium. These factors can better explains the returns. For size, Fama and French uses SMB (small minus big market capitalization). It measure the returns of small minus big caps. For value, they uses HML (high minus low book to market ratio). It measures the returns which are excess over the value and growth stocks.

(Jegadeesh and Titman, 1993) presents the momentum as the fourth factor to effect the stock returns. (Carhart, 1997) expand the Fama and French model by adding momentum to their model. This factor is important mostly when investors deals in buying and selling stocks. Carhat suggest that investor needs to buy stock that lost its value and sell the stock which has increased in order to get best result. The reason of this strategy is that there is always a correction in market. When a stock is overpriced, people tends to sell it in order to get profit, thus lowering its value. This procedure makes the stock to return to its original value.

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(Wood et al., 1976) introduce the Arbitrage Pricing Theory. He believes that the return of an asset is determined by a number of factors. CAPM is criticized by many researchers who believes that a single factor cannot explain the risk and return relationship. APT theory is applicable in one period where investors invest in an asset and estimates that return is influenced by the covariance of factors known as 'factor loading' or beta. The model drives a rate of return which is exactly equal to the discounted price of that asset. If the prices of the assets moves opposite to price predicted by model, arbitrage moves the price back as predicted by model. Arbitrage means taking advantage in the form of positive returns if any security is over or under priced. APT introduces a number of factors that effects the returns which are not explained by CAPM. It explain the portfolio's returns along with many risk factors. So it can explain many anomalies better than CAPM.

(Banz, 1981) presents that size anomaly by showing that small size firms results in high returns than large firms. The small firms tends to have higher returns than large firms over a large period. Various risks are associated with small size firms. These risks puts downward pressure on prices and increases their returns. This anomaly effect is confirmed by (Blume and Stambaugh, 1983). Pandey and Sehgal (2015) measured the size effect on Indian stock market stock market using data from BSE 500 companies. The study reports that returns decreases with firm size. The size effect is confirmed by working on U.S data. Since 1990s the research on size effect has been dived in two school of thought. Many models are developed that favored the size effect by presenting that when market risk is controlled, small firms tends to provide higher returns than large firms. However recent research on size effect has doubted the presence of size effect and finds that size effect has disappeared since 1990. (Van Dijk, 2011) argued that size effect has gone away. The disappearing size effect is found in US market.

It is commonly believed that firms with high book to market ratio tends to have high average returns. In order to link book to market ratio with idiosyncratic volatility, portfolios with high idiosyncratic volatility must be composed of such stocks which must be having low average returns.

(Hong et al., 2000) claims that momentum effect is asymmetric. It has a positive effect on rising stock and strong negative impact on the declining stock. This means that winner remains winner and loser remain loser. A positive relation between return and momentum is repoted in the past literature. When momentum is linked with idiosyncratic volatility, stock with low returns have an inverse relation with idiosyncratic volatility. Stock having low returns have high volatility. So winner stocks in the past have low volatility but loser stock could be represented with high idiosyncratic volatility.

(Pástor and Stambaugh, 2003) mentions that liquidity is a systematic risk. When liquidity is linked volatility then high idiosyncratic volatility stocks have low liquidity. Thus it leads to low average stock returns. Some other variables are also documented by the literature e.g. research and development was introduced by

(Al-Horani et al., 2003), effect of liquidity risk is documented by (Pástor and Stambaugh, 2003), and idiosyncratic volatility by Drew, (Drew et al., 2004).

(Ang et al., 2006a) claims in their paper that stock which are more sensitive to volatilities and innovations tends to have lower average returns in the future. This effect is estimated through stocks having high idiosyncratic volatility in Fama and French model and badly shows the low returns in average. These results are not caused by high risk or other anomilies in Fama and French four factor model. Size, book to market equity, momentum and liquidity effect cannot be allocated for low returns of the stocks having either higher systematic volatility or higher idiosyncratic volatility. Cash flow volatility changes from time to time which tends to change the investment opportunities available which in turn changes the potential of the future stock returns. It also effects the risk return relationship. Stock which behave differentially to invention in total volatility are assumed to have different returns.

(Cen et al., 2006) reports that forecasted or estimated earnings per share (FEPS) can forecast successive future returns of the stocks. Stocks with high earning per share are having significantly high future returns other than the stocks with low earnings. These results remain same even after controlling for risk, size, earning momentum, value and earnings to price effects. This effect works better in small firms having low prices. Such firms may be loser in past or gained less attention. This effect continues to exist for a longer time period.

A link is reported between the idiosyncratic volatility of returns and cash flows. (Cen et al., 2006) also report that when idiosyncratic volatility of stock increases, it directly attributes to decreased return's equity and increased return's volatility. (Pástor and Pietro, 2003) finds that a firm's uncertain profitability in future returns makes an increase in the idiosyncratic volatility of return.

(Bollerslev et al., 2017) mentions that good and bad volatilities are associated with low and high returns. The stocks are categorized into good and bad volatilities based on frequencies of price increments. Sorting the portfolios on the basis of good and bad volatilities causes the significant difference in stock returns. Stocks with comparatively good volatilities tends to have higher returns than the stocks with

bad volatilities. The returns are lower than stock with good volatilities. When portfolios are sorted on the basis on their individual variations, a large weekly spread between the stock returns of the highest and lowest quintile portfolios (approximately 20% per year) is observed. (Breckenfelder and Tédongap, 2012) and (Farago and Tédongap, 2018) claims good and bad volatilities are the result of behavioral biases. Investors react more to downside volatility than upside volatility and tends to price systematic downside volatility. Although returns are predicted by firms still volatility is considered a result of systematic risk factor. The returns predictability is valid only for weekly basis and mostly short lived, thus causing doubt on risk factor. The skewness measure works well for smaller firms, firms showing more volatile prices and more illiquid firms, reliable to investor reaction to extreme price movements

(Ang et al., 2009) measures the relation between idiosyncratic volatility and future returns with respect to local, regional and world version of Fama and French 1993 model and finds that stocks having high idiosyncratic volatilities in the past can lower the future stock returns. The study list 23 nation's stockson the basis of their idiosyncratic volatility and measured within the relation to Fama and French model. The alpha difference of stocks having high idiosyncratic volatility and stocks having low volatility on three factor of size, market and book to market are approximately 1.31% per month. This strong significant effect is observed in different regions of world with many other firm characteristics. The relationship of higher idiosyncratic volatility and lower future returns are not only sample specific but measured worldwide. The worldwide effect significantly move in accordance to effect of idiosyncratic volatility as stated in United State. When controlling the U.S portfolio having long position in stocks (with high idiosyncratic volatility) and short position in stocks (with low idiosyncratic volatility), the idiosyncratic volatility effect in various international market is insignificant. Thus U.S volatility effect can be used to measure global idiosyncratic volatility effect. However the risk factor cannot explain the lower returns and higher idiosyncratic volatility.

(Jiang and Lee, 2006) examines the effect of idiosyncratic risk on returns of the stock market. Previously this effect is observed on the volatility of only one lagged

period that provides only a limited picture of the effect. But the period is extended and then finds a positive relationship of idiosyncratic volatility and equity return. Initially market respond negatively to volatility but afterwards positively for several periods. It includes strong firm size portfolio, longer time period and various procedures to measure this risk. But these findings are not affected by firm size. Although this relation remain robust to different sample period. The volatility greatly affect the stock market by modifying the present value of future cash flow and their discount rate. Thus it can be concluded that idiosyncratic risk creates the mispricing in the equity market.

(Bali and Cakici, 2008) uses the NYSE/AMEX/NASDAQ sample to explore the cross section relation of idiosyncratic volatility and expected stock returns. When daily data is used to measure idiosyncratic volatility, a significant negative relation between risk and return of value weighted portfolios is estimated on CRSP breakpoint. On the other hand, when Nadaq or 20% market share are used as breakpoints and portfolios are created on these breakpoints, no significant relationship is established between the volatility and stock returns. Different weighting schemes are also used to explore this relationship and no significant positive and negative relation is found under high and low volatility portfolio. (Bollerslev et al., 2015) predicts the returns and cash flows using a GARCH model. The time varying volatility and volatility uncertainty is applied in that model. This model finds that expected return variation and risk premium positively forecast the short term returns and dividend growth rates. According to old efficient market hypothesis returns are predictable but now generally returns are predictable over a long time period. At the same time cash flows of the aggregate portfolio are less predictable than the expected returns. Using a present value framework, it is estimated that cash flows are negatively related to the long term growth and volatility uncertainty is positively associated with long term growth.

(Pontiff and Irvine, 2009) reports that there is a major increase in the idiosyncratic volatility of cash flows, earnings and sales over the period of 1964-2003. That increased competition among firms is the major cause of the increased volatility. When cross sectional and time series test are conducted, return on assets which are

negatively related to idiosyncratic volatility, declined over time. Firms facing foreign competition has increased over time and such firms bears more idiosyncratic risk. Countries having more growth in idiosyncratic volatility of stock returns have more competitive economy and experiences faster technological innovation. This evidence supports the fact that competition leads to high level of idiosyncratic stock-return risk.

