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Effect of Illiquidity on Stock Return: Evidence from Pakistan

by

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This work is dedicated to my beloved family who have encouraged me to achieve this milestone and to my respected supervisor who has been a constant source of inspiration.

CERTIFICATE OF APPROVAL

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Abstract

This study presents the effect of illiquidity on excess stock return in Pakistani equity market. Study conducted on daily and monthly prices of 14 years from June 2002 to June 2016 for non-financial companies listed in Pakistan Stock Exchange (PSX). Firm characteristics i.e. size, book to market and illiquidity portfolio returns are used to measure the effect of illiquidity. The descriptive results of the portfolios are consistent with literature as small stock portfolios outperformed from the big stock portfolios, the value stocks outperformed from the growth stock and illiquid stock are less risky and higher return from liquid stock. Applying the portfolios analysis one factor model CAPM is insignificantly effects and poor performer to explain the excess returns in all the portfolios. The Fama and French three factor model is explaining the excess return and significant for the portfolio where the Adjusted R^2 is higher from the CAPM. The residual illiquidity (firm level liquidity) and illiquidity risk derive from Amihud measure (2002) have mixed results as vary on different characteristics of the stock. The liquidity risk on market level have strong and significant effect on the excess return for big stocks, small stock growth stock, most illiquid and east illiquid stock. Where the firm level liquidity have profound effect in small stock, big stock, value stock, most illiquid and least illiquid. Moving towards simple to complex model this study regressed model have more explanatory power are estimated. Concluding the results, liquidity risk and firm level liquidity have strong effects and able to explains the excess return in Pakistan Equity Market.

Keywords: Market Premium; Size premium; Value premium; liquidity premium; Residual illiquidity.

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Chapter 1

Introduction

1.1 Introduction

Liquidity refer to ease of quickly trade-off security in a stock market for the profitable purpose. Massive studies are conducted that determined the factors that driving the assets pricing. Studies evaluate the liquidity is important factor for assets pricing. Illiquidity premium are demanded by the investor while having cost of liquidity. Hence liquidity include risk where the relation is exist for investor requires a higher return on the least liquid stocks Chiang and Zheng (2015). Stock liquidity itself measure the efficiency and growth of the market where at company level, liquidity provide wealthy reputation of a firm in the financial market which increase it firm value. Current study prevails the liquidity factor effect on the excess stock returns including in the market, size and value premium.

The empirical research investigate that traditional assets pricing CAPM (Capital assets pricing model) are ignore illiquidity effects, which derived by Sharpe (1964). The CAPM introduced not only the risk and returns relationship but also determined the sensitivity to market are explain the asset return. A concept of risk free security as concerned the time value of money along with the systematic risk was added by Sharpe (1964) and the systematic risk concerned the higher rate of return for an investor. This introduction evolve the literature of demanding the count up rate of return on investment in the risky securities by the investor. Initially CAPM are supported empirically by researchers as they find out relation between

risk and return but later on the challenged are faced based on incompleteness. The acceptable limit of CAPM is if the return are normally distributed not applicable in variation of returns. Acharya and Pedersen (2005) studied assets pricing basis of these parameters liquidity, size and value for NYSE adding the standard and adjusted version of Capital assets pricing model (CAPM). Adjusted CAPM is one beta return in term of gross return including the illiquidity cost. They estimate adjusted CAPM is highly relative from standard CAPM where the risk premium is positive and statistically insignificant. Acharya and Pedersen (2005) investigate using monthly data form1964 to 1999 standard CAPM are not explain return for the weighted portfolio. Where the studies of Jacoby et al. (2000) used liquidity as price factor and they developed one period CAPM base model to measure for systematic risk on the basis of the net results. Their finding are supporting the evidence that rejection is expected at some extent for the traditional beta and they conclude the convex relationship with he expected gross return. This studied are being different from suggested model of Amihud and Mendelson (1986) as they identified there is a concave and positive relation between future spread and expected stock return.

The empirical debate started after 1980s onwards others factors like size, value and other multi factor variables that effects the pricing of these financial assets. The study on size effects by Banz (1981) sample including stocks prices from New York Stock Exchange (NYSE) for 40 years. The study examine relationship between market returns and market value of the shares which stated as size effect , also examine the relation between returns of stocks in Capital Asset Pricing model which knows as (CAPM) and market risk on same data. Banz (1981) justified the miss specification of CAPM and the small firms returns on average have the higher returns from the large firms in all 40 year period. Like size the study conducted by Stattman (1980) and Rosenberg et al. (1985) innovate the relation of book-to-market value (value anomaly) with excess returns. They identify impact as companies having low book to market are lower performer from the companies having high book-to-market value. After evaluation of size and book-to-market the Fama and French (1993) proposed three factor model that consist market, size

and value premiums. They reported the portfolios return that are formed on the basis of market capitalization and book-to-market and confirm that with addition of size and value premium, three factor model is captured better explain the excess return from the CAPM.

After size and book value impact on stock expected returns Amihud and Mendelson (1986) are very first which consider liquidity is the primary attribute in securities industry. They measured the liquidity base on the cost execution as investor may wait for execute at their optimal price or sell on bid and ask price. They argued in both scenario in case of transition cost and uncertainty which they bear, investor demand the premium. They suggest the expected return are increased in relate to the bid and ask spread where they predict higher spread assets have higher expected return and the holding cost is increase while holding period. Serval proxies are used to measure the illiquidity and illiquidity cost in assets pricing. Turnover rate and trading volume are used by Rouwenhorst (1999) Berkman and Eleswarapu (1998); Levine and Schmukler (2006), to identify the role of illiquidity in assets pricing. While stock prices volatility turnover ratio and trading volume are not captured the price impact and the trading cost. This outcome are observed in international prospective while the Asian Flu crises in 1997 and period of financial crises 2008. The trading volume of stock is high during these period but it seems low stock liquidity while crisis. Amihud (2002) prevent an illiquidity measure that called Amihud illiquidity, which is daily absolute over daily volume in dollar for a period. The measure is consider is appropriate is recent studies as they covered price impact which used in previous studies before this new measure. The other important aspect is the trading volumes are covered in addition with volatility impact on returns variation. Amihud (2002) examines the relationship of stock illiquidity excess return. He found the different effect over time across stock that sorted on size and liquidity where a strong relation in small portfolio returns.

Illiquidity examined in literature widely since illiquidity is consider as a risk factor, Investor not compensate on expected return. Investor required higher liquidity premium on investing in least liquid stocks. Above mentioned evidences and

different model that relate with excess returns are studies in different developed countries. As liquidity is considered the most influential determinant of the market quality are studies in many developed countries like U.S securities market. Recently empirical studies are highlighted that certain market forces which determine the liquidity and its co-movement for assets pricing that results are different in particular stock markets. Very few of the studies are examined in the emerging and developing countries for illiquidity impact on assets pricing. Liquidity is documented as an important factor in Hong Kong for returns pricing while investigating various assets pricing factor Lam and Tam (2011). This study confirm that the impact of liquidity is conditional on excess return base on the market condition and the excess return are also effected with including the other control variable in the model. Lesmond (2005) compared the commonly used five liquidity measures are tested in emerging markets but the outcome of liquidity premium is documented as different in all markets. Hence while examining the emerging market excess returns it is needed to test the firm characteristics that effect stock returns such as illiquidity premium, the value premium, the size premium and the market premium which play significant role. Campaigning the issue, this study are conducted the impact of illiquidity on excess return of Pakistani Stock market (PSX) based on asset pricing model and the Fama-French three factor model with the portfolio approach.

1.2 Theoretical Background:

Market Microstructures Theory

Market Microstructures theory deals in capital markets for their trading mechanism. Although theory effects on assets pricing including stocks, corporate finance, transaction cost, international finance and the liquidity. This theory explain that how the transaction in stock market affects the trading volume and the security price formation. The process where the interaction of seller and buyer which determined the stock price are explained by this theory. Garman (1976) studied

how the risk averse investor set the bid ask price which they demand the maximum profit and avoid from the bankruptcy. Garman Models for dealer market explained the positive spread. Amihud and Mendelson (1986) expanded the work on different period and conclude similar behavior for investor and dealer. Since few decades, the theory considered is an important component to explain the relation between the stock market returns and the liquidity. Bundled of studies conducted in market which considered the liquidity is an important determinant to explain the stock return. Current study is examines equity returns as liquidity is considered as price factor along with Fama and French 3 factor model.

1.3 Problem Statement:

In this study, we investigated the issue either the relationship between the illiquidity and the stock return exists in Pakistan stock market (PSX) or not. Secondly, the studies by Bekaert et al. (2007) and Lesmond (2005), which investigate developed markets, and the study by Acharya and Pedersen (2005) and Amihud (2002), which only concentrate on the U.S. Developed market. There is not much work done employing emerging markets data as the literature investigating this nexus in emerging markets is still very light and this study only focuses on the emerging market Pakistan which considered to be in nearly future the influential markets in the Asian market and their financial system.

1.4 Research Question

The main assessment is to concerned of determining the Impact of liquidity on the stock pricing. there raises important significant questions that are relating to illiquidity and their relationship between illiquidity and stock pricing in PSX. Below is the stated questions.

1. What is the effect of illiquidity risk on the excess stock return of Pakistan market?

2. What is the effect of Fama & French 3 Factor model on the excess returns in Pakistan market?

3. What is the effect of Capital assets pricing model on excess returns in Pakistan?

1.5 Study Objective

The current study examines that how illiquidity of stock is priced in Pakistan Stocks Market. In specific, based on Pakistan stork listed companies the relationship will be study between the stocks return and illiquidity.

• To investigate that Market illiquidity risk is a significant factor in pricing the excess stock return.
• To investigate effect of Fama & French 3 Factor model on the excess return in Pakistan.
• To confirm The Capital assets pricing model is explaining excess stock return in Pakistan.

1.6 Significance of the Study

Liquidity effects may be particularly acute in emerging markets.Diversification in the ownership structure in emerging markets are barely achive and illiqudity might be culpit. Lesmond (2005) and Chuhan (1992) argued that the once a main reason of international investments is the liquidity in the emerging countries. Pakistan is currently the status as the emerging market and currently the favorable market for the local and foreign investor. So, in this scenario, we suggest it is the time to explore more about this emerging market Pakistan. This study uses a 100 non financial firms stock data from Pakistan to construct liquidity based, book to market price factor. These firms characteristics or these price factors, addition

with the market premium, we testing these fundamental elements of pricing the assets. Through sorting the data in based of size , the based on value and illiquidity allows to investigate the different prospective of stock in results of illiquidity effect in Pakistan,

1.7 Plan of Study

The study designed in five chapters Chapter No 1 Introduction, which explains the Problem Statement, Research Question, Objective of the study, significance of the study. The Chapter No 2 is the Literature Review in three section i.e. CAPM and Stock return, Fama and French three factor model and the liquidity in relation with stock return. The Chapter No 3 explains the Data description and Methodology which we use in study and the evaluation of Model Evaluation from literature. Chapter No 4 the Empirical results and Finding reports of the study, lastly Chapter No 5 is Conclusion and recommendation.