(Babenko et al., 2013) claims that unpriced cash flows can predict the future pricing of risk. Whenever a constructive idiosyncratic tremor occurs, it leads to decrease in the firm value to price its risk which ultimately increases the size of firm and idiosyncratic volatility. The book to market and firm size are taken as anomalies and it explores a negative relationship between idiosyncratic volatility and stock returns. When idiosyncratic shock is modelled, it shows negative relation with growth and risk too. It mention that expected stock returns can be predicted when any monetary variable is linked with the history of idiosyncratic shocks. A firm's beta directly depends on idiosyncratic shocks history which vary over time. Firm value is inversely related to risk and reason behind it is that any positive idiosyncratic shock to cash flow leads to an increase in market capitalization and ultimately causes a decreases in systematic risk.

(Bhamra and Shim, 2016) finds that Portfolios having high idiosyncratic volatility perform poor relative to portfolios having low idiosyncratic volatility. Earlier findings mentions a simultaneous positive relation between firm level stock returns and idiosyncratic volatility in real option theory. These findings are contradicting to the standard asset pricing theory which measures that idiosyncratic volatility has no relation with returns. Bhamra and Hwan Shim explain this relationship by introducing stochastic idiosyncratic volatility cash flow risk with an equity valuation model based on firms having growth options. When return and idiosyncratic volatility are measured with same risk, the systematic risk falls while idiosyncratic volatility falls. With this model firm's systematic risk depends on the delta of growth option. This delta is lower when idiosyncratic volatility rises, it brings down the firm systematic risk and expected return. Thus, firms with higher idiosyncratic volatility have lower expected returns. This model also proposes the

additional findings regarding idiosyncratic volatility: Firstly, when firms are distinguished as mature firms (having no growth options) and young firms (possess growth options), under this model returns correlate positively with idiosyncratic volatility. This is known as switch effect and it is due to intervals between large changes in idiosyncratic volatility. Secondly, this switch effect and anomalies are stronger among firms which undergo larger changes in idiosyncratic volatility. The returns shows heteroscedasticity and discontinuous jumps that matches with large changes in idiosyncratic volatility and explored new vision regarding the three way relation between stock returns, idiosyncratic volatility and expected return skewness.

(Fink et al., 2012) measures the relationship of idiosyncratic volatility forecast available to traders and expected returns and finds no relation. This result rejects the relationship of expected idiosyncratic volatility and expected returns. This is tested using numerous methods to forecast volatility. Although a positive relation is documented in literature only when advanced information is considered while assessing volatility. The positive relation is derived by component of idiosyncratic volatility that is not predicted by investors. These results are tested for numerous models and time periods. (Malkiel and Xu, 2002) proposes theoretical asset pricing models where investor have full information about the parameters of the model. Earlier paper of (Malkiel and Xu, 1997) regulate that specific estimations of idiosyncratic volatility and assumption of agent's knowledge of the parameters leads to positive relation between idiosyncratic volatility and returns. (Malkiel and Xu, 2002) also supports these results. (Fink et al., 2012) are concerned that under this positive relation, is it possible to establish portfolio to earn abnormal returns. The answer is linked to the volatility portion that is not expected for the investor while making decision. This unexpected portion drives the result. This positive association is attached to the forecasts of volatility which are contaminated due to this unexpected volatility.

A similar positive association is determined when contemporaneous realized idiosyncratic volatility is used. This is exactly opposite to (Ang and Bekaert, 2006a). He uses the lagged idiosyncratic volatility. (Bandyopadhyay et al., 2010) finds that

when lagged idiosyncratic volatility is estimated from daily data and returns are taken into account, both have no association. (Han and Lesmond, 2011) mentions that this relationship is overstated due to lagged idiosyncratic volatility with a liquidity bias. These results are supported by (Fink et al., 2012) by forecasting the expected idiosyncratic volatility through EGARCH and states that it is unrelated to expected returns. Although forward-looking information of investors drives positivity into relationship between expected returns and idiosyncratic volatility. (Fu, 2009) also present this positive relation when contemporaneous data is used in measuring the idiosyncratic volatility.

(Berrada and Hugonnier, 2013) recommend a model to use it for firm valuation to measure the ambiguous relation of idiosyncratic volatility and stock returns along with the assumption of incomplete information. Under this study, investors behave rationally on their belief. According to them explaining this relationship does not require any behavioral model or anomalies. The investors determine the aggregate shock and cash flows of the firms. However it results in incomplete information about volatility so growth rate of cash flows are used. The incomplete information agrees to measure a significant part of relationship. In the existence of the incomplete information regarding idiosyncratic shocks, any specific forecast error of the firm is scaled by idiosyncratic volatility. So this model needs some proxy for measuring the effect of idiosyncratic volatility. The proxy is constructed using earnings forecasts and idiosyncratic volatility is measured using the traditional asset pricing model and calculating its residual. On the other hand Investor's perception are summed up as a probability measure. When investors behave rationally CAPM holds their probability measure so that expected return reflects the exposure to aggregate risk only. Despite this probability measure, expected returns depends on investors' forecast errors. Along with this forecast review, proxy for idiosyncratic volatility that helps to explain the relationship of idiosyncratic volatility with stock returns. The expected returns is deviating from the traditional asset pricing model with a term that comes from the product of the idiosyncratic volatility of the stock and investor's forecasted error. This term causes a relationship between idiosyncratic volatility and expected stocks returns if

investors are biased. A strong relation is determined between risk-adjusted alpha) and the idiosyncratic volatility proxy effect. When the sample is split between good and bad news events, this relationship tends to be stronger.

(Berggrun et al., 2016) conducted a study in Mila from 2001 to 2014 to measure the relationship of volatility and stock returns. The portfolio are sorted and it is estimated that idiosyncratic volatility or risk cannot predict the returns with the entire period or with the months having high volatility or low volatility. The idiosyncratic volatility effect does not exist in multivariate setting conducted in error free variable panel. So in Mila unsystematic risk is not valued. (Fama and MacBeth, 1973) also shows that in U,S market idiosyncratic volatility is not a valued. (Ang et al., 2009) shows a negative relation between lagged idiosyncratic volatility and future returns with monthly data from developed countries. Guo and Savickas (2010) finds that smaller stocks have high idiosyncratic volatility. Portfolios having high idiosyncratic stocks underperform those portfolio having low idiosyncratic stocks. (Han and Kumar, 2013) also explores the negative association between returns and idiosyncratic volatility and linked it to investor behavior. The investors tends to hold high volatile stock which are usually overpriced due to speculation. High trading of proportional stock leads to underperformance of the stock that are mostly operated by stockholders. This proportional of capitalizing is related with the negative association of returns and volatility.

(Lee and Wei, 2012) and (Nartea et al., 2013) also finds the negative association between lagged idiosyncratic volatility and expected returns of the Hong-Kong stocks in the short run. The findings are founded on (Shleifer and Vishny, 1997) who claims that stocks with lower level of idiosyncratic risk are more profitable because risk averse investor tilt their profit to low volatility shares in the short run, which causes an upward swing in stock prices and trading of such stocks. (Nartea et al., 2013) also document a negative association of risk adjusted returns and idiosyncratic volatility in China. This is explained with the behavioral tendency of the Chinese investor who are willing to pay more for high volatile stocks due to which such stock underperform.

Some other studies reports the significant relation between the volatility and returns. (Merton, 1987) present a typical model which shows that when the investor are undiversified. They will demand premium to hold higher volatile stock. So high volatile stocks will result in higher returns in future. (Xu and Malkiel, 2004) measured a positive relation between returns and past idiosyncratic volatility under the portfolio formation strategy as introduced by (Fama and MacBeth, 1973). (Fu, 2009) also show a positive relation between expected idiosyncratic volatility (forecasted through EGARCH model) and expected returns. (Bandyopadhyay et al., 2010) uses an exponential GARCH model and measures a positive relation between monthly returns and volatility with a rolling window of thirty months return. (Vozlyublennaia, 2012) estimates a significant positive relationship among returns and lagged idiosyncratic volatility. She mentions the characteristics which leads to positive correlation. Specifically, large companies with higher rate of share turnover and low leverage are linked with progressive relation.

Some recent literature also present the notion that volatility is not having a significant association with expected returns. (Han and Lesmond, 2011) discovers that those portfolio which are longer on high volatile stock and short on low volatile stock shows a nil correlation when controlling the size, distress, market and momentum. (Bali and Cakici, 2008) does not discover any association between idiosyncratic volatility and returns with Fama and French three factor model. The study uses the sample that omits the least liquid stock, smallest and lowest priced stock. (Jiang et al., 2009) also provides that no association exit between these two variables when future earnings are controlled. (Fink et al., 2012) document that idiosyncratic volatility forecasts using return information is not useful in predicting future returns.

(Goyal and Santa-Clara, 2003) determine a significant positive association between stock return and average stock variance (which is idiosyncratic risk). The portfolio returns of the NYSE/AMEX/NASDAQ stocks are measured for the sample period of 1963-1999. It is the opinion that variance of the market returns cannot predict the market returns. On the other hand asset pricing models shows that systematic risk is major factor to effect stock returns, so these findings seems to be futile.

Similarly (Bali et al., 2005) claims that (Goyal and Santa-Clara, 2003) findings does not hold for portfolios of stocks listed on NYSE/AMEX or for the sample period of 1963-2001. The main reason is the liquidity premium associated with stock or due to small stocks traded on the Nasdaq.

The capital asset pricing model (CAPM) is proposed by (Sharpe, 1964), (Lintner, 1965), and (Black, 1992). It is based the mean-variance efficiency of the market portfolio on (Markowitz, 1952) findings. The main findings is about the relation between expected returns and beta of securities. According to them, no other variable other than beta can measure the cross-sectional variation in expected returns. However literature suggests that a possible association exist between idiosyncratic volatility and expected returns when investors are not able to diversify firm specific risk and demands compensation for it. (Levy, 1978) shows that if investor hold less assets in their portfolio then there is a possibility that idiosyncratic risk affects equilibrium asset prices. (Merton, 1987) mention that when investor does not hold any of the market portfolio, it causes them to consider their total risk along with market risk. Thus firms having imperfect diversification require higher returns with larger variance (idiosyncratic volatility). Supporting this view, (Tinic and West, 1986) determines that portfolios which are having high idiosyncratic volatility results in high average returns. (Malkiel and Xu, 1997) also supports this concept (Lehmann, 1990) finds a significant positive coefficient of idiosyncratic volatility when the study determines the residual variance at the firm-level regressions over the sample period. But the coefficient of idiosyncratic risk can change its sign acting under different econometric conditions.

Recently, (Malkiel and Xu, 2002) determines the relation between idiosyncratic risk and the cross section of expected returns at the firm level and finds a significantly positive relation. These finding measure the idiosyncratic volatility as a stock's residual standard deviation of one of the 200 beta/size portfolios to whom a stock belongs.

(Ang and Bekaert, 2006b) (AHXZ hereafter) measures a negative relation between two variable. The study uses the three-factor (Fama and French, 1992) model to measure idiosyncratic volatility of individual stocks. It form the portfolio by

sorting them to the individual stocks' idiosyncratic volatility and shows that stocks with low idiosyncratic risk earn high average returns. It is found that average return difference between portfolios of the lowest and highest idiosyncratic risk is 1.06% per month.

(Fu, 2009) illustrate that as idiosyncratic risk varies with time and literature does not justify this positive association as the idiosyncratic volatility cannot capture the variable properties in earlier studies. The study uses the monthly data and estimates the idiosyncratic variance of stock returns of the sample using EGARCH model and finds a significant and positive relationship.

On the basis of above literature, it can be concluded that information uncertainty in the form of cash flow volatility represents an important anomaly to effect the stock returns. Various proxies of cash flow volatility can significantly affect the stock returns. Both the component of cash flow volatility must be priced to determine its impact in equity market.

2.2 Proposed Hypothesis of the Study

Based on previous research, the following hypothesis is developed for this study.

H1: There is a negative relationship between cash flow volatility and stock returns.

H2: There is a negative relationship between idiosyncratic cash flow volatility and stock returns.

Chapter 3

Research Methodology

3.1 Population and Sample of Study

This study has been conducted to explore the effect of cash flow volatility on the stock return of Pakistan by considering the idiosyncratic and systematic volatility along with anomalies of size, value, expected returns, market, illiquidity and earning yield.

This analysis covers the monthly closing prices of 80 non-financial firms listed at Karachi Stock Exchange of Pakistan. The research period is from 2005 to 2016. The data regarding monthly share prices is collected from business recorder website. The annual operating cash flow values are collected from annual financial statements of firms.

Only non-financial firms of Pakistan are used in this research as the capital structure of financial and nonfinancial sectors of Pakistan are different. The accounting period of financial sector closes at Dec while the accounting period of nonfinancial sector ends in June. So only nonfinancial firms are taken into consideration for analysis. The firms are selected from the developed industries of the Pakistan. The basis for the selection of the firms is the availability of the data for whole sample period. Eighty companies from developed industries are considered for analysis in order to measure the effect across different industries. The following industries are considered in this study.

TABLE 3.1: Selection of Industries and firms

INDUSTRIES	**No. OF FIRMS**
Automobile Assembler	08
Automobile Parts & Accessories	04
Cable & Electrical Goods	03
Cement	09
Chemical	02
Engineering	03
Fertilizer	04
Food & Personal Care Products	08
Glass & Ceramics	04
Miscellaneous	04
Oil & Gas Marketing Companies	02
Power Generation & Distribution	06
Sugar & Allied Industries	08
Technology & Communication	06
Paper & Board	06
Others	03
TOTAL	80

3.2 Description of Variables

3.2.1 Independent and Control Variables

In order to study the effect of cash flow volatility on return a set of return informative variables e.g cash flow volatility, expected returns, size, illiquidity, earning yield, market beta and book to market ratio are taken as independent variables. Whereas stock return is the dependent variable. Selection of these variables is due to the fact that stock returns are considerably effected by these variables.

- **RETURN (RT):**

  Return is defined as the change in the value of the stock. It is measured by the calculating the price difference by dividing the current price with the preceding price to estimate whether the stock has been appreciated or not. Return = LN (P2/P1)

- **SIZE (ME):**

  Size is defined as the market value of the firm and explained on the base of

the market capitalization of the firm. It is introduced by Banz in 1981. The proxy of size is market capitalization. The size is measured by (Fama and French, 1992). It is measured as: Size = $No.of shares \times$MPS

- **BOOK TO MARKET (BTM):**

  Book to market is introduced by Rosenberg in 1985 who used it as the proxy of value premium. Book to market equity is used to find the firm value by comparing the book value of firms. It is calculated by the following formula: Book to market equity (BTM) = Book value of equity / Market value of equity

- **EXPECTED RETURNS (ER):**

  Expected returns is captured as the past 12 month return of the stock. It is either the profit or the loss that the investor anticipates on the investment. ER = Average of 12 month returns

- **ILLIQUIDITY (ILL):**

  Amihud (2002) defined the illiquidity as the daily price response which is associated with trading volume of one dollar and measured it as daily ratio of stock return to dollar volume. ILL = Average of daily returns/ daily dollar trading volume Daily dollar trading volume is captured using the following proxy. Daily dollar trading volume= $MPS \times$No. of outstanding shares.

- **EARNING YIELD (EY):**

  Earning yield is defined as percentage of each dollar invested in the stock that company earned. It is measured as earning to market equity. It is profitability related measure and used by many investors and managers to determine asset alloction. EY= Earning/Market Equity

- **CASH FLOW VOLATILITY (CFV):**

  Cash flow from operations are taken into consideration to measure volatility. Cash flow from operations are defined as the sum of earnings before extraordinary items, depreciation and amortization, and change in working capital.

Fama and French measured earning with the income before hand unusual items minus preferred dividends.

Firms are separated according to their respective industries. Each industry average is used to create residual for firms. The variance of residual is calculated for every 4 rolling year. So first 3 year values are used in calculation and volatility values are determined form 2008 to 2016. The reason for choosing 4 year rolling base is that firms differ in their fiscal year end month and reporting time. Using each firm's current annual year cash flows as its quarterly cash flow, mean industry cash flow is computed. So by this method, yearly data is considered as quarters and analysis is conducted for 12 years (considered as quarters) so 4 year data is utilized as base. (Huang, 2009) uses this approach for the measurement of return volatility. Here model is constructed and regression is run for each firm with 4 year rolling basis. The square root of the variance of residual term is cash flow volatility.

$$CFi.j.t = \alpha i + \beta i CFj.t + \epsilon i.j.t \tag{3.1}$$

Here t refers time, i refers to firm and j refers industry to whom the firm belongs. CFi.j.t is defined as industry cash flow at the t time period. So it average cash flow of the firms in that industry. βi is the measure of i's firm cash flow exposure to industry cash flow. Industry cash flow volatility is measured as SQRT (VAR CFi.j.t). ϵi.j.t interprets the idiosyncratic volatility at t time. Idiosyncratic cash flow volatility is measured as the square root of the residual of the industry mean cash flow. Idiosyncratic cash flow volatility is the square root of var (ϵ) of the regression of following equation.

- **CASH FLOW TO SALES VOLATILITY (CFSALES):**
  In order to standardize cash flow to firm size, sales are used as scalar. The ratio cash flow to sales is taken to measure volatility instead of cash flows. The following model is constructed and regression is run for each firm with 4 year rolling basis. The square root of the variance of residual term is cash

flow to sales volatility.

$$CFSALESi.j.t = \alpha i + \beta i CFSALESj.t + \epsilon i.j.t \tag{3.2}$$

Here t refers time, i refers to firm and j refers industry to whom the firm belongs. Industry cash flow to sales volatility is measured as SQRT (VAR CFSALESi.j.t). Idiosyncratic cash flow to sales volatility is measured as SQRT (VAR ϵi.j.t).

- **CASH FLOW TO BOOK EQUITY VOLATILITY (CFBE):**
  To standardize cash flow to firm size, book equity is also used as scalar. The ratio cash flow to book equity is taken to measure volatility. The following model is constructed and regression is run for each firm with 4 year rolling basis. The square root of the variance of residual term is cash flow to book equity volatility.

$$CFBEi.j.t = \alpha i + \beta i CFBEj.t + \epsilon i.j.t \tag{3.3}$$

Here t refers time, i refers to firm and j refers industry to whom the firm belongs. Industry cash flow to book equity volatility is measured as SQRT (VAR CFBEi.j.t). Idiosyncratic cash flow to book equity volatility is measured as SQRT (VAR ϵi.j.t).