Chapter 2

Literature Review

Financial assets liquidity is considered as the essential part of smooth function of capital market. Liquidity is an ability to participate in financial market for a period to expected financial benefit without significant loss. A liquid security is define as the immediate trade of share in market and quickly convert in to cash. An important role of liquidity is the price discovery of asset as liquid securities have highly demanded in stock market at zero cost. The illiquid securities while trading in market required a premium to overcome uncertainty that is globally considerable for the researcher. This study is debating that effects of illiquidity on excess return with some control variables that are primarily considered as stock prices indicator.

CAPM with Excess Return

The Modern finance founder Markowitz contribute as concept of diversification and innovate computation of systematic risk and portfolio returns. Further work is extend by the Sharp,s and introduced the risk free security and provide method to measure the systematic risk. The systematic risk is referred as sensitivity of market factors, where the higher systematic risk required the higher rate of the return. Sharpe (1964) introduce Capital Assets Pricing Model (CAPM) that an exposures to safe from the uncertain outcomes as investor dont want to loss and expected a higher return. Bundle of studies are performed before eighties that

support the empirical work for the CAPM to exposure of market risk. Early empirical testing of CAPM explains the high stock returns are due to the higher betas Roll, Fama et al. (1969) and Blume (1970) but later on the assets pricing and beta relationship is demonstrated. CAPM has been questioned by numerous studies, the studies are supporting the evidence that unconditional CAPM are not explained cross-sectional average returns as compare to other pricing factor are explain the returns in a pattern. Like small stocks are always outperform from large stock, higher book-to-market are outperformed from the low book-to-market. When Fama and French (1992) worked on book-to-market and size (market capitalization) there is announcement of the death of beta. Using the sample from 1963 to 1990, they argued CAPM does a poor explanation of variation in cross sectional on average return as compared with the market capitalization (size) and book-to-market ratio (value).

Lewellen and Nagel (2006) concluded from their study on conditional CAPM explain the assets pricing anomalies form data 1964 to 2001. Their empirical evidence explains the betas are consider overtime with the frequency changed in different year but insignificantly pricing. Fernandez (2006) focused on CAPM estimation for Chiles stock market and Santigo stock market stock that are actively trade for the period 1997- 2002. Evidence are supporting the CAPM but in medium term scale. Dempsey (2013) Study investigated the validity of CAPM in four different market sample period from year 1963 to 2009. Study concluded the CAPM with traditional market beta have predictive power in cross sectional stock returns. Where found there is significant relationship of static and conditional CAPM with expected return conclude in study. Akhtar et al. (2017) studied the Indian stock market where the evidence that capture the impact of CAPM on excess return on basis of portfolio formed on size, value, and momentum illiquidity. Studies argue the patterns have same for these factors and clearly indicate the excess return are not supported by the Capital Assets Pricing Model (CAPM). The another evidence from Indian market are conclude Fama-French three factor model are better explain the stock return variation from the single factor CAPM (Aggarwal (2017).

Hypothesis 1: There is a positive and insignificant impact of standard CAPM

with excess retunes

Fama and French with Excess Return

The empirical evidence agreed that the combination of risk factor are better explained the stock-return from the single factor beta. The experimental and realistic research start in early eighties that the numerous factor are contribute which explain the stock returns. These studies starting from price earnings ratio by Basu (1977), size by Banz (1981), the momentum effect Jegadeesh and Titman (1993) and the Fama-French three factor model by Fama and French (1993). Before the three factor model Fama and French (1992) examines the relationship between size anomaly, value anomaly, earning yield and leverage in U.S stocks market for the year 1962 to 1998. The study declare that the small size market capitalization portfolio are outperform from the big size market capitalization portfolio by .74% in a month. Study observed the no relationship between the market beta and stock return and confirm that alone beta are not explained the cross sectional returns where they conclude a significant explanatory power of sorted size and book-to-market value in their study. The book-market value have higher explanatory power from size and other market characteristics like leverage and earning price ratio.

Fama and French (1993) extend the study in bonds and stock market that include the size premium, market premium and value premium are able to better explain the stock return from the market risk. Form the expansion of Capital Assets Pricing Model (CAPM) Fama & French developed the 3 factor model market premium is the(market return minus risk free rate) with adding two portfolios size premium which is the (small stock minus big stock) and value premium explains (high minus low book-to-market ratio) as consider risk factor. A time series regression are applied for twenty five portfolios returns market, size and value portfolio. Study confirmed the stock return are explained by these market factor where the value stock are outperform from the growth stock and small stocks are outperform from big stock returns at high risk level. The numerous studies measure the impact of the excess return on Fama & French developed market factor.

Eugene et al. (1996) argue that the excess return could not explain by only beta of

market return and their study examines the negative results for CAPM. As beta is insufficient to explained the average return and the variation is not related to the size. Miles and Timmermann (1996) studied the U.K by applied the Fama & French 3 Factor model and found book-to-market value is the better measure from firm size and liquidity to measured the average return for market of U.K. firms. Eugene et al. (1996) argue that the excess return could not explain by only beta of market return and their study examines the negative results for CAPM. As beta is not sufficient to explain the average return and the variation is not related to the size. Claessens et al. (1995) explore the study of different anomalies that explains stock return on the 20 emerging market for the period of 1986 to 1993. Their results indicate the market premium, size premium and trading volume are significantly effect in different market. They document the positive sign for liquidity factor and size factor in most of market where a negative sign for value factor in some markets.

Bartholdy and Peare (2005) compare the CAPM and Fama & French 3 factor model performances on individual stock and portfolio stocks. They documented the CAPM one factor model is estimating the excess return of individual stock using the different time frames, with differences frequencies but poor performance in portfolio is only 3% explain difference in return. Where for the portfolio returns are better explain by the Fama & French 3 factor model but the model is not better in estimating in individual expected return. A relevant study is conducted by Suh (2009) on time series approach in prospective of corporate investment decision. The daily and monthly data was collected from different stocks for five year time period reported the significant results of market risk premium for portfolios and individual stock. Growth portfolios are better estimating by CAPM as compare to value portfolio which is not reasonable estimation. Where the Fama & French 3 factor model are overall superior explanation while efficient in measuring value portfolio. Study on Australian stock market are conducted by Dempsey (2010) which investigate the value stock relationship with the excess return by testing the both model CAPM and Fama & French 3 factor model. The returns are highly

explained by the Fama & French model from CAPM, the study results are conclude the positive relationship between the value stock and excess returns.

In Pakistan studied are conducted by Iqbal and Brooks (2007) measure the CAPM in Karachi Stock Exchange now as Pakistan Stock exchange(PSX) by using monthly, weakly and daily data for period 1992 to 2006. The study document the strong non-linier relationship for the risk return and reason conclude the emerging market have infrequent trading in general and high level of trading activity and liquidity. Javid and Ahmad (2008) studied different economic variable with the market return for period 1993 to 2004 for Karachi Stock exchange. Their finding in some variable have significant impact on explaining the stock return therefore Conditional CAPM are better explanatory power from the standard CAPM. Where in Javid (2009) using the monthly and daily prices are used for same period and conclude the standard CAPM are not explaining the stock return in Pakistani market and the three moment CAPM is better to explaining the stock return.

Mirza and Shahid (2008) investigate Fama & French model by using the daily prices for the period 2003 to 2007 and conclude the significant impact of size and market to book value with the expected return. Hassan and Javed (2011) investigate the assets pricing used mechanism for the period of 1998 to 2007 in Pakistan stock market. Fama & French 3 factor model are tested where found the significant and the positive relation in value premium for the portfolios return and insignificant in growth stock. The study conclude the size effect has significant-positive impact on small size stocks portfolios where return of small stocks is high with their high risk. Finally the study conclude the Fama & French 3 factor model have better explanatory power from the conventional CAPM.

Hypothesis 2: There is a positive and significant impact of Fama & French 3 Factor model with excess retunes

Liquidity with Excess Return

Investor are unable to trade the illiquid stock on their desired time frame and they required premium on this uncertainty. Empirical finding argue that if a stock become illiquid the expected return rise due to because of investor required a

higher return for holding illiquid stock. A significant attention toward liquidity from many years as important component of assets pricing. Earliest study account the presence of relation is identified as positive & significant relation between the stocks returns & illiquidity by Amihud and Mendelson (1986). They confirm the return premium is demanded by the investor in case of bear the transaction cost. Amihud and Mendelson (1986) empirically studied the bid-ask spread effects on assets pricing. These researcher are very first which consider liquidity is the primary attribute in securities industry. They measured the liquidity base on the cost execution as investor may wait for execute at their optimal price or sell on bid-ask price. They argued in both scenario in case of transaction cost and uncertainty which they bear, investor demand the premium. They suggest the expected return are increase in relate to the bid and ask spread where they predict higher spread assets have higher expected return and the holding cost is increase while holding period.

Eleswarapu and Reinganum (1993) investigate the sessional behavior of liquidity risk premium for year 1961 to 1990 New York Stock exchange. The bid ask spread was tested which examined after limited the January-effect and found the relation between the illiquidity and estimated returns are significant on sectional component and positive during the month of January. Datar et al. (1998) used turnover rate of traded volume as the proxy of illiquidity measure for period 1962 to 1991 New York Stock exchange. The volume traded turnover rate which the number of share traded over total share outstanding. They documented the stock return are negatively correlated with the turnover ratio as measured of illiquidity and study confirm the illiquid stocks provider the high rate of return through the period. The relationship of excess return are significant even controlling the variable January effects, book to market ratio and size.

Ahn and Cheung (1999) examine behavior of spread and depth for Hong Kong stock exchange (SEHK) which to examines relationship between market spread and low liquidity depth of market which present a strong significant and negative relation. In the theoretical foundation many different aspects of liquidity are

measured in serval trading system by O'hara (1997) which capture numerous association with returns of various liquidity measure with different outcome. Harris (1991) argued on liquid market have less transaction cost and easily convertible into cash. Jones (2002) presents the important measure of illiquidity, spread and the turn over where study documented that the predicted one year stock return high spread have high returns where the prediction for turnover stock is low. Study also confirm that illiquidity is the most influential determinant for explaining the return. Earlier researcher have suggested the explanation of size effect as small portfolio are most illiquid having greater transaction cost and information of the small is less available therefore monitoring cost is small portfolio is greater from the big stock portfolios.

Amihud (2002) studies the effect of illiquidity and excess returns for New York Stock exchange (1963-1997) that results is positively and significant effects of market illiquidity with excess return. They confirm the liquidity premium are presented by the excess returns and positive liquidity relationship are estimated in cross-sectional and negative related in time series effects. The study prevent an illiquidity measure that called Amihud illiquidity, which is absolute of daily returns over the daily traded volume in dollar for period of time. The measure of Amihud illiquidity is consider the appropriate is recent studies as they covered measurement of price impact which are proposed by Kyle (1985). The other important aspect is the trading volumes are covered in addition with volatility impact on returns variation. Amihud (2002) stock illiquidity impact on excess return documented the different effect over time across stock that sorted on size and liquidity. It conclude strong relation exist in small portfolio returns with expected illiquidity that is subject to the greater illiquidity risk.Pástor and Stambaugh (2003) examines the relationship between the illiquidity and stocks return which documented the statistically significant and consistent relationship to between the excess stock return with the liquidity of the stock.