3.3 Research Methodology

The relationship between stock returns and cash flow volatility is analyzed using Panel data regression. Panel data regression is used as data have both time series and cross sectional entries. The relationship between cash flow volatility measures and returns variables is measured at the firm level as well as at the industry level. This study requires the estimation of cash flow volatility with 4 year rolling base for which sample must have many time series observations. I used the annual data for this purpose from 2005 to 2016.The relationship between cash flow volatility

and stock return is measured to estimate how to price systematic and idiosyncratic cash flow volatility. The following econometric model is developed and Panel data analysis is used with the return related variables and cash flow volatility measures.

$$Rt = \alpha t + \beta 1 \beta m + \beta 2 ME + \beta 3 BTM + \beta 4 ER + \beta 5 ILLt + \beta 6 EY + \beta 7 CFV + \epsilon \quad (3.4)$$

$$Rt = \alpha t + \beta 1 \beta m + \beta 2 ME + \beta 3 BTM + \beta 4 ER + \beta 5 ILLt + \beta 6 EY + \beta 7 CFSALES + \epsilon \quad (3.5)$$

$$Rt = \alpha t + \beta 1 \beta m + \beta 2 ME + \beta 3 BTM + \beta 4 ER + \beta 5 ILLt + \beta 6 EY + \beta 7 CFBE + \epsilon \quad (3.6)$$

Here Rt is the average monthly return, ME is the size of the firm. BTM is the book to market equity. ER is the expected returns. EY is the earning yield and ILLIQ is the illiquidity.

3.3.1 Panel Regression

Panel data analysis is applied as the data is two dimensional (longitudinal and cross sectional). The data is collected over many years and for many companies so panel regression is used to analyze the data. There are three approaches of panel data analysis:

- Common Coefficient Model
- Fixed Effect Model
- Random Effect Model

Common Coefficient Model is applied when intercept is same for all firms over the time period. There is no specific characteristics of the firms in the sample and no general effect over time under this model. A common coefficient model with one exploratory model may take this form.

$$Yit = \alpha + \beta Xit + \mu it \quad (3.7)$$

Fixed Effect model is used when intercept is different for every firm or company. There are unique characteristics of the firms that remain same over time. These characteristics may be correlated to the dependent variables.

$$Yit = \alpha i + \beta 1X1it + \beta 2X2it + \ldots\ldots\ldots + \beta kXkit + \mu it \tag{3.8}$$

To choose between common coefficient model and fixed effect model, redundant fixed effect test is used.

On the other hand Random Effect Model is used when intercept behave differently or randomly over the time period. The firms may have unique and time constant characteristics which are not linked to individual regressors.

$$Yit = \alpha i + \beta 1X1it + \beta 2X2it + \ldots\ldots\ldots + \beta kXkit + (vi + \mu it) \tag{3.9}$$

To choose between fixed effect and random effect model, Haussman Test is used.

Chapter 4

Results

4.1 Data Analysis

Table 4.1: DESCRIPTIVE STATISTICS

VARIABLES	Mean	Median	St. Dev	Kurtosis	Skewness	Minimum	Maximum	Count
Rt	0.071	0.089	0.484	0.749	-0.195	-1.461	1.807	720
β	-0.099	-0.075	0.525	1.712	-0.159	-2.293	1.936	720
ME	3.186	0.240	17.243	126.721	10.655	0.000	245.467	720
BTM	0.914	0.713	5.790	41.563	2.379	-35.329	61.332	720
ER	0.007	0.008	0.045	1.308	-0.066	-0.158	0.212	720
EY	0.230	0.145	1.263	194.007	12.075	-3.838	23.503	720
ILL	0.004	0.001	0.009	17.178	3.680	0.000	0.085	720
CFV	1.229	0.292	2.463	10.515	3.179	0.001	15.362	720
CFSALES	0.088	0.052	0.163	35.465	5.666	0.002	1.405	720
CFBE	6.872	0.000	33.361	44.065	6.309	0.000	340.515	720

Rt stands for return, β stands for beta, ME for Size (scaled with ten thousand), BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns, CFV for Cash Flow Volatility (scaled with ten lac), CFSALES stands for cash flow to sales and CFBE stand for Cash flow to book equity (scaled with million).

The data collected for this study has to be checked for its accuracy before applying the regression analysis. For checking the data accuracy, descriptive statistics is presented in the above table. Descriptive statistics presents the general behavior

of the data which includes the characteristics of both dependent and independent variables. The descriptive statistics table includes the mean, median, maximum and minimum value, standard deviation, skewness, kurtosis and number of observations. The Mean value is the average value of the data covering all the time series and cross sectional data. The standard deviations shows that deviation of data from mean. Maximum is the highest value of data whereas minimum is the lowest value in the data. Skewness measures how data look from its point of origin. It shows the symmetrical distribution from left to right. Kurtosis represent the tail of data from the center whether it is highly tailed or lightly tailed from center.

Descriptive statistics shows the critical characteristics of the data including the central tendency and variability of statistics. The above table represent the descriptive statistics of the 10 variables included in this study. It is the average of variables with time series and cross sectional measurements. The data covers the 57600 observation of 80 non-financial firm listed on Karachi Stock exchange and monthly returns of firms from June 2005 to June 2016. Here RT is the monthly stock return of firms. The mean value of return is 7.1 percent and standard deviation is 48.4 percent. Skewness shows that it is negatively skewed. The maximum value of return is 1.80 and minimum value is -1.46.

Beta is the measure of market risk. It is measured as the slope of firm returns and market (KSE) return. Its mean value is -9.9 percent with a maximum value of 1.93 and minimum value of -2.29. It is negatively skewed data.

ME is the market value of equity (in million). The mean value of size is 3.18. Its maximum value is 245.467 and minimum value is 0. Skewness shows that it is positively skewed.

BTM is book to market ratio. Its mean value is 91.4 percent with a maximum of 61.332 and minimum value is -35.329 value. The minimum value corresponds to Southern Electric Power Company Limited for 2016 and the maximum value is of Kohinoor Sugar Mill Limited for year 2012. Skewness shows that it is positively skewed.

EY is the earning yield. It has a mean value of 0.75 percent. The maximum value is 0.2122 and minimum value is -0.1577. It is negatively skewed. ILL is the

measure of illiquidity as calculated by Amihud (2002). Its mean value is 0.2297. The maximum value is 23.5027 and the minimum value is -3.8385. It is positively skewed.

ER is the expected return. Its mean value is 0.40 percent. The maximum value is 0.0852 and the minimum value is 0.0000. It is positively skewed.

CFV is the idiosyncratic cash flow volatility (in thousand). Its mean value is 122.9 percent. The maximum value is 15.362 of K-Electric Limited for the year 2016 and the minimum value is 0.001. It is positively skewed.

CFSALES is the standard deviation of industry adjusted cash flow scaled to sales. Its mean value is 8.8 percent. The maximum value is 1.405 and the minimum value is 0.002. It is positively skewed.

CFBE is the measure of industry adjusted cash flow scaled to book equity calculated with the standard deviation of the residual.Its mean value is 687.2 percent. The maximum value is 340.515 of Dawood Hercules Chemicals Limited 2014 and the minimum value is 0. It is positively skewed.

Kurtosis shows three different patterns of normal distribution. If its value is equal to 3, it is normal distribution and pattern is known as mesokurtic. If value is greater than 3, the pattern is leptokurtic which is peaked fat tail. When it is less than 3, it is platykurtic which is simultaneously a thinner tail having low peak. Return, beta and price momentum shows platykurtic behavior. All other variables of above table are showing leptokurtic behavior. Which represents that data is peaked and have a fat tail.

Table 4.2 represent the average correlation among the variable. It is the time series average of cross sectional correlation among variables. It covers the all 80 non-financial firms from 2008 to 2016. Correlation estimates the strength and direction of relation among variables. Table 4.2 shows how variables are correlated at 1% level of significance.

TABLE 4.2: CORRELATION MATRIX

	Rt	β	ME	BTM	ER	EY	ILL	CFV	CFSALES	CFBE
Rt	1.000									
β	0.013	1.000								
ME	0.012	-0.014	1.000							
BTM	0.057	0.000	-0.022	1.000						
ER	0.766	0.021	-0.010	0.027	1.000					
EY	0.020	0.059	-0.033	-0.050	0.020	1.000				
ILL	-0.214	0.072	-0.074	-0.024	-0.107	0.025	1.000			
CFV	-0.027	-0.070	0.288	0.067	-0.031	0.018	-0.080	1.000		
CFSALES	-0.024	-0.062	-0.041	0.026	-0.039	-0.021	0.031	0.167	1.000	
CFBE	-0.004	-0.064	0.010	0.009	0.001	0.028	-0.061	0.376	0.001	1.000

All values are significant at the 1% level.
Rt stands for return, β stands for beta, ME for Size, BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns, CFV for Cash Flow Volatility , CFSALES stands for cash flow to sales and CFBE stand for Cash flow to book equity.

Firstly, there is a positive correlation of returns with beta, size, book to market and earning yield. The correlation between these variables is weak. The correlation between return and expected earnings is positive and strong. The return is negatively correlated with illiquidity.

Secondly the correlation between returns and cash flow volatility is negative. (Ang and Bekaert, 2006a) mentions that there is a negative correlation between idiosyncratic return volatility and return. Similarly a significant correlation between cash flow volatility and idiosyncratic volatility is reported in the paper. Under these observation and above table, it is estimated that returns are significantly and negatively correlated with cash flow volatility.

The correlation between CFSALES and return is negative yet weak. Similarly correlation between return and CFBE is negative and very weak.

Table 4.3 represent the Panel data analysis for the period of 2008 to 2016 including cash flow Volatility, Expected Returns, Size, Earning yield, Illiquidity, Market beta, Book to Market Equity effect on Stock Returns. Data is analyzed using Common Coefficient Model. The redundant fixed effect likelihood ratio is used to decide if common coefficient model or fixed effect model is applicable. The resultant figures decide that fixed effect model is more appropriate as F-statistics probability and Chi-square probability are significant. The correlated random effect Hausman test results are significant which also favors fixed effect model.

TABLE 4.3: Common Coefficient model Impact of cash flow volatility on stock return

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.5057	-2.4698	-2.4786	-2.5221	-2.5271
t-stat	-19.4599	-19.3082	-19.4312	-17.4621	-17.1500
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	0.0029	0.0026	0.0012	0.0019	0.0017
t-stat	0.1155	0.1038	0.0503	0.0779	0.0690
Prob	0.9081	0.9174	0.9599	0.9379	0.9450
EY	0.0342	0.0313	0.0345	0.0346	0.0346
t-stat	9.8796	8.8991	9.1776	9.1837	9.1720
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1818	5.1405	5.1564	5.1587	5.1578
t-stat	29.6347	29.6169	29.7823	29.7769	29.7414
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-1.6920	-1.7331	-1.6808	-1.6853
t-stat		-3.8068	-3.9089	-3.7272	-3.7287
Prob		0.0002	0.0001	0.0002	0.0002
CFV			-0.0299	-0.0298	-0.0298
t-stat			-2.3712	-2.3642	-2.3624
Prob			0.0180	0.0183	0.0184
BTM				0.0112	0.0111
t-stat				0.6430	0.6352
Prob				0.5204	0.5255
β**m**					0.0048
t-stat					0.1769
Prob					0.8596
R^2	0.6196	0.6272	0.6301	0.6303	0.6303
Adj R^2	0.6180	0.6251	0.6275	0.6272	0.6267
F-stat	388.2518	300.3062	242.9249	202.3398	173.2026
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

CFV stands for Cash Flow Volatility, ER for Expected Returns, ME for Size, ILL for Illiquidity, EY for Earning yield, βm stands for beta and BTM for Book to Market ratio.

Table 4.4 represent the fixed effect model analysis for the period of 2008 to 2016 including β, Size, Earning yield, Expected Returns, Book to Market Equity, Illiquidity and Cash flow Volatility Effect on Stock Returns. Here P statistics and t

statistics estimate the effect of every individual variable. R square represents that how much change in dependent variable is explained by the independent variable Adjusted R square represent the adjustment or modification due to other factors in the model. F statistics is about the fitness of hypothesis and takes the account of null hypothesis. When f significance is greater than 5%, the model is appropriate for the explanation of relationship among variables.

In this study size, expected returns, earning yield and illiquidity are used as the control variables as these variables can affect the stocks returns and cash flow volatility relationship so these variables are controlled to reduce their impact on the dependent variable. In model 1 the impact of control variables on stock return is observed. The slop of ME is negative and it is insignificantly related with returns. This confirms the disappearing effect of firm size on stock returns. EY is significantly related to stock returns with the t-value of 9.8796. The coefficient is positive so earning yield and stock returns moves in same direction. One percent change in earning yield can cause 0.03 percent change in stock returns. ER is significantly related with returns with a t-value of 29.6347. Its coefficient is positive and shows that one percent change in ER can cause 5.18 percent change in returns. ER is able to explain variation in stock returns. These results are supported by theory. Adjusted R-square is 0.6180 so these variables can affect the stock returns by 61.8%. F-stat shows the significance of this model.

ILL is added with above variables in model 2. It is estimated that ILL is significantly related with returns. The t value is -3.8068 and the coefficient is negatively related. These results are supported by theory which shows that low trading activity of the stock can inversely effect the firm returns. Other variables shows the same behavior. Adjusted R-square is 0.6272 which means that 62.72% variation in dependent variable is due to independent variables. F-stat shows the significance of this model. F probability is significant which shows the goodness of this model.

When Cash flow Volatility is regressed along with these independent and control variables in model 3, the results shows that cash flow volatility have a significant relation with returns. The t value is -2.3712. The coefficient is negative which indicated that as cash flow volatility increases, stock return decreases. The cash

TABLE 4.4: Impact of cash flow volatility on stock return: Fixed Effect Model

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.5057	-2.4698	-2.4786	-2.5221	-2.5271
t-stat	-19.4599	-19.3082	-19.4312	-17.4621	-17.1500
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	0.0029	0.0026	0.0012	0.0019	0.0017
t-stat	0.1155	0.1038	0.0503	0.0779	0.0690
Prob	0.9081	0.9174	0.9599	0.9379	0.9450
EY	0.0342	0.0313	0.0345	0.0346	0.0346
t-stat	9.8796	8.8991	9.1776	9.1837	9.1720
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1818	5.1405	5.1564	5.1587	5.1578
t-stat	29.6347	29.6169	29.7823	29.7769	29.7414
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-1.6920	-1.7331	-1.6808	-1.6853
t-stat		-3.8068	-3.9089	-3.7272	-3.7287
Prob		0.0002	0.0001	0.0002	0.0002
CFV			-0.0299	-0.0298	-0.0298
t-stat			-2.3712	-2.3642	-2.3624
Prob			0.0180	0.0183	0.0184
BTM				0.0112	0.0111
t-stat				0.6430	0.6352
Prob				0.5204	0.5255
β**m**					0.0048
t-stat					0.1769
Prob					0.8596
R^2	0.6196	0.6272	0.6301	0.6303	0.6303
Adj R^2	0.6180	0.6251	0.6275	0.6272	0.6267
F-stat	388.2518	300.3062	242.9249	202.3398	173.2026
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

CFV stands for Cash Flow Volatility, ER for Expected Returns, ME for Size, ILL for Illiquidity, EY for Earning yield, βm stands for beta and BTM for Book to Market ratio.

flow volatility can effect stock by 0.03%. These results are supported with theory that volatility inversely affect the stock returns. Cash flow volatility is significantly and negatively related to returns in all models. Adjusted R square is 62.75% which indicates that these variables can affect the stock returns by 62.75%.

The relationship between Book to market equity and stock returns is observed in model 4. Book to market equity is insignificant. Its coefficient is positive. It is positively correlated with stock returns as supported by theory yet insignificant in this study. Book to market equity positively predicts the returns having a t value of 0.6430. Size and expected returns are significant with a t value of 0.0779 and 29.7769. ILL is found to negatively significantly relate with returns. Cash flow volatility is also significantly and negatively related to returns. Adjusted R square is 0.6272 which shows that 62% variation in returns is due to these variables.

In model 5 market beta is regressed along with other independent variables using the fixed model of panel data regression. The result indicates that beta is insignificant. These results are supported by theory. Model 5 shows the combined effect of all independent variables on stock returns. Cash flow volatility is significantly and negatively related to returns having a t value of -2.3624. Here book to market equity is insignificant and positive. Size and expected returns are positively and significantly related to returns with t value of 0.0690 and 29.7414. Illiquidity is significantly and negatively related to return. Its t value is -3.7287. Adjusted R square is 62.67% which implies that all these variables can cause 62% change in stock returns. F significance indicates that this model is significant at 95% confidence level.

F significance indicates that model is appropriate and highly significant at the confidence level of 95%. It shows the goodness of fit as the model is fit enough to explain the relationship between dependent and independent variables. All the model in above table are significant at 95% confidence level.

Table 4.5 represent the Panel data analysis which shows the cash flow to book equity effect on Stock Returns for the period of 2008 to 2016. Cash flows are standardize using book equity as scale. CFBE is the standard deviation of industry adjusted cash flow scaled to equity. Here Data is analyzed using Common Coefficient Model.