Acharya and Pedersen (2005) studied assets pricing basis of these parameters liquidity, size premium and value premium for New York Stock Exchange for using

monthly data form 1964 to 1999. The study included the adjusted version of capital assets pricing model (CAPM) which is one beta return in term of gross return including the illiquidity cost and the Standard CAPM. They estimate adjusted CAPM is highly relative and high R square from standard CAPM where the risk premium is positive and statistically insignificant. Further study investigate standard CAPM are not explain return for the weighted portfolio. Their model fail to captured the effect of Book to market but the model is consider reliable for portfolios that are sorted based on liquidity, size and liquidity variation. The returns are explaining 1.1% by the liquidity risk and the average illiquidity effect is standardized. The studies confirm the return increased to due covariance of market liquidity which means if an assets is illiquid cause of market illiquidity hence investor will demands high return where the investor agreed for low return while trading a liquid asset.

Chan and Faff (2005) studied assets pricing for Australian stock market for period 1990 to 1998 by using the illiquidity proxy share turnover and Fama & French 3 Factor model. Their 4 factor model are strongly supported to excess returns and they conclude the premium on the size, value, market and turnover are generally positive and significant. Bekaert et al. (2007) are studies on impact of liquidity on expected returns on 19 emerging markets and confirm that illiquidity significantly measured the expected return. They used the transaction cost and turnover for illiquidity measure where bid ask spread is positively correlated with the return and for illiquidity measure turnover is insignificant and negatively correlated with expected return. Ghysels and Pereira (2008) examine empirical relationship between optimal weighted portfolio and the liquidity, they argued that the optimal portfolio of small stocks strongly increased due to illiquidity and stock got affected while investment in small stock for a short time horizons.

Lee (2011) studied liquidity adjusted CAPM at global level including 30 thousand stocks of fifty countries for period 1988 to 2007 which proposed by the Acharya and Pedersen (2005). Their study concluded that the illiquidity risk priced as independent from markets risk in international context, also test after controlling

size and value premium have same results. Study suggests that investor can re-balance their portfolio for illiquid market and illiquidity risk is local market is not important where the market have global investor. Liang and Wei (2012) also studied at global level where liquidity risk as a pricing factor are locally diversified while controlling size and value factor globally. They measure global liquidity as a simple average of all liquidity of developed markets and result conclude liquidity premium is significantly contribute in expected returns at global market.

Stahel (2005) worked on developed countries Japan, US and UK from 1980-2001 to investigate the liquidities commonalties to pricing finical assets. The analysis suggests excess return are related to sensitivity of the returns in global liquidity and conclude that the liquidity premiums are equal around these countries. Domowitz et al. (2005) studies the importance of liquidities commonalities which they argued, along with the liquidity the liquidity commonalities are specified for the assets pricing model. Doroshenko (2011) investigate U.K. stock market for period 2001-2011 as the impact of illiquidity on assets pricing. This study used daily time-series regression on Fama & French three and four factor model including illiquidity as a fourth factor. The portfolios are designed on based on increasing liquidity which concluded investor demands different expected return where the study reveal the positive & significant effect of liquidity on excess return.

Karolyi et al. (2012) examines the commonality in the iliquidity over the time varies across countries. Study documented that in greater countries, commonality in liquidity exist during the period of high market volatility, and trading activity is high where the presence of international investor. Lam and Tam (2011) look over the role of liquidity and excess return in Hong Kong market having 769 companies for the years 1981 to 2004 along with the assets pricing factor. They documented the significant effect while controlling the well-known stock return factor like Fama & French 3 factor and momentum. They regressed all the factors to measure excess return and estimate the best fit model from the other asset pricing models. (Chollete et al., 2008) examines the illiquidity to explain the illiquidity risk and conclude that the investor are prefer those stock which have high return in illiquid market and also even accept the low return of these stock during the liquidity

period. Study suggest the different alternative measure are impact on liquidity risk as every alternate covering the different aspect of illiquidity. The other aspect of liquidity are discussed where the illiquid stock have very low return and highly liquid stock have higher return because the impact of price volatility in financial market Kumar and Misra (2015). Study argued that while investor trading a large deal in illiquid market that will make them loss if uncertain change in stock prices.

Akbas et al. (2011) examines the relation between the expected-return and the volatility of liquidity by using the Amihud (2002) as illiquidity measure for daily date from AMEX and New York Stock Exchange. From their regression result they conclude the robust and positive relation between expected return and volatility of the liquidity while controlling the different estimated period and the systematic risk factor. Vu et al. (2015) investigate the study on pricing the liquidity risk using stock prices from 1991 to 2010 from Australian Stock Market. Liquidity adjusted model that develop by the Acharya and Pedersen (2005) are used measure the liquidity risk on stock return. They documented the co-movements have significantly impact between the market liquidity, stock illiquidity, stock retunes and market return.

Hagströmer et al. (2013) examines the relationship between the illiquidity risk, value, size, momentum, and illiquidity level for U.S stock market data 1927 to 2010. They estimate in their study that excess returns are determined by variation in liquidity and level of illiquidity. The study documented the liquidity risk is varies over the time period and they identified the period from much longer period. Hubers (2012) analysis the relationship to illiquidity and the assets pricing on London Stock Exchange (LSE) using the models standard CAPM, CAPM with the illiquidity factor and liquidity along with the CAPM and Fama & French 3 factor model. Liquidity and size sorted portfolio are examines in regression model again the illiquidity. Finally study conclude the positive-direct relationship in stock return and the illiquidity.

In various studied many different proxies are used for measure the illiquidity around the globe. For liquidityAmihud and Mendelson (1986) used bid-ask spread,

Putyatin and Dewynne (1999) used same bid-ask spread as efficient service in liquidity trading. Datar et al. (1998) uses the turnover ratio employs for measure liquidity, Brennan and Subrahmanyam (1996) used the proxy daily variance log returns as a liquidity measure. A terms of different spread are used by the Chordia et al. (2000) in their study, including effective spread, proportional effect spread, quoted depth and quoted spread, the proportional quoted spread as a proxy measure. Chordia et al. (2001) used natural log of traded volume in dollar, the stranded deviation and the coefficient of the traded volume, along with the share turnover their standard deviation and the coefficient of the variation in share turnover are used as measure as a proxies of the liquidity. For stock illiquidity we select a well-accepted Amihud (2002) liquidity measure. The empirically evidence by Goyenko et al. (2009)f test the different proxys measure of the illiquidity which included high frequently liquidity spread, low frequently spread prices and low frequency price impact which is Amihud (2002) illiquidity measure and also this study confirm the Amihud is better measured from the other proxies. Studied by Fog and Holden confirm the vital role of illiquidity to explain the stock return and they used the different liquidity measure like present cost benchmark which is effective spread, the cost per dollar benchmark which is square root of the dollar trading volume, trading activity filters which is considered the daily volume and Amihud measure which they confirm the best proxy measured that won in term of capturing price impact and other aspect.

Hypothesis 3: There is positive and significant impact of illiquidity with excess return

Chapter 3

Data Description and Methodology

This chapter justifies the data gathering method, explanation of the variable and the techniques what we chosen are addressed:

3.1 Data Description

A titative design data is evaluate and analyzed in the study while using the daily closing & monthly closing stocks prices of 100 non-financial firms listed in Pakistan stock Exchange(PSX). The selected time duration of sample is 14 years stock prices data of 100 companies range from June 2002 to June 2016. The selection criteria of 100 companies is based on the big market capitalization. The reason behind selecting the leading companies is the trade consistency of the stock hence inactive stock are already eliminated from sample. Basically the big capitalization companies are the market innovator and their return are high percentage point from the inactive stock.

The study comprise the non-financial sector companies as the fiscal year of non-financial companies are closed at June. Where the financial companies fiscal year is closed on December so it is difficult to measure at a different point of time. Same as the capital structure of these companies are different. Non-Financial sector have higher equity percentage while financial companies have higher debt

percentage.

The daily, monthly stock prices and daily trading volume belonging to the 100 companies are acquired from the website Business Recorder and Pakistan Stock Exchange PSX. Further the data obtained from Annual Financial reports which including the Number of outstanding shares to calculate market capitalization and Shareholder equity. Monthly risk-free rate for the year 2002 to 2016 for Pakistani market are collect from the State Bank of Pakistan Website.

3.2 Measurement of Variable

This experimental study investigate and explain the relation of excess return with different assets pricing variable i.e. illiquidity, size-premium, market-premium and value-premium. Following is the details of variable measurement procedure:

3.2.1 Measurements of Illiquidity

While investigating illiquidity effects on stock return it is essential to use an appropriate proxy measure of illiquidity. In empirical research, liquidity is measure by using numerous technique since it is not the direct measure due to theirs ambiguous nature. As from the literature it seems for measure liquidity, the bid and ask spread (micro structural data) and trading cost are used Amihud and Mendelson (1986) ; Brennan and Subrahmanyam (1996). While study the data in Pakistani stock market for a log period the Bid and ask price is not available and trading cost also not obtainable from any reliable source. Limitation due to the data availability and reliability, the daily trading volume and turnover are frequently used to measure of illiquidity in previous studies Levine and Schmukler (2006) ; Rouwenhorst (1999). In term of trading volume, market liquidity can be measure if the stock is frequently traded in market. But it is difficult to measure liquidity, due the difference between the volume of share traded in market and the out standing. As price of a stock is linked to the stock demand but the stock that are not floating with the reason owed by company specific, promotor or government

holding are not priced. These proxies are failed to captured price impact per trade and trading cost.

Hence an appropriate measure is required to explain the impact of liquidity on returns. For this study we identified Amihud (2002) measure is the relatively perfect among all the indirect measurement of illiquidity. Lesmond (2005), Sadka (2006) confirm that Amihud (2002) illiquidity measure is captured the trading volume, price and volatility impact on returned variation. The Amihud (2002) illiquidity measure is defined as average the absolute daily return with daily traded volume in price. For the calculation of monthly illiquidity for a stock it is written as:

$$illiq_{i,m}, = \frac{1}{D_{i,m}} \sum_{t=1}^{D_{i,m}} \frac{|R_{i,d}|}{TV_{i,d}}$$

$illiq_{im}$, denoted as monthly illiquidity of a stock

$D_{i,m}$ is the total trading days in a month of a stock

$|R_{i,d}|$ is the absolute daily return for a stock

$TV_{i,d}$ is the daily traded volume of stock

The stock return is calculated as

$R_{i,d} = \frac{log(P_t)}{log(P_{t-1}} \text{ x } 100$

$Ri, d =$ Daily return of firm stock

$P_t =$ Daily market closing price of share

$P_{t-1} =$ Previous day market closing price of share

For daily returns calculation used the $R_{i,d}$ formula, then the absolute of the daily return for convert all negative return to positive. For daily traded volume in price we multiply the daily traded volume with market price of share of that day. Further divide the absolute daily return to the daily traded volume in price. Finally count the number of days of the security that traded in a month divided by the value of $|R_{i,d}|/TV_{i,d}$. Hence monthly illiquidity is calculated.

Amihud (2002) illiquidity measured are widely used that is considered as the appropriate proxy of direct measure of illiquidity which measure the high correlation with the returns among all the indirect measure by (Fong, Holden, Trzcinka;

2011). With this above reason of appropriate and directly measure we adopt Amihud (2002) measure the excess stock return.

3.2.2 Market Capitalization

Size or the Market Capitalization is mostly denoted as market cap that is calculate as current market price of the share multiply with outstanding share.

$$Size = MPS * Number\,of\,share\,outstanding.$$

For this study market cap for the every security is computed on 30th June of every year.

3.2.3 Book-to-Market Ratio

Book to market ratio are measure for variable value premium which will be use in this study. Book value is the worth of a company where after sales of assets and paid back to the liabilities. Whereas market value is the value of the company by its stock market where the company is traded. It will be calculate as current share market price multiply with outstanding traded in market. The ratio is calculated as

$$BTM = \frac{Book\,Value\,of\,Equity}{Market\,Value\,of\,Equity}$$

For this study BTM ratio for the every security is computed on 30th June of every year.

3.2.4 Portfolios Construction

Five Quintile base portfolios are formulated in this study as same techniques used by Chiang and Zheng (2015) and Acharya and Pedersen (2005) in their study as international context.

3.2.5 Size Sorted Portfolio

Portfolios to capture the size effect, portfolios are formulated on the base of market capitalization by using the monthly stock prices of an individual firm. Where the market cap is measured as outstanding shares of the company at end of year June multiply the market price of share at the end of month June. After the measured Market capitalization of 100 firms for a year the value is sorted as descending order and the companies are breakpoint at 20% tile (equally weighted) for each year. The portfolios are grouped into five portfolios for each year which shows the 20% companies having big market capitalization, then 2nd tile having 20% to 40% having big towards small capitalization, 3rd percentile having 40% to 60% having big towards small capitalization, 4th having 60% to 80% having big towards small capitalization and 5th having small capitalized companies. Then monthly returns are calculated for each company including in each portfolio.

$$R_{i,t} = ln\frac{P_1}{P_0}$$

$R_{i,t}$ = Monthly return of firm stock
P_1 = Monthly market closing price of share
P_0 = Previous month market closing price of share
Further the average of the returns are measured for each portfolio on monthly bases of each year.

3.2.6 Value Sorted Portfolio

Portfolios to capture the Book-to-market value effect, portfolios formulated on base of book to market ratio by using the monthly stock prices of an individual firm. Where the book-to-market value is measure as Book Value of Equity at the end of divide to the Market Value of Equity at the end of June. After the measured Book to Market value of 100 firms for a year the value is sorted as descending order and the companies are breakpoint at 20% (equally weighted) for each year. The portfolios are grouped into five portfolios for each year which shows the 20%

companies have high book-to-market value, then 2nd percentile having 20% to 40% having high towards low book-to-market value, 3rd percentile having 40% to 60% having high towards low book to market value, 4th percentile having 60% to 80% having high towards low book-to-market value and 5th percentile having low book to market value. Then monthly returns are calculated each company including in each portfolio.

$$R_{i,t} = ln\frac{P_1}{P_0}$$

$R_{i,t}$ = Monthly return of firm stock

P_1 = Monthly market closing price of share

P_0 = Previous month market closing price of share

Further the average of the returns are measured for each portfolio on monthly bases of each year.

3.2.7 Illiquidity Portfolio

Portfolios to capture the illiquidity effect, portfolios are formulated on the base Amihud (2002) illiquidity measured by using the monthly stock prices of an individual firm. Where the monthly illiquidity is measured as above method in measurement of illiquidity. After the measured Amihud (2002) illiquidity of 100 firms for a year the value is sorted as descending order and the companies are breakpoint at 20% percentile (equally weighted) for each year. The portfolios are group into 5 portfolios for each year which shows the 20% of most illiquid companies, then 2nd percentile having 20% to 40% having most toward least illiquid companies, 3rd percentile portfolio having 40% to 60% having most toward least illiquid companies, 4th percentile having 60% to 80% having most toward least illiquid companies and 5th percentile having least illiquid companies. Then monthly returns are calculated for each company including in each portfolio.

$$R_{i,t} = ln\frac{P_1}{P_0}$$

$R_{i,t}$ = Monthly return of firm stock

P_1 = Monthly market closing price of share

P_0 = Previous month market closing price of share

Further the average of the returns are measured for each portfolio on monthly bases of each year.

3.3 Variable Construction

To investigate impact of illiquidity on excess stock-return, Chiang and Zheng (2015) used Fama and French (1993) three factors as an appropriate control variable which is used to examines excess stock return. The 3 factor model including the market-premium, size-premium and value-premium. These factor capable to explain much average stock return variation from the earning, sales, cash flows and growth. The empirical studies examines Fama & French 3 factors have a significant explanatory power that explain the excess stock return while assists pricing. Here is the construction of the variable of the portfolios having different dimension are incorporated into current study.

3.3.1 Market Premium

Market risk is the factor that explains cross sectional variation of excess return known as CAPM or Single factor model proposed by the Sharpe (1964). Later the critic in literature by the authors that many of the other factor are also explain cross sectional variation in the excess return.

Market-premium is return from the market and risk free rate. In this study, return of market is the return of KSE 100 index hence;

Market Premium= $RM_t - RF_t$

Whereas

$$RM_t = ln\frac{P_1}{P_0}$$

RM_t = monthly return of the KSE 100 Index.

ln is the natural log

P_1 = Index value of the current month.

P_0= Index value of the last month.

RF_t = the risk free rate of a month

Market premium is calculated for July 2002 to June 2016 on monthly bases where total observation is 168.

CAPM extended by the Fama and French (1993) including the variable Size premium and value premium.

3.3.2 Size Premium SMB

Size premium or SMB proposed by Fama and French (1993)) where the portfolios of having small capitalization minus the big capitalization portfolios. For variable we follow Chiang and Zheng (2015) criteria for constricting variable and portfolio construction as well. After construction of portfolio on base of market capitalization, the monthly return are calculated of each company for all quintile and then calculate average of each 12 months in each quintile. The process is repeat for years 2002 to 2016.

$Size\,Premium(SMB) = Small\,Capitalization\,portfolio - Big\,Capitalization\,portfolio$

$= MC_5 - MC_1$

MC_1 = 20% companies having large market Capitalization

MC_5 = 20% companies having small market Capitalization

(SMB) The return of small capitalized portfolios minus large capitalized portfolio

3.3.3 Value Premium HML

Value premium or HML proposed by Fama and French (1993) where the portfolios of having high book-to-market to low book-to-market portfolios. We follow Chiang and Zheng (2015) criteria for constricting variable and portfolio construction

as well. After construct of portfolio on base of high book-to-market value, the monthly return are calculated of each company for all quintile and then calculate average of each 12 months in each quintile. The process is repeat for years 2002 to 2016.

$Value\,Premium(HML) = High\,book-to-market\,portfolio\ -\ Low\,book-to-market\,portfolio$

$= BM_1\ -\ BM_5$

$BM_1 = 20\%$ companies having high book to market

$BM_5 = 20\%$ companies having low book to market

(HML) The return of high book-to-market portfolio minus low book-to-market portfolio

3.3.4 Illiquidity Risk

We follow Chiang and Zheng (2015) criteria for constricting variable and portfolio construction as well. After construction of portfolio on base of most illiquid portfolio , the monthly return are calculated of each company for all quintile and then calculate average of each 12 months in each quintile. The process is repeat for years 2002 to 2016.

$Illiquidity\,risk(Illiqrisk) = Most\,illiquid\,portfolio\ -\ least\,illiquid\,portfolio$

$= ill_1\ -\ ill_5$

$ill_1 = 20\%$ companies having Most illiquid

$ill_5 = 20\%$ companies having least illiquid

(ill) The return of Most illiquid portfolio minus least illiquid portfolio

3.3.5 Residual Illiquidity

Recent study of Chiang and Zheng (2015) documented the impact of the illiquidity risk could come from 2 different sources: illiquidity risk

innovation term of illiquidity (Residual illiquidity)

Since the unexpected change, not the level of illiquidity, affects stock returns, following Amihud (2002) the Chiang and Zheng (2015) derive residual term (the innovation term) of a firm's illiquidity. The residual through the auto-regressive process which we use in this study is given by:

$$ln(Illiq_{i,m}) = c_0 + c_1 ln(Illiq_{i,m-1}) + \epsilon_{i,m}$$

Where C_0 and C_1 are constant coefficients of the regression, $Illiqi_m$ is defined as in last equation and $\epsilon_{i,m}$ is the innovation term of illiquidity for firm i at time t. The innovation of this equation can be written as $Res - Illiq_t$ in the following analysis and model specifications.

3.4 Model Specification

To incorporate the arguments into a regression model, we explain/write:

$$R_{p,t} - r_{f,t} = \beta_0 + \beta_1 ResIlliq_{i,t} + \beta_2 Illiqrisk_t + \beta_3 RP_t + \beta_4 SMB_{i,t} + \beta_5 HML_{i,t} + \epsilon_{i,t}$$

Where $R_{p,t} - r_{f,t}$ is the excess stock return, Where $R_{i,t}$ is return of portfolio and $R_{f,t}$ is the risk free rate at month t.

$Illiq-riskt_t$ The illiquidity risk factor measure by the high illiquid stock portfolio's return minus the low illiquid stock portfolio's return for a given month.

$Res - Illiq_t$ Chiang and Zheng (2015) invocation term used to measure the Res-Illiq which drive from the Amihud (2002) liquidity measure.

RP_t is the ris-premium, which is is value weighted market returns in excess of local market risk-free rateswhich equals $R_{m,t} - r_{f,t}$; and $R_{m,t}$ is the value weighted domestic market returnand $r_{f,t}$ is the risk free rate at month t.

SMB_t, which is the returns on small market capitalization portfolios minus the return on large market capitalization portfolios for a month.

HML_t HMLt, which is the return on high book to market value portfolios minus the return on low book to market value portfolios for a month.

Chapter 4

Results and Discussion

4.1 Descriptive Statistics

Descriptive presents statistical behavior of the data. Including Mean value that measure of central tendency of data. Standard deviation reflected from mean and its provide dispersion and spread of data from mean value. Skewness indicate the positive or negative spread of the data and if skewness is zero then data is symmetrical or normally distributed. Kurtosis indicate that data distribution is pointedness or comparatively smoothness. Approximately 3 is normally distribution of data and if higher than 3 data show it pointed or lepokurtic else if data less than 3 it is relatively peaked or platykurtic.