Table 4.6 represent the Panel data analysis for the period of 2008 to 2016 including Size, Expected Returns, Earning yield, market beta, Illiquidity, Book to Market Equity, and Cash flow to equity Volatility Effect on Stock Returns. Data

TABLE 4.5: Impact of Cash flow to Book Equity volatility on Stock Returns: Common Coefficient model

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.5057	-2.4698	-2.4739	-2.5188	-2.5226
t-stat	-19.4599	-19.3082	-19.3274	-17.3786	-17.3793
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	0.0029	0.0026	0.0029	0.0036	0.0033
t-stat	0.1155	0.1038	0.1167	0.1450	0.1335
Prob	0.9081	0.9174	0.9071	0.8848	0.8939
EY	0.0342	0.0313	0.0312	0.0313	0.0315
t-stat	9.8796	8.8991	8.8844	8.8935	8.9028
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1818	5.1405	5.1456	5.1479	5.1523
t-stat	29.6347	29.6169	29.6294	29.6250	29.6092
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-1.6920	-1.6944	-1.6405	-1.6417
t-stat		-3.8068	-3.8119	-3.6288	-3.6297
Prob		0.0002	0.0001	0.0003	0.0003
CFBE			-0.0075	-0.0075	-0.0075
t-stat			-0.9395	-0.9386	-0.9306
Prob			0.3478	0.3482	0.3524
BTM				0.0116	0.0119
t-stat				0.6618	0.6801
Prob				0.5083	0.4966
β**m**					0.0143
t-stat					0.5817
Prob					0.5609
R^2	0.6196	0.6272	0.6277	0.6279	0.6281
Adj R^2	0.6180	0.6251	0.6250	0.6248	0.6244
F-stat	388.2518	300.3062	240.3820	200.2334	171.5175
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

β stands for beta, ME for Size, BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns and CFBE for Cash Flow to Book Equity Volatility.

is analyzed using Fixed Effect Model as Hausman test results are significant. Size, expected returns, earning yield and illiquidity are used as the control variables. So these variables are controlled to reduce their impact on the dependent variable.

TABLE 4.6: Impact of Cash flow to Book Equity volatility on Stock Returns: Fixed Effect Model

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.4406	-2.3549	-2.3583	-2.4362	-2.4392
t-stat	-17.5579	-17.3689	-17.3743	-14.5756	-14.5691
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	-0.0039	-0.0028	-0.0026	-0.0022	-0.0023
t-stat	-0.1401	-0.1054	-0.0979	-0.0814	-0.0853
Prob	0.8886	0.9161	0.9221	0.9351	0.9321
EY	0.0361	0.0312	0.0311	0.0313	0.0314
t-stat	9.5534	8.3175	8.3007	8.3291	8.3172
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1042	5.0062	5.0104	5.0181	5.0217
t-stat	27.2701	27.4592	27.4542	27.4504	27.4189
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-4.8563	-4.8460	-4.7795	-4.7719
t-stat		-6.3405	-6.3231	-6.1982	-6.1824
Prob		0.0000	0.0000	0.0000	0.0000
CFBE			-0.0057	-0.0058	-0.0057
t-stat			-0.6712	-0.6747	-0.6665
Prob			0.5023	0.5001	0.5053
BTM				0.0198	0.0200
t-stat				0.7993	0.8065
Prob				0.4244	0.4203
β**m**					0.0102
t-stat					0.4020
Prob					0.6878
R^2	0.6320	0.6539	0.6542	0.6545	0.6546
Adj R^2	0.5846	0.6087	0.6084	0.6081	0.6076
F-stat	13.3212	14.4562	14.2771	14.1087	13.9280
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

β stands for beta, ME for Size, BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns and CFBE for Cash Flow to equity Volatility.

In model 1 the control variables are regressed to observe their impact on stock returns. The coefficient of size is negative and it is insignificantly related with

returns. This supports the disappearing effect of firm size on stock returns as provided by literature. EY is significantly related to stock returns with the t-value of 9.5533. The coefficient is positive so earning yield and stock returns moves in same direction. One percent change in earning yield can cause 0.03 percent change in stock returns. ER is significantly related with returns with a t-value of 27.27. Its coefficient is positive and shows that one percent change in ER can cause 5.104 percent change in returns. ER is able to explain variation in stock returns. These results are supported by theory. Adjusted R-square is 0.6180 so these variables can affect the stock returns by 58.46%. F-stat shows the significance of this model.

In model 2 ILL is regressed with above variables. It is observed that ILL is significantly related with returns. The t value is -6.3405 and the coefficient is negatively related. These results are supported by theory which shows that low trading activity of the stock can inversely effect the firm returns. Other variables shows the same behavior. Adjusted R-square is 0.6087 which means that 60.87% variation in dependent variable is due to independent variables. F-stat shows the significance of this model. F probability is significant which shows the goodness of this model. CFBE is added along with these independent and control variables in model 3, the results shows that cash flow to book equity volatility is negative but insignificant. The coefficient is negative which indicated that as cash flow to book equity volatility increases, stock return decreases. The negative association is supported with theory that volatility inversely affect the stock returns. CFBE have negative slope in all models. Adjusted R square is 62.75% which indicates that these variables can affect the stock returns by 62.75%.

Book to market equity is added in model 4. Book to market equity is insignificant. It is positively correlated with stock returns as shown by its coefficient yet insignificant in this study. Size and expected returns are significant with a t value of -0.0814 and 27.4503. ILL is found to negatively significantly relate with returns. CFBE is insignificant and negative in this model. Adjusted R square is 0.6081 which shows that 60% variation in returns is due to these variables.

In model 5 market beta is regressed along with other independent variables using

the fixed model of panel data regression. The result indicates that beta is insignificant. These results are supported by theory. Model 5 shows the combined effect of all independent variables on stock returns. CFBE is negative having a t value of -0.6666. Here book to market equity is insignificant and positive. Size and expected returns are positively and significantly related to returns with t value of -0.0853 and 27.4189. Illiquidity is significantly and negatively related to return. Its t value is -6.1823. Adjusted R square is 60.76% which implies that all these variables can cause 60% change in stock returns. F significance indicates that this model is significant at 95% confidence level. F significance indicates that model is appropriate and highly significant at the confidence level of 95%. It shows the goodness of fit as the model is fit enough to explain the relationship between dependent and independent variables. All the model in above table are significant at 95% confidence level.

Table 4.7 represent the Panel data analysis including; Size, Expected Returns, Earning yield, Illiquidity, Market beta, Book to Market Equity and Cash flow to sales volatility effect on Stock Returns for the period of 2008 to 2016. Cash flows are standardize using sales as scale. CFSALES is the standard deviation of industry adjusted cash flow scaled to sales Here Data is analyzed using Common Coefficient Model.

Table 4.8 represent the Panel data analysis for the period of 2008 to 2016 including; Size, Expected Returns, Earning yield, Illiquidity, Market beta, Book to Market Equity and Cash flow to sales volatility effect on Stock Returns for the period of 2008 to 2016. Data is analyzed using Fixed Effect Model as Hausman test results are significant. Size, expected returns, earning yield and illiquidity are used as the control variables. In model 1 the control variables are regressed to observe their impact on stock returns. The coefficient of size is negative and it is insignificantly related with returns. This supports the disappearing effect of firm size on stock returns as provided by literature. EY is significantly related to stock returns with the t-value of 9.5534. The coefficient is positive so earning yield and stock returns moves in same direction. One percent change in earning yield can cause 0.03 percent change in stock returns. ER is significantly related with returns with a

TABLE 4.7: Impact of Cash flow to Sales volatility on Stock Returns: Common Coefficient model

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.5057	-2.4698	-2.4700	-2.5236	-2.5269
t-stat	-19.4599	-19.3082	-19.1410	-17.2034	-17.2050
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	0.0029	0.0026	0.0026	0.0026	0.0024
t-stat	0.1155	0.1038	0.1044	0.1053	0.0955
Prob	0.9081	0.9174	0.9169	0.9162	0.9239
EY	0.0342	0.0313	0.0313	0.0315	0.0317
t-stat	9.8796	8.8991	8.8386	8.8694	8.8803
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1818	5.1405	5.1407	5.1352	5.1399
t-stat	29.6347	29.6169	29.4310	29.3655	29.3465
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-1.6920	-1.6913	-1.6423	-1.6433
t-stat		-3.8068	-3.7768	-3.6299	-3.6303
Prob		0.0002	0.0002	0.0003	0.0003
CFSALES			0.0002	-0.0076	-0.0072
t-stat			0.0128	-0.3919	-0.3692
Prob			0.9898	0.6953	0.7121
BTM				0.0158	0.0159
t-stat				0.7694	0.7734
Prob				0.4419	0.4395
β**m**					0.0143
t-stat					0.5788
Prob					0.5629
R^2	0.6196	0.6272	0.6272	0.6275	0.6277
Adj R^2	0.6180	0.6251	0.6246	0.6244	0.6240
F-stat	388.2518	300.3062	239.9085	199.9080	171.2375
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

β stands for beta, ME for Size, BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns and CFSALES for Cash Flow to Sales Volatility.

t-value of 27.27. Its coefficient is positive and shows that one percent change in ER can cause 5.104 percent change in returns. ER is able to explain variation in stock returns. These results are supported by theory. Adjusted R-square is

TABLE 4.8: Impact of Cash flow to Sales volatility on Stock Returns: Fixed Effect Model

Model	**1**	**2**	**3**	**4**	**5**
Intercept	-2.4406	-2.3549	-2.3514	-2.4759	-2.4778
t-stat	-17.557	-17.368	-17.161	-14.177	-14.172
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ME	-0.0039	-0.0028	-0.0032	-0.0044	-0.0044
t-stat	-0.1401	-0.1054	-0.1202	-0.1616	-0.1633
Prob	0.8886	0.9161	0.9044	0.8717	0.8703
EY	0.0361	0.0312	0.0312	0.0318	0.0320
t-stat	9.5534	8.3175	8.2945	8.3759	8.3649
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ER	5.1042	5.0062	5.0021	4.9967	5.0005
t-stat	27.2701	27.4592	27.2224	27.1913	27.1515
Prob	0.0000	0.0000	0.0000	0.0000	0.0000
ILL		-4.8563	-4.8699	-4.8134	-4.8057
t-stat		-6.3405	-6.3253	-6.2408	-6.2244
Prob		0.0000	0.0000	0.0000	0.0000
CFSALES			-0.0033	-0.0188	-0.0184
t-stat			-0.1883	-0.8507	-0.8289
Prob			0.8507	0.3953	0.4075
BTM				0.0359	0.0357
t-stat				1.1500	1.1425
Prob				0.2506	0.2537
β**m**					0.0094
t-stat					0.3692
Prob					0.7121
R^2	0.6320	0.6539	0.6539	0.6547	0.6547
Adj R^2	0.5846	0.6087	0.6081	0.6083	0.6078
F-stat	13.3212	14.4562	14.2629	14.1178	13.9362
F-Prob	0.0000	0.0000	0.0000	0.0000	0.0000

β stands for beta, ME for Size, BTM for Book to Market ratio, ILL for Illiquidity, EY for Earning yield, ER for Expected Returns and CFSALES for Cash Flow to Sales Volatility.