Table 4.1 explained the monthly average returns of the portfolios that are sorted based on book-to-market ratio, illiquidity and market capitalization. Results of BM_1 explain the average earning of high book-to-market portfolio is 1.95%, where it examine the risk of high book to market value is 8.01% variation. The maximum loss during the period is 19.21% and the maximum profit for the period is 26.80%. This portfolio is positively skewed and positive kurtosis with the value is less than 3. From moving high toward low book-to-market portfolios the results of table 4.1 shows the average return of portfolio are declining. The portfolio MB_2 represents 40% high towards low book-to-market value shows average return for period is 1.42% where the standard deviation is 7.4%. The maximum loss during the period is 21.38% and the maximum profit for the period is 22.78%, this

TABLE 4.1: Descriptive of Value, Illiquidity and Size Portfolios

Portfolios	**Mean**	**St Dev**	**Kurtosis**	**Skewness**	**Min**	**Max**
$\mathbf{BM_1}$	0.01925	0.08017	0.45495	0.22977	-0.1921	0.26806
$\mathbf{BM_2}$	0.01419	0.07474	0.22906	-0.1887	-0.2124	0.22784
$\mathbf{BM_3}$	0.00773	0.06869	0.59836	-0.4803	-0.2492	0.15562
$\mathbf{BM_4}$	0.00943	0.06449	2.20206	-0.5751	-0.28	0.21189
$\mathbf{BM_5}$	0.00693	0.0607	0.81796	-0.6741	-0.2067	0.13695
$\mathbf{ill_1}$	0.01680	0.06726	0.53205	0.38012	-0.1644	0.23125
$\mathbf{ill_2}$	0.01218	0.06927	4.91275	-0.7925	-0.3731	0.19778
$\mathbf{ill_3}$	0.01056	0.06673	0.00674	-0.028	-0.1513	0.17487
$\mathbf{ill_4}$	0.01203	0.07607	0.71797	-0.4401	-0.2534	0.22914
$\mathbf{ill_5}$	0.00595	0.08411	4.91279	-1.1862	-0.4533	0.24181
$\mathbf{MC_1}$	0.00908	0.06992	5.54997	-1.409	-0.3862	0.16414
$\mathbf{MC_2}$	0.00913	0.06943	0.74665	-0.5646	-0.2611	0.1484
$\mathbf{MC_3}$	0.01137	0.07266	-0.1667	-0.0064	-0.1786	0.22177
$\mathbf{MC_4}$	0.01109	0.06717	0.33363	-0.0335	-0.1957	0.18671
$\mathbf{MC_5}$	0.01686	0.07623	0.6389	0.37004	-0.1635	0.27556

Note: Table 4.1 reports the summary statistics of the monthly-average return of portfolios. Portfolios are grouped into five portfolios for each measure, denote top 20% companys portfolio then 40%, 60%, 80% and 100%. Included Book to Market portfolios that sorted in descending order where BM_1 denote as 20% companies portfolio having high book to market value where BM_2 denote as 40% high towards low book to market value respectively shows BM_3 denotes 60%, 80% denoted as BM_4 and lastly BM_5 denote 20% portfolio of companies having lowest book-to-market. Further the illiquidity portfolios are sorted as descending order, ill_1 denote as 20% most illiquid portfolios where ill_5 denote 20% least illiquid portfolio of companies. Ill_2 denote as 40% most towards least illiquid portfolios that respectively shows ill_3 denotes 60% and ill_4 denote as 80% least towards most illiquid portfolios. The portfolios for market capitalization are also sorted as descending order which MC_1 represents the top 20% companies having big capitalization. The next 20% to 40% denote by the MC_2 that shows big to small capitalized portfolio. Then respectively 60% and 80% companies denoted by MC_3, MC_4 and lastly the 20% companies, having small capitalization among 100 companies.

portfolio is negatively skewed and positive kurtosis with the value is less than 3. While moving the portfolio having 60% high to low book to market which denote MB_3 results in Table 4.1 shows average return for period is .77% where the variation of results is 6.9%. The maximum loss during the period is 24.9% and the maximum profit for the period is 15.6%, this portfolio is also negatively skewed and positive kurtosis with the value is less than 3. The portfolio 80% high towards low book to market value which denote as MB_4 shows average return for period is .94% where the standard deviation is 6.4%. The maximum loss during

the period is 28.10% and the maximum profit for the period is 21.20%, this portfolio is negatively skewed and positive kurtosis with the value is less than 3. The portfolio having low book to market value BM_5 explain the average return during a period is .60% where the standard deviation is 6.07% variation. The maximum loss during in the month is 20.68% and maximum profit in a period is recorded 13.70%. This portfolio is negatively skewed and positive kurtosis with the value is less than 3. This study measured that the stock of the companies having high book-to-market ratio, known as value stock are earned the higher returns from the stock of the companies having low book-to-market ratio also known as growth stocks. The results of this study are consistent and reliable with the theory that is value stock are out perform or higher returns from the growth stock, further assumption of this theory is higher earning potential in riskier stock. Hence, found in this study value stock portfolio average return is 1.95% and risk is 8.01% while in growth stock portfolio average returns is .60% and risk 6.07%.

The illiquidity portfolios are sorted as descending order where the results of ill_1 explain the average earning of 20% most illiquid portfolios are 1.68%, where it examine the risk is most illiquid portfolios are 6.72% variation. The maximum loss during the period is 16.43% and the maximum profit for the period 23.13%. This portfolio is positively skewed and positive kurtosis with the value is less than 3. While moving towards most illiquid portfolios to least illiquid portfolios the average return of portfolios are declining. The portfolio ill_2 represents 40% most towards least illiquid portfolios average return for period is 1.22% where the standard deviation is 6.92%. The maximum loss during the period is 37.30% and the maximum profit for the period is 19.78%, this portfolio is negatively skewed and positive kurtosis with the value is greater than 3. The portfolio having 60% most toward least illiquid portfolios which denote as ill_3 exhibit average return for period is 1.06% where the variation of results is 6.67%. The maximum loss during the period is 15.13% and the maximum profit for the period is 17.49%, this portfolio is also negatively skewed and positive kurtosis with the value is less than 3. The portfolio that returns consist 60% to 80% most towards least 20 companies represented by ill_4 shows the earning return is 1.20% and the standard deviation

is 7.6%. The maximum loss during the period is 25.34% and the maximum profit for the period is 20.29%, this portfolio is negatively skewed and positive kurtosis with the value is less than 3. The 20% least illiquid portfolios that represent as ill_5 shows average earning for the period is .59% further the standard deviation is 8.41% variation. The maximum loss during in the month is 45.33% and maximum profit in a period is recorded 24.18%. This portfolio is negatively skewed and positive kurtosis with the value is more than 3. These returns are supported by the empirical results by Datar et al. (1998) that illiquid stock have higher rate return from the liquid stock. The investment is long term horizon in illiquid stock are less risky from the investment in liquid stock. In other way Amihud (2002) conclude that the liquid stock have higher investor demand and attractive for investor in short term so in will always be reduce the expected return. The average earning of 20% most illiquid portfolios are 1.68%, where it examine the risk is most illiquid portfolios are 6.72% variation and 20% least illiquid portfolios average earning for the period is .59% further the standard deviation is 8.41% variation.

Portfolios of market capitalization are also sorted as descending order which MC_1 represents the top 20% companies having big capitalization. The average return of MC_1 for period is .91% and standard deviation 6.99%. The maximum loss during the period is 38.62% and the maximum profit for the period is 16.41%, this portfolio is negatively skewed and positive kurtosis with the value is more than 3. From moving high toward big market capitalization to small market capitalization portfolios the results of table 4.1 exhibits the average returns of the portfolio are increasing. The next 20% to 40% denote by the MC_2 that shows big to small capitalized portfolio which characterize average return in a period is .91% and the standard deviation is 6.94%. The maximum loss during the period is 26.11% and the maximum profit for the period is 14.84%, this portfolio is negatively skewed and positive kurtosis with the value is less than 3. The portfolio having 60% big capitalization towards small portfolios which denote as MC_3 exhibit average return for period is 1.14% where the variation of returns are 6.67%. The maximum loss during the period is 17.86% and the maximum profit for the period is 18.67%, this portfolio is also negatively skewed and negative kurtosis with the value is less

than 3. The portfolio that returns consist 60% to 80% big to small capitalization 20 companies represented by MC_4 shows the earning return is 1.11% and the standard deviation is 6.72%. The maximum loss during the period is 19.57% and the maximum profit for the period is 18.67%, this portfolio is negatively skewed and positive kurtosis with the value is less than 3. Lastly the 20% companies, having small capitalization among 100 companies. The average return of MC_5 for period is 1.69% and standard deviation is 7.62%. The maximum loss during the period is 16.35% and the maximum profit for the period is 27.56%, this portfolio is positively skewed and positive kurtosis with the value is more than 3. This study identifies that the stock of the companies having big market capitalization are earned the lower return from the stock of the companies having small market capitalization. The results of this study are consistent and reliable with the theory that is small cap stocks are out perform or realized higher returns at high risk level from the big market cap at low risk level. Hence, this study indicate that the small cap MC5 is average return is 1.69% and risk level is 7.62% while in big cap MC_1 average returns is .91% at risk level 6.99%.

TABLE 4.2: Descriptive of Variable Res Illiq, Illiq-Risk, RP, SMB and HML

	Mean	**St Dev**	**Kurtosis**	**Skewness**	**Min**	**Max**
Res Illiq	0	0.00568	29.15187	4.89065	-0.00723	0.04463
IlliqRisk	0.01085	0.08239	4.96135	0.13039	-0.36691	0.41981
RP	0.01835	0.07421	9.08816	-1.7439	-0.4489	0.20224
SMB	0.00778	0.07023	2.03023	0.27101	-0.25925	0.27057
HML	0.01232	0.05894	0.98902	0.40578	-0.16734	0.22764

Note: This table reports statistics of the independent variable where Res illiq is calculated as auto regressive process of the illiquidity. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio, Rm-rf is the market premium calculated as value-weighted market returns in excess of local market risk free rates, SMB denote as 20% small market value portfolios minus the return on large market value portfolios where HML is which is the return on 20% high book to market value portfolios minus the return on 20% low book to market value portfolios .

Table 4.2 explain the statistical measure of premiums of residual illiquidity, the illiquidity risk, expected market return, small-big capitalization (SMB) that is size-premium and high minus low book-to-market (HML) is value-premium. Residual illiquidity average return is minimum but positive return. The standard deviation

is .56%. The maximum loss during the period is .07% and the maximum profit for the period is 4.46%, this premium is positively skewed and positive kurtosis with the value is more than 3. Illiquidity risk average return is 1.08% where the standard deviation is 8.23%. The maximum loss during the period is 36.69% and the maximum profit for the period is 41.98%, this premium is positively skewed and positive kurtosis with the value is less than 3. Market premium is 1.83% and the standard deviation is 7.42%. The maximum loss during the period is 44.89% and the maximum profit for the period is 20.22%, this premium is negatively skewed and positive kurtosis with the value is more than 3. The size-premium average return is 0.78% where as standard deviation is 7.02%. The maximum loss during the period is 25.92% and the maximum profit for the period is 27.05%, this premium is positively skewed and positive kurtosis with the value is less than 3. The value premium average return is 1.23% where as standard deviation is 5.89%. The maximum loss during the period is 16.73% and the maximum profit for the period is 22.76%, this premium is positively skewed and positive kurtosis with the value is less than 3. Premium of all variables are positive as the market premium are the highest among all which shows most of the market dynamics are captured by CAPM.

4.2 Multicollinearity

For testing the significance of coefficients while regression analysis we measure the multicollinearity to identify the association between the variables. Correlation and VIF test indicate the multicollinearity that shows one independent variable are correlated to other independent variable. Multicollinearity is problematic when the correlation of the two independent variable are perfectly correlated. Here we examines both the correlation and VIF test to check availability of multicollinearity. The values of Correlation is always between the +1 which shows a positive perfect linear relationship and -1 which shows a perfect negative linier relationship.

4.2.1 Correlation Matrix

TABLE 4.3: Correlation Matrix

	Res Illiq	**Illiq-Risk**	**RP**	**SMB**	**HML**
Res Illiq	1				
Illiq-Risk	-0.06171	1			
RP	0.008664	-0.08331	1		
SMB	-0.12871	0.796279	-0.07891	1	
HML	-0.10643	0.262553	0.08179	0.545633	1

Note:This table reports the correlation between the independent variable where Res illiq is calculated as auto regressive process of the illiquidity. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio, Rm-rf is the market premium calculated as value-weighted market returns in excess of local market risk-free rates, SMB denote as 20% small market value portfolio minus the return on large market value portfolio where HML is which is the return on 20% high book to market value portfolios minus the return on 20% low book to market value portfolios .

Table 4.3 exhibit the multicollinearity between the independent variable including residual illiquidity, the illiquidity risk, and the market-premium, small minus big capitalized portfolio and high minus low book-to-market. The results indicate that relation between the residual illiquidity and illiquidity risk is .06 which is a week negative linier relation. While there is positive relationship between the residual illiquidity and market premium, the strength of relationship is .008 which is considered as no linier relationship. There is negative relationship of residual illiquidity with the size-premium and value-premium. The strength of the relationship is .12 and .10, which is considered as week correlation. When associating the relation between the illiquidity risk and market-premium the results shows .08 a week negative linier relation. Where there is positive relationship between the illiquidity risk and size-premium, the strength of relationship is .79 which is considered as strong positive linier relationship but not a perfect relationship. There is positive relationship between the illiquidity risk and size-premium, the strength of the relationship is .26, which is considered as week correlation. Further comparing relationship of market premium with the size-premium, found negative relationship with the strength is .07 which consider as week correlation. There is positive relationship between the market premium and value premium, the strength of relationship is .08 which also considered as week relationship. Lastly measures

found a positive relationship between the size and value-premium, the strength of relationship is .54, which is consider as a moderate uphill linier correlation.

4.2.2 Variance Inflation Factor

The other way to confirm tolerable limit of multicollinearity in regression model we use Variance Inflation Factor(VIF) test. That measure how much the variance of the regression coefficient increase where the variables are correlated. As a rule of thumb if the VIF will be 1 there is no auto correlation exist in variables but multicollinearity is potential problematic if the VIF is more than 5 and that will be effected the regression results.

Table 4.4: Variance Inflation Factor (VIF)

Variables	**Coefficient Variance**	**Uncentered VIF**	**Centered VIF**
C	0.0000	1.11741	NA
RP	0.00378	1.09295	1.0296
HML	0.00958	1.71752	1.64518
SMB	0.01712	4.2259	4.17437
Res Illiq	0.64067	1.02207	1.02207
Illiq-Risk	0.00924	3.15276	3.09872

Note:This table reports the (variance Inflation Factor) VIF between the independent variable where Res illiq is calculated as auto regressive process of the illiquidity. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio, Rm-rf is the market premium calculated as value-weighted market returns in excess of local market risk-free rates, SMB denote as 20% small market value portfolios minus the return on large market value portfolios where HML is which is the return on 20% high book to market value portfolios minus the return on 20% low book to market value portfolios .

Table 4.4 exhibit the multicollinearity between the independent variable including market premium, high minus low book-to-market value, small minus big capitalized portfolio, residual illiquidity and the illiquidity risk. The centered value in table is less than 5 for all the independent variables that is good indication. The Market premium centered value is 1.03 that show variable is not correlated with any other independent variable. The value-premium centered VIF is 1.64 that also

show no correlation with the any other variable. While in size-premium the centered value is 4.17 which will be moderately correlated but the multicollinearity is not problematic because the value is less than 5. Further residual illiquidity centered value is 1.02 that also no multicollinearity exist in the variable and lastly the illiquidity risk centered VIF is 3.09 that indicate the value less than 5 and no correlation with other independent variable. Hence we can assume the coefficient of the regression can be significantly estimated due to no multicollinearity in model.

4.3 Regression Analysis:

In this section regression analysis are reporting the performance of the Capital Assets Pricing Model CAPM which include the market beta. The Fama & French 3 factor model and 5 factor after including illiquidity. The effects of the illiquidity are vary on different market condition or the characteristics of stock. Following the regression results that explains the effects of different market factor that effecting the excess return.

4.3.1 Regression Analysis of Size Base Portfolio

Empirical studies evaluate many stock characteristic that are effected to the expected stock returns. Size is one of the important market characteristic that affects the excess return. In Table 4.5 the 20% portfolio returns having big market capitalization returns are 1.4% of the variation are explain by the CAPM. The impact is positive but insignificant on returns. Whereas Farma & French model is explaining 26% of the variation in big cap returns where the impact of size-premium is negative and value-premium is positive but both significant. Innovation term and the illiquidity risk explain the 34% of the variation in big cap returns and their impact is negative but significant. Hence the liquidity risk on market level have strong effect on the excess return big stocks. Where the liquidity innovation effect is less profound in large firm stocks so their results in Pakistani market is

TABLE 4.5: Regression analysis of Size base Portfolio.

$R_{p,t} - r_{f,t} = \beta_0 + \beta_1 RP_t + \beta_2 SMB_{i,t} + \beta_3 HML_{i,t} + \beta_4 ResIlliq_{i,t} + \beta_5 Illiqrisk_t + \epsilon_{i,t}$									
	β_0	β_1	β_2	β_3	β_4	β_5	**Adj.R²**	**F stat**	**F Sig**
1st percentile 20% companies having big Capitalized portfolios									
MC1	0.007	0.134					0.014	3.451	0.065
t-value	1.198	1.858							
p-value	0.233	0.065							
MC1	0.007	0.059	-0.611	0.457			0.268	21.355	0.000
t-value	1.469	0.934	-7.679	4.823					
p-value	0.144	0.351	0.000	0.000					
MC1	0.015				-1.414	-0.501	0.346	45.209	0.000
t-value	3.299				-1.833	-9.425			
p-value	0.001				0.069	0.000			
MC1	0.010	0.065	-0.082	0.281	-1.234	-0.493	0.385	21.935	0.000
t-value	2.326	1.126	-0.665	3.044	-1.635	-5.438			
p-value	0.021	0.262	0.507	0.003	0.104	0.000			
2nd percentile 20% to 40% companies having big towards small Capitalized portfolios									
MC2	0.007	0.108					0.007	2.222	0.138
t-value	1.301	1.491							
p-value	0.195	0.138							
MC2	0.007	0.075	-0.238	0.222			0.039	3.237	0.024
t-value	1.246	1.047	-2.628	2.054					
p-value	0.214	0.297	0.009	0.042					
MC2	0.013				-1.8	-0.358	0.185	19.937	0.000
t-value	2.667				-2.105	-6,072			
p-value	0.008				0.037	0.000			
MC2	0.011	0.084	0.501	-0.022	-1.33	-0.686	0.266	13.092	0.000
t-value	2.349	1.331	3.744	-0.217	-1.623	-6.976			
p-value	0.020	0.185	0.000	0.829	0.107	0.000			
3rd percentile 40% to 60% companies having big towards small Capitalized portfolios									
MC3	0.009	0.111					0.007	2.167	0.143
t-value	1.621	1.472							
p-value	0.107	0.143							
MC3	0.007	0.089	-0.045	0.287			0.040	3.327	0.021
t-value	1.138	1.184	-0.475	2.543					
p-value	0.257	0.238	0.635	0.012					
MC3	0.012				-1.696	-0.091	0.015	2.246	0.109
t-value	2.202				-1.723	-1.338			
p-value	0.029				0.087	0.183			
MC3	0.009	0.093	0.274	0.177	-1.264	-0.301	0.079	3.876	0.002
t-value	1.516	1.262	1.746	1.504	-1.316	-2.613			
p-value	0.131	0.209	0.083	0.134	0.190	0.010			

4th percentile 60% to 80% companies having big towards small Capitalized portfolios									
MC4	0.01	0.058					0.002	0.689	0.408
t-value	1.875	0.83							
p-value	0.063	0.408							
MC4	0.006	0.035	0.001	0.357			0.085	6.195	0.001
t-value	1.163	0.517	0.013	3.503					
p-value	0.247	0.606	0.990	0.001					
MC4	0.011				-1.223	0.006	0.001	0.905	0.407
t-value	2.107				-1.333	.101			
p-value	0.037				0.184	0.920			
MC4	0.007	0.037	0.170	0.298	-0.777	-0.16	0.092	4.390	0.001
t-value	1.371	0.550	1.178	2.76	-0.882	-1.512			
p-value	0.172	0.583	0.240	0.006	0.379	0.132			
5th percentile 20% companies having small Capitalized portfolios									
MC5	0.016	0.060					0.003	0.564	0.454
t-value	2.597	0.751							
p-value	0.010	0.454							
MC5	0.007	0.059	0.389	0.457			0.384	35.714	0.000
t-value	1.469	0.934	4.893	4.823					
p-value	0.144	0.351	0.000	0.000					
MC5	0.015				-2.402	0.173	0.060	6.320	0.002
t-value	2.604				-2.381	4.448			
p-value	0.010				0.018	0.014			
MC5	0.010	0.065	0.918	0.281	-1.234	-0.493	0.483	32.199	0.000
t-value	2.326	1.126	7.438	3.044	-1.635	-5.438			
p-value	0.021	0.262	0.000	0.003	0.104	0.000			

Note:This table reports monthly return on book-to-market sorted portfolios. Portfolios for market capitalization are also sorted as descending order which MC1 represents the top 20% companies having big capitalization. The next 20% to 40% denote by the MC2 that shows big to small capitalized portfolio. Then respectively 60% and 80% companies denoted by MC3, MC4 and lastly the 20% companies, having small capitalization among 100 companies. Where dependent variable is the excess return which is the return of the portfolio minus the risk-free rate at month. where the dependent variable include RP is the market premium calculated as value-weighted market returns in excess minus local market risk free rates, SMB denote as 20% small market value portfolios minus the return on large market value portfolios where HML is which is the return on 20% high book to market value portfolios minus the return on 20% low book to market value portfolios. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio and Res illiq is calculated as auto regressive process of the illiquidity..

consistent with the literature. Addition of Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows 38% of the total variation of big market capitalization returns able to predict by these five variables. The impact of the variable is consistent in all portfolios returns having big stock except the value-premium is negative but insignificant.