0.5846 so these variables can affect the stock returns by 58.46%. F-stat shows the significance of this model.

In model 2 ILL is regressed with above variables. It is observed that ILL is

significantly related with returns. The t value is -6.3405 and the coefficient is negatively related. These results are supported by theory which shows that low trading activity of the stock can inversely effect the firm returns. Other variables shows the same behavior. Adjusted R-square is 0.6087 which means that 60.87% variation in dependent variable is due to independent variables. F-stat shows the significance of this model. F probability is significant which shows the goodness of this model. CFSALES is added along with these independent and control variables in model 3, the results shows that cash flow to sales volatility is negative but insignificant. The coefficient is negative which indicated that as cash flow to book equity volatility increases, stock return decreases. The negative association is supported with theory that volatility inversely affect the stock returns. CFBE have negative slope in all models. Adjusted R square is 60.81% which indicates that these variables can affect the stock returns by 60.81%.

Book to market equity is added in model 4. Book to market equity is insignificant. It is positively correlated with stock returns as shown by its coefficient yet insignificant in this study. Size and expected returns are significant with a t value of -0.1616 and 27.1913. ILL is found to negatively significantly relate with returns. CFSALES is insignificant and negative in this model. Adjusted R square is 0.6083 which shows that 60% variation in returns is due to these variables.

In model 5 market beta is regressed along with other independent variables using the fixed model of panel data regression. The result indicates that beta is insignificant. These results are supported by theory. CFSALES is negative having a t value of -0.8289. Here book to market equity is insignificant and positive. Size and expected returns are positively and significantly related to returns with t value of -0.1633 and 27.1515. Illiquidity is significantly and negatively related to return. Its t value is -6.2244. Adjusted R square is 60.78% which implies that all these variables can cause 60% change in stock returns. F significance indicates that this model is significant at 95% confidence level. F significance indicates that model is appropriate and highly significant at the confidence level of 95%. It shows the goodness of fit as the model is fit enough to explain the relationship between dependent and independent variables. All the model in above table are significant

at 95% confidence level.

4.2 Discussion

The explanatory power of the Fama and French Four Factors and multi factor model has been used to explain the relationship between cash flow volatility and stock returns. The anomalies of size, expected returns, earning yield and illiquidity are used as the control variables. A multi factor model is used to capture the effect of these variables on the stock of Pakistan. Panel data Analysis is used as data is both cross sectional and time series. All variables are regressed with Common coefficient model and fixed effect model moving from specific to general combination. . Results are presented in above table

Firstly control variables are regressed to control their impact on stock returns. The slope of size is negative but it is insignificant. This insignificant relationship show the disappearing effect of size. Size moves in opposite direction of stock returns. Previous studies provides the negative association of the size and returns. (Banz, 1981) explained that small firms tends to have higher returns in the future than large firms. Due to various risk associated with small size of firms, market forces put pressure on the prices and increases their returns. However many recent studies have found that size effect have disappeared in 1980s. (Van Dijk, 2011) argued that size effect has gone away. The disappearing size effect is found in US market. The disappearing effect of size is also confirmed by (Fama and French, 1992) study. Earning yield is positively related with returns. It is a profitability measure. It shows a positive significant relationship with stock returns. This relationship is also supported by theory. Previous studies document a positive relation between equity returns and equity yield and a negative relation between size and returns. (Louis K. C. Chan, 1991) determined the fundamentals of stock returns in Japan and measured a positive relation between returns and earning yield.

Expected Returns are significantly and positively related with returns as expected. When expected returns is regressed along with other control variables, its explanatory power is higher. So expected returns is responsible for large variation in stock returns. Expected Returns leads to significant increase in returns as explained by (Jegadeesh and Titman, 1993). They elaborated the stock market efficiency where buying stocks which performed well in past and selling stock which performed poorly in past generates significant positive returns. This is in accordance with (Huang, 2009) results. When cash flow volatility is added, the results shows that cash flow volatility is negatively and significantly related with stock returns. The negative association between cash flow volatility and stock returns is in accordance with prior studies. (Huang, 2009) document negative relation between cash flow volatility and returns. The study mentions that firms with cash flow volatility experiences 0.2% decrease in their average returns. (Ang et al., 2006a) paper also support the negative association between returns and idiosyncratic volatility.

Illiquidity is significantly and negatively related with returns. The result is supported by (Mooradian, 2010). Mooradiann finds a negative relation between stock return and variability of trading volume. He document that this relation is due to market momentum where higher and continuous trading determines the strong market sentiment and leads to higher returns.

Market β is insignificant. Previous studies has measured the effectiveness of beta to capture stock returns and finds that beta is unable to capture stock returns. (Yuenan Wang, 2007) mentions that beta lacks the explanatory power in examining stock returns. When the beta is used as a measure of systematic risk in China, it does not support the significant stock returns. The insignificant relation of beta with stock return is supported by other studies. (Fama and French, 1992) and (Huang, 2009) studies favors this result.

Cash flow Volatility is significantly and negatively related with returns. Beta, size and book to market equity are insignificant whereas earning yield, Expected Returns and Illiquidity are significant in all models. These results are in accordance with prior studies: (Fama and French, 1992), (Huang, 2009), (Ang et al., 2006a), (Jegadeesh and Titman, 1993), (Mooradian, 2010), (Louis K. C. Chan, 1991).

In the next section CFBE is used as a proxy for cash flow volatility. CFBE is negative but not significant. The negative association between returns and cash flow volatility is supported by (Ang et al., 2006b) and (Huang, 2009). The insignificant relation states that idiosyncratic risk is not considered while estimating returns. Manager focuses on systematic risk only. So this firm specific component has an insignificant relationship with returns. Beta, book to market equity and earning size are insignificant whereas earning yield, Expected Returns and Illiquidity are significant in all models. These results are in accordance with prior studies: (Fama and French, 1992), (Jegadeesh and Titman, 1993), (Mooradian, 2010), (Louis K. C. Chan, 1991).

In the next section CFSALES is used as a proxy for cash flow volatility. CFSALES is negative but not significant. The insignificant relation states that idiosyncratic risk is not considered while estimating returns. This firm specific component has an insignificant relationship with returns. Beta, book to market equity and earning yield are insignificant whereas Size, expected return and Illiquidity are significant in all models. These results are in accordance with prior studies: (Fama and French, 1992), (Jegadeesh and Titman, 1993), (Mooradian, 2010), (Louis K. C. Chan, 1991).

Chapter 5

Discussion and Conclusion

5.1 Conclusion

This study explores the effect of cash flow volatility on returns of stocks of 80 non-financial sector companies listed in the stock exchange for the period of June 2005 to June 2017. The relationship between stock returns and cash flow volatility is analyzed along with the control variables of size, earning yield, illiquidity and expected returns. Earning yield is included as a profitability measure. To explore the impact cash flow volatility on stock returns, panel data regression is tested. The results of this research holds over the time period of 2008 to 2016. The 4 year data is used as a rolling base for the estimation of volatility. Cash flow volatility is detangled into systematic and idiosyncratic volatility to price both these components of cash flow volatility. The pricing of idiosyncratic cash flow volatility is treated as an anomaly.

Cash flow volatility is found significantly and negatively related to stock returns. Cash flow volatility affect the stock returns by 0.2% at the firm level. This relation extends to both systematic and idiosyncratic volatilities in relation with Fama-French factors and other variables. The result of analysis leads to acceptance of proposed hypothesis. The findings are in accordance with Huang (2009) and indicates that information uncertainty is negatively related with future returns. These findings reveals that Cash flow volatility has a significant role in expected

returns. The distress firms are found to have negative returns. So returns are estimated to be inconsistent with cash flow volatility.

When the standard deviation of cash flow to sales and the standard deviation of cash flow to book equity are used as proxies for cash flow volatility, it is estimated that these proxies of cash flow volatility are not significantly related to stock returns.