For the portfolio comprising 20% to 40% big to small capitalized portfolios return are explains .07% by the single factor model CAPM and they have positive and insignificant impact on the returns. Like Farma & French 3 factor value of the Adjusted R^2 is .39% of the total variation which show the explanatory power of the model. The impact of size-premium is negative where the value-premium is positive and both are significant at 95% interval. The Adjusted R^2 of residual illiquidity and the illiquidity risk is 18% which shows the total variation in model due to these two variable. While including the Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows these five factor model have 26% of the total variation in big to small capitalized portfolios return. The impact of the variable is not consistent in all portfolios returns having big to small capitalized portfolios return. This impact is negative and insignificant in value-premium where the significant and positive in size-premium. The residual illiquidity is negative and insignificant impact on 20% to 40% big to small capitalized portfolio returns.

From moving toward big market capitalization to small market capitalization portfolios return 40% to 60% are only .7% fundamentally explain by single factor model with the impact is positive and insignificant. The Farma & French explanatory power is 4% where the impact of size-premium is negative and insignificant and the impact of value-premium is positive and significant. Whereas the Adjusted R^2 of innovation term of illiquidity is 1% which mean 1% of the total variation of portfolio returns explain by the illiquidity risk and residual illiquidity. The effect of the both variable is negatively insignificant. While enhancing the Farma & French 3 factor model with illiquidity risk and residual illiquidity the model explanatory power is 7.9% which have overall greater impact of portfolio returns.

The impact of size and value-premium is positive and insignificant, while the additional variable residual illiquidity is negative and insignificant.

The fourth percentile 60% to 80% big towards small capitalization portfolios returns are not explain by the single factor model. The explanatory power have .2% and impact is insignificant. The Fama-French 3 factor model Adjusted R^2 is 8% where the impact of size-premium is positive and insignificant and the impact of value-premium is positive as well and significant. However the Adjusted R^2 of the next model including variable residual illiquidity and illiquidity risk is .1% and both are insignificant with negative effect of residual illiquidity and positive impact of illiquidity risk. Expanding the Farma and French model with illiquidity risk and residual illiquidity the model Adjusted R^2 is 9.2% which have overall better explanatory power of the 80% big towards small capitalization portfolio returns. The impact of size and value-premium is positive and insignificant, while the additional variable residual illiquidity is negative and insignificant. The impact of variable is consistent, same as the impact of variable on other models excluding negative impact of illiquidity risk.

The portfolio returns of the 20% companies having small capitalization are regressed as the result of CAPM shows the explanatory power of model is .3% and the impact is positive and insignificant. The explanatory power of the Farma & French 3 factor model is 38% which means 38% of the total variation in small capitalized portfolios can be explain by the Farma & French 3 factor model. The impact of size and value-premium is positive and significant. Separating the residual illiquidity as innovation term and illiquidity risk the result of the model is 6% variation in these variable with the portfolio return. Their impact on returns is significant but positive in illiquidity risk and negative in residual illiquidity. Pástor and Stambaugh (2003) and Amihud (2002) conclude the small stock are the most sensitive of illiquidity risk. For small market capitalization stock the illiquidity effect is stronger as the studies by the Ghysels and Pereira (2008) documented that the portfolio have a strong increase in liquidity while investing a shorter time in small stock. We conclude that same results the market illiquidity risk is great positive effects on excess stock return for small stock investment while

the negative effect of firm level liquidity innovation term on excess stock return in Pakistan stock market. Pástor and Stambaugh (2003) conclude same result for the US market. Extends CAPM with Farma & French with additional variables the explanatory power of the variable is 48% at 95% significance level. The impact of Farma & French 3 factor model is constant but the innovation term and illiquidity risk is slightly different. The impact of innovation term is negative and insignificant where the illiquidity risk is negative but significant

TABLE 4.6: Comparison of Adjusted R^2 and Significance level of all model (SIZE).

	CAPM		**FF3**		**Illiq**		**Five Factor**	
	Adj.R2	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**
MC1	0.014	0.065	0.268	0.000	0.346	0.000	0.385	0.000
MC2	0.007	0.138	0.039	0.024	0.185	0.000	0.266	0.000
MC3	0.007	0.143	0.04	0.021	0.015	0.109	0.079	0.002
MC4	0.002	0.408	0.085	0.001	0.001	0.407	0.092	0.001
MC5	0.003	0.454	0.384	0.000	0.06	0.002	0.483	0.000

Note:This table reports Comparison of Adjusted R^2 and Significance level based on market capitalization. The portfolios for market capitalization are sorted as descending order which MC1 represents the top 20% companies having big capitalization. The next 20% to 40% denote by the MC2 that shows big to small capitalized portfolio. Then respectively 60% and 80% companies denoted by MC3, MC4 and lastly the 20% companies, having small capitalization among 100 companies.

The above mention results of table 4.6 are the regress on the base of market capitalization where the Five factor model have significant results and explain return from all regressed model. While moving simplest to complex model the Adjusted R^2 is higher. The liquidity test to measure excess returns explaining mixed results for the portfolios and same at significance level. CAPM is insignificant for all excess return either it least or most illiquid portfolios return and CAPM unable to capture the effect on excess returns and poor explaining the returns. The study is supported the evidence about CAPM by Fama and French (1992) where the Fama and French three factor model is explain better model from CAPM and significant results from all portfolios. A relevant evidence in Pakistan market by Hassan and Javed (2011) are found that the Fama & French model estimating returns more than CAPM.

4.3.2 Regression Analysis of Value Base Portfolio

Empirical literature documented that the many of the stock characteristic that are effected the relation of the expected returns. Book to market ratio is one of the market characteristic that affects the excess return. In Table 4.7 the portfolio returns of the 20% companies having high book-to-market are regressed, as the result of CAPM shows the explanatory power of model is .8% and the impact of market-premium is positive and insignificant. The explanatory power of the Farma & French 3 factor model is 42% which means 42% of the total variation in high book to market portfolios can be explain by the Farma & French 3 factor model. The impact of size-premium is positively insignificant and value-premium is positive and significant. Separating the residual illiquidity as innovation term and illiquidity risk the result of the model is 1.1% variation in these variable with the portfolio return. Their impact on returns is insignificant but positive in illiquidity risk and negative in residual illiquidity. These statistics for book-market portfolio for the residual illiquidity or the innovation term co-efficient is greater from the absolute vale and significant for high book-to-market stock or the value stock. That indicate the liquidity factor are effected by the high book market or the value stock these evidence are supported by the previous studies by the Fama and French (1993). Extends Farma & French with additional variables the explanatory power of the model is 47% at 95% significance level. The impact of Farma & French 3 factor model is positive and significant but the innovation term and illiquidity risk is slightly different. The impact of innovation term is negative and insignificant where the illiquidity risk is negative but significant.

The Second percentile 20% to 40% high towards low book to market value portfolios returns only captured .4% total variation in single factor model and impact is positive and insignificant. The Farma & French 3 factor model Adjusted R^2 is 7% where the impact of size-premium is negative and insignificant and the impact of value-premium is positive as well and significant. However the Adjusted R^2 of the model including variable residual illiquidity and illiquidity risk is 3% and both are negative effect and residual illiquidity is significant. Expanding the Farma and French model with illiquidity risk and residual illiquidity, Adjusted R^2 is 13%

TABLE 4.7: Regression analysis of Book to market base Portfolio.

$R_{p,t} - r_{f,t} = \beta_0 + \beta_1 RP_t + \beta_2 SMB_{i,t} + \beta_3 HML_{i,t} + \beta_4 ResIlliq_{i,t} + \beta_5 Illiqrisk_t + \epsilon_{i,t}$									
	β_0	β_1	β_2	β_3	β_4	β_5	**Adj.R²**	**F stat**	**F Sig**
1st percentile 20% companies having high Book to Market portfolios									
BM1	0.017	0.128					0.008	0.126	0.126
t-value	2.663	1.536							
p-value	0.009	0.126							
BM1	0.007	0.075	0.042	0.860			0.428	42.589	0.000
t-value	1.416	1.171	0.516	8.949					
p-value	0.159	0.243	0.606	0.000					
BM1	0.019				-1.952	0.054	0.011	1.95	0.146
t-value	3.009				-1.794	0.713			
p-value	0.003				0.075	0.476			
BM1	0.009	0.080	0.442	0.728	-0.836	-0.372	0.474	31.148	0.000
t-value	1.987	1.297	3.376	7.433	-1.044	-3.873			
p-value	0.049	0.196	0.001	0.000	0.298	0.000			
2nd percentile 20% to 40% companies high toward low Book to Market portfolios									
BM2	0.012	0.103					0.004	1.743	0.189
t-value	2.076	1.320							
p-value	0.039	0.189							
BM2	0.008	0.073	-0.054	0.393			0.074	5.457	0.001
t-value	1.450	0.961	-0.569	3.446					
p-value	0.149	0.338	0.570	0.001					
BM2	0.015				-2.596	-0.088	0.035	3.985	0.020
t-value	2.650				-2.59	-1.279			
p-value	0.009				0.010	0.202			
BM2	0.011	0.078	0.281	0.271	-2.068	-0.322	0.133	6.139	0.000
t-value	1.891	1.054	1.791	2.315	-2.158	-2.797			
p-value	0.060	0.293	0.075	0.022	0.032	0.006			
3rd percentile 40% to 60% companies high toward low Book to Market portfolios									
BM3	0.007	0.059					0.002	0.669	0.414
t-value	1.218	0.818							
p-value	0.225	0.414							
BM3	0.005	0.026	-0.198	0.279			0.031	2.77	0.043
t-value	0.979	0.360	-2.199	2.608					
p-value	0.329	0.720	0.029	0.010					
BM3	0.011				-1.713	-0.27	0.108	11.156	0.000
t-value	2.112				-1.935	-4.420			
p-value	0.036				0.055	0.000			
BM3	0.009	0.032	0.387	0.086	-1.252	-0.544	0.176	8.143	0.000
t-value	1.765	0.493	2.755	0.816	-1.459	-5.276			
p-value	0.079	0.623	0.007	0.416	0.147	0.000			

4th percentile 60% to 80% companies high toward low Book to Market portfolios									
BM4	0.007	0.119					0.013	3.168	0.077
t-value	1.422	1.78							
p-value	0.157	0.077							
BM4	0.006	0.069	-0.334	0.387			0.117	8.356	0.000
t-value	1.223	1.073	-4.151	4.031					
p-value	0.223	0.285	0.000	0.000					
BM4	0.013				-1.262	-0.336	0.181	19.45	0.000
t-value	2.878				-1.585	-4.420			
p-value	0.005				0.115	0.000			
BM4	0.009	0.075	0.23	0.202	-0.848	-0.523	0.264	12.967	0.000
t-value	2.090	1.284	1.85	2.173	-1.113	-5.718			
p-value	0.038	0.201	0.066	0.031	0.268	0.000			
5th percentile 20% companies having low Book to Market portfolios									
BM5	0.006	0.063					0.000	0.989	0.321
t-value	1.196	0.995							
p-value	0.234	0.321							
BM5	0.007	0.075	0.042	-0.140			0.001	1.078	0.360
t-value	1.416	1.171	0.516	-1.456					
p-value	0.159	0.243	0.606	0.147					
BM5	0.008				-1.012	-0.13	0.027	3.274	0.04
t-value	1.789				-1.238	-4.420			
p-value	0.075				0.217	0.022			
BM5	0.009	0.080	0.442	-0.272	-0.836	-0.372	0.083	4.024	0.002
t-value	1.987	1.297	3.376	-2.784	-1.044	-3.873			
p-value	0.049	0.196	0.001	0.006	0.298	0.000			