The Fama-French three factor model is not appropriate to capture the effect of cash flow volatility. Some commonality in distress risk embodied in value and size factor is the cash flow uncertainty risk, which provides this evidence that cash flow uncertainty must be priced so a multifactor model is used to capture this impact that shed light on fundamental risk exemplified in the Fama-French size and value factor.

5.2 Recommendation and Policy Implications

Investors should consider the pricing of Cash flow volatility while making investment and resource allocation. This can help them to better estimate the future returns at the firm level as well as while forming portfolio. Both components of cash flow volatility must be priced to elaborate their true impact on market return. Although only systematic risk is considered by managers while taking any investment but it is necessary to consider idiosyncratic volatility. The significant relation between idiosyncratic volatility and negative returns in Pakistani market should prompt policy makers to consider various proxies of the information uncertainty while policy making to enhances the stock returns. Finance manager should also explore the systematic and idiosyncratic volatility role while making important investment decisions.

5.3 Limitation or Future Research

Many other proxies of information uncertainty should be taken into consideration to explore the impact on stock returns of Pakistani stock market E.g. investor's

behavioral biases of under reaction and over confidence, limits due to arbitrage which includes transaction costs. Many research model has been developed to price the systematic volatility, but the idiosyncratic volatility pricing is ignored. New research work is needed to explore not only systematic volatility but it need to add the idiosyncratic volatility pricing on the portfolio level as well. The financial sector of Pakistan stock market should also be explored to analyze the impact of cash flow volatility on stock returns.

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Appendix-A

TABLE A1: Lists of Companies Selected from Different Sectors

S.NO.	Companies	Sectors
1	Atlas Honda Limited	Automobile Assembler
2	Ghani Automobiles Industries Limited	Automobile Assembler
3	Honda Atlas Cars (Pak) Limited	Automobile Assembler
4	Indus Motor Company Limited	Automobile Assembler
5	Pak Suzuki Motor company Limited	Automobile Assembler
6	Hinopak Motors Limited	Automobile Assembler
7	Ghandhara Industries Limited	Automobile Assembler
8	Millat Tractors Limited	Automobile Assembler
9	Atlas Battery Limited	Automobile Parts & Accessories
10	Baluchistan Wheels Limited	Automobile Parts & Accessories
11	Exide Pakistan Limited	Automobile Parts & Accessories
12	General Tyre & Rubber Company	Automobile Parts & Accessories
13	Pakistan Cables Limited	Cable & Electrical Goods
14	Siemens (Pakistan) Engineering Co. Ltd.	Cable & Electrical Goods
15	Singer Pakistan Limited	Cable & Electrical Goods
16	Bestway Cement Limited	Cement

17	Cherat Cement Company Limited	Cement
18	Fauji Cement Company Limited	Cement
19	Gharibwal Cenment Limited	Cement
20	Kohat Cement Company Limited	Cement
21	Lucky Cement Limited	Cement
22	Maple Leaf Cement Factory Limited	Cement
23	Pioneer Cement Limited	Cement
24	Attock Cement Pakistan Limited	Cement
25	Bawany Air Product Limited	Chemical
26	Biafo Industries Limited	Chemical
27	Pakistan Engineering Company Limited	Engineering
28	K.S.B. Pumps Company Limited	Engineering
29	Crescent Steel & Allied Products Limited	Engineering
30	Dawood Hercules Chemicals Limited	Fertilizer
31	Engro Corporation Limited (Engro Chemical)	Fertilizer
32	Fauji Fertilizer Company Limited	Fertilizer
33	Fauji Fertilizer Bin Qasim Limited	Fertilizer
34	Fauji foods limited	Food & Personal Care Products
35	Murree Brewery Company Limited	Food & Personal Care Products
36	Shezan International Limited	Food & Personal Care Products

37	Clover Pakistan Limited	Food & Personal Care Products
38	National Foods Limited	Food & Personal Care Products
39	Nestle Pakistan Limited	Food & Personal Care Products
40	Rafhan Maize Products Company Limited	Food & Personal Care Products
41	Unilever Pakistan Foods Limited	Food & Personal Care Products
42	Shabbir Tiles and Ceramics Limited	Glass & Ceramics
43	Baluchistan Glass Limited	Glass & Ceramics
44	Tariq Glass Industries Limited	Glass & Ceramics
45	Ghani Glass Mills Limited	Glass & Ceramics
46	Shifa International Hospitals Limited	Miscellaneous
47	Ecopack Limited	Miscellaneous
48	MACPAC Films Ltd.	Miscellaneous
49	Grays Of Cambridge (GOC) Limited	Miscellaneous
50	Sui Northern Gas Pipelines Limited	Oil & Gas Marketing Companies
51	Sui Southern Gas Company Limited	Oil & Gas Marketing Companies
52	Attock Refinery Limited	Others
53	Philips Morris ltd	Others
54	Pakistan National Shipping Corporation	Others
55	Security Papers Ltd.	Paper & Board
56	Pakistan Paper Products Limited	Paper & Board
57	Cherat Packaging Limited.	Paper & Board
58	Merit Packaging Limited	Paper & Board

59	Packages Limited	Paper & Board
60	Century Paper and Board Mills Limited	Paper & Board
61	Hub Power Company Limited	Power Generation & Distribution
62	Japan Power Generation Limited	Power Generation & Distribution
63	K-Electric Limited	Power Generation & Distribution
64	Kohinoor Energy Limited	Power Generation & Distribution
65	Kot Addu Power Company Limited	Power Generation & Distribution
66	Southern Electric Power Company Limited	Power Generation & Distribution
67	Al-Abbas Sugar Mills Limited	Sugar & Allied Industries
68	Al-Noor Sugar Mills Limited	Sugar & Allied Industries
69	Faran Sugar Mills Limited	Sugar & Allied Industries
70	Mehran Sugar Mills Limited	Sugar & Allied Industries
71	Mirpurkhas Sugar Mills Limited	Sugar & Allied Industries
72	Pangrio Sugar Mills Limited	Sugar & Allied Industries
73	Shakerganj Mills Limited	Sugar & Allied Industries
74	Kohinoor Sugar Mills Limited (jauharabad)	Sugar & Allied Industries
75	HUM Network Limited	Technology & Communication
76	Netsol Technologies Limited	Technology & Communication
77	Pakistan Telecommunication Company Limited	Technology & Communication
78	Telecard Limited	Technology & Communication
79	WorldCall Telecom Limited	Technology & Communication

80	Pak Datacom Limited	Technology & Communication

Table A2: Unit Root Test

	Augmented Dickey Fuller test	
Variables	t statistics	Prob
Rt	-5.0671	0.0000
β	-12.9850	0.0000
btm	-8.5440	0.0000
cfv	-4.1990	0.0007
cfbtm	-7.7726	0.0000
cfsales	-6.7335	0.0000
Ey	-26.9628	0.0000
Ill	-9.4792	0.0000
Pmom	-7.4806	0.0000
Me	-8.3076	0.0000

Augmented Dickey Fuller test represent the individual unit root process.
Unit root analysis reveals that all the variables are stationary at level, and none of the series has unit root process.

Table A3: Auto-Correlation

Variable	**Coefficient**	**Std. Error**	**t-Stat**	**Prob.**
C	-5.9533	1.4308	-4.1608	0.0000
BETA	0.0046	0.0219	0.2083	0.8351
ME	0.0005	0.0007	0.6729	0.5012
BTM	0.0030	0.0020	1.5080	0.1320
ER	8.0068	0.2529	31.6549	0.0000
ILL	-7.1598	1.2782	-5.6016	0.0000
EY	0.0041	0.0091	0.4565	0.6482
CFV	-0.0041	0.0049	-0.8464	0.3976
R^2	0.6062			
Adjusted R^2	0.6024			
F-statistic	156.5900			
F-Prob	0.0000			
Durbin Watson	2.3934			

No Auto-correlation exist in the data as Durbin Watson is 2.3934.

TABLE A4: Multicollinearity

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
BETA	0.000478	57.10447	1.013797
ME	4.79E-07	1.135453	1.097921
BTM	3.91E-06	39.93576	1.010411
ER	0.063979	1990.894	1.015226
ILL	1.633695	12709.66	1.027543
EY	8.22E-05	18.35112	1.009396
CFV	2.37E-05	2.018452	1.108887

Multicollinearity does not exist in the data as indicated by Variance Inflation Factor.

TABLE A5: Heteroskedasticity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.9533	1.2955	-4.5955	0.0000
BETA	0.0046	0.0261	0.1744	0.8616
ME	0.0005	0.0003	1.5998	0.1101
BTM	0.0030	0.0024	1.2530	0.2106
ER	8.0068	0.3109	25.7550	0.0000
ILL	-7.1598	1.0736	-6.6688	0.0000
EY	0.0041	0.0187	0.2214	0.8248
CFV	-0.0041	0.0049	-0.8415	0.4004
R^2	0.6062			
Adjusted R^2	0.6024			
F-statistic	156.5900			
F Prob	0.0000			
Durbin Watson	2.3934			
Wald F-stat	110.2588			
Wald Prob	0.0000			

Above table shows white heteroskedasticity-consistent standard errors & covariance. Hetroskedasticity exist in the data so white test is applied to remove it.