Note:This table reports monthly return on book-to-market sorted portfolios where BM1 denote as 20% companies portfolio having high book to market value where BM2 denote as 40% high towards low book-to-market value respectively shows BM3 denotes 60%, 80% denoted as BM4 and lastly BM5 denote 20% portfolio of companies having lowest book-to-market value. Where dependent variable is the excess return which is the return of the portfolio minus the risk free rate at month. where the dependent variable include RP is the market premium calculated as value-weighted market returns in excess minus local market risk-free rates, SMB denote as 20% small market value portfolios minus the return on large market value portfolios where HML is which is the return on 20% high book to market value portfolios minus the return on 20% low book to market value portfolios. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio and Res illiq is calculated as auto regressive process of the illiquidity .

which have overall better explanatory power of the 40% high toward low book to market portfolio returns. The impact of size and value-premium is positive and significant, while the additional variable residual illiquidity is negative and significant.

From moving toward high book to market value to low book to market value portfolios return 40% to 60% are not fundamentally explain by the single factor model. The explanatory power have .2% and impact is insignificant. The Farma & French 3 factor model explanatory power is 3% where the impact of size-premium is negative and the impact of value-premium is positive and both are significant. Whereas the Adjusted R^2 of innovation term of illiquidity is 10% which mean 10% of the total variation of portfolio returns explain by the illiquidity risk and residual illiquidity. The effect of the both variable is negatively significant. While enhancing the Farma & French 3 factor model with illiquidity risk and residual illiquidity the model explanatory power is 17% which have overall greater impact of portfolio returns. The impact of size and value-premium is positive and insignificant, while the additional variable residual illiquidity is negative and insignificant. The impact of variable is consistent, same as the impact of variable on other models.

For the portfolio comprising 60% to 80% high to low book to market value portfolios return are explains .13% by the single factor model CAPM and they have positive and insignificant impact on the returns. Like Farma and French three factor value of the Adjusted R^2 is .11% of the total variation which show the explanatory power of the model. The impact of size-premium is negative where the value-premium is positive and both are significant at 95% interval. The Adjusted R^2 of residual illiquidity and the illiquidity risk is 18% which shows the total variation in model due to these two variable. While including the Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows these five factor model have 26% of the total variation high toward low book to market portfolios return. This impact is positive and significant in value-premium where the insignificant and positive in size-premium. The residual illiquidity is negative and insignificant impact on 60% to 80% high toward low book to market portfolio returns.

Studying the 20% portfolio having low book-to-market value returns are not explained by CAPM. The impact is positive but insignificant on returns. Whereas Farma & French 3 factor model is explaining .1% of the variation in portfolio returns where the impact of size-premium is positive and value-premium is negative but both insignificant. Innovation term and the illiquidity risk explain the 2% of the variation in low book market portfolio and their impact is negative and insignificant for illiquidity risk. For low book-t0-market we concluded same result for coefficient for liquidity risk are have effect on excess stock return in Pakistani market as well, the results are supported by the study of Fama and French (1993). As Addition of Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows 8% of the total variation of low book to market returns able to predict by these five variables. The impact of the illiquidity variables is consistent in the model and value-premium is negative, size-premium is positive on 95% significant level.

TABLE 4.8: Comparison of Adjusted R^2 and Significance level of all model (Book to market)

	CAPM		**FF3**		**Illiq**		**Five Factor**	
	Adj.R2	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**
BM1	0.008	0.126	0.428	0.000	0.011	0.146	0.474	0.000
BM2	0.004	0.189	0.074	0.001	0.035	0.02	0.133	0.000
BM3	0.002	0.414	0.031	0.043	0.108	0.000	0.176	0.000
BM4	0.013	0.077	0.117	0.000	0.181	0.000	0.264	0.000
BM5	0.000	0.321	0.001	0.360	0.027	0.040	0.083	0.002

Note:This table reports Comparison of Adjusted R^2 and Significance level of book to market sorted portfolios where BM1 denote as 20% companies portfolio having high book to market value where BM2 denote as 40% high towards low book to market value respectively shows BM3 denotes 60%, 80% denoted as BM4 and lastly BM5 denote 20% portfolio of companies having lowest book to market value.

The above mention results in table 4.8 are the regress on the base of book-to-market portfolios where the Five factor model have significant results and explain return from all regressed model. While moving simplest to complex model the Adjusted R^2 is higher. The liquidity test to measure excess returns explaining mixed results for the portfolios and same at significance level. CAPM is insignificant for all excess return either it high or low book-to-market portfolios return

and CAPM unable to capture the effect on excess returns and poor explaining the returns. The study is supported the evidence about CAPM by Fama and French (1992) where the Fama and French three factor model is explain better model from CAPM and significant results from all portfolios. A relevant evidence in Pakistan market by Hassan and Javed (2011) are found that the Fama and French model estimating returns more than CAPM.

4.3.3 Regression Analysis of Illiquidity Base Portfolio

Evidence from the literature conclude that many of the stock characteristic that are effected the relation of the expected returns. Illiquidity is one of the market characteristic that effects the excess return. In Table 4.7 the the portfolio comprising 20% most illiquid portfolios return are explains .0% by the single factor model CAPM and they have positive and insignificant impact on the returns. In Farma & French 3 factor model, value of the Adjusted R^2 is 27% of the total variation which show the explanatory power of the model. The impact of size-premium and value-premium is positive and both are significant at 95% interval. The Adjusted R^2 of residual illiquidity and the illiquidity risk is 15% which shows the total variation in model due to these two variable. Impact of residual illiquidity is negative and illiquidity risk is positive but both significant. The greater co-efficient for the residual illiquidity and significant of the variable for more illiquid stock explains the illiquidity factor have stronger effect on the most illiquid stock. These results are supported by the literature Asness et al. (2013) and Easley et al. (2010) examines the same outcome. While including the Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows these five factor model have 27% of the total variation in most illiquid stock return. The impact of the Farma and French is consistent in all portfolios returns having most illiquid portfolios return.

TABLE 4.9: Regression analysis of illiquidity base Portfolio.

$R_{p,t} - r_{f,t} = \beta_0 + \beta_1 RP_t + \beta_2 SMB_{i,t} + \beta_3 HML_{i,t} + \beta_4 ResIlliq_{i,t} + \beta_5 Illiqrisk_t + \epsilon_{i,t}$									
	β_0	β_1	β_2	β_3	β_4	β_5	**Adj.R²**	**F stat**	**F Sig**
1st percentile 20% most illiquid portfolios									
ill1	0.015	0.073					0.000	1.083	0.300
t-value	2.892	1.041							
p-value	0.004	0.300							
ill1	0.009	0.083	0.359	0.254			0.274	22.024	0.000
t-value	2.018	1.374	4.710	2.796					
p-value	0.045	0.171	0.000	0.006					
ill1	0.013				-1.716	0.305	0.157	16.554	0.000
t-value	2.808				-2.037	5.245			
p-value	0.006				0.043	0.000			
ill1	0.009	0.083	0.248	0.279	-1.212	0.092	0.279	13.942	0.000
t-value	1.913	1.369	1.933	2.906	-1.542	0.975			
p-value	0.058	0.173	0.055	0.004	0.125	0.331			
2nd percentile 20% to 40% most toward least illiquid portfolios									
ill2	0.011	0.055					0.002	0.586	0.445
t-value	2.025	0.766							
p-value	0.044	0.445							
ill2	0.006	0.048	0.182	0.320			0.151	10.92	0.000
t-value	1.151	0.713	2.144	3.166					
p-value	0.252	0.477	0.033	0.002					
ill2	0.012				-1.147	0.059	0.003	1.225	0.296
t-value	2.143				-1.215	0.910			
p-value	0.034				0.226	0.364			
ill2	0.008	0.052	0.567	0.196	-0.406	-0.355	0.202	9.473	0.000
t-value	1.635	0.801	4.069	1.878	-0.476	-3.471			
p-value	0.104	0.424	0.000	0.062	0.634	0.001			
3rd percentile 40% to 60% most toward least illiquid portfolios									
ill3	0.009	0.092					0.005	1.775	0.185
t-value	1.675	1.332							
p-value	0.096	0.185							
ill3	0.006	0.077	0.007	0.248			0.043	3.492	0.017
t-value	1.144	1.113	0.077	2.399					
p-value	0.254	0.267	0.939	0.018					
ill3	0.012				-2.366	-0.095	0.040	4.464	0.013
t-value	2.277				-2.651	-1.539			
p-value	0.024				0.009	0.126			
ill3	0.009	0.082	0.417	0.105	-1.859	-0.389	0.138	6.365	0.000
t-value	1.731	1.252	2.990	1.003	-2.18	-3.799			
p-value	0.085	0.212	0.003	0.318	0.031	0.000			

4th percentile 60% to 80% most toward least illiquid portfolios								
ill4	0.010	0.085				0.001	1.144	0.286
t-value	1.733	1.070						
p-value	0.157	0.286						
ill4	0.009	0.038	-0.317	0.359		0.062	4.675	0.004
t-value	1.574	0.486	-3.232	3.073				
p-value	0.117	0.628	0.001	0.002				
ill4	0.016			-1.59	-0.345	0.138	14.374	0.000
t-value	2.870			-1.649	-5.193			
p-value	0.005			0.101	0.000			
ill4	0.013	0.045	0.301	0.155	-1.149	-0.573	0.190	8.828	0.000
t-value	2.359	0.620	1.950	1.347	-1.219	-5.063			
p-value	0.020	0.536	0.053	0.180	0.225	0.000			
5th percentile 20% least illiquid portfolios								
ill5	0.003	0.165				0.015	3.615	0.059
t-value	0.439	1.901						
p-value	0.661	0.059						
ill5	0.003	0.072	-0.734	0.599		0.273	21.857	0.000
t-value	0.512	0.945	-7.698	5.267				
p-value	0.609	0.346	0.000	0.000				
ill4	0.013			-1.716	-0.695	0.461	72.41	0.000
t-value	2.808			-2.037	-11.963			
p-value	0.006			0.043	0.000			
ill5	0.009	0.083	0.248	0.279	-1.212	-0.908	0.539	40.074	0.000
t-value	1.913	1.369	1.933	2.906	-1.542	-9.618			
p-value	0.058	0.173	0.055	0.004	0.125	0.000			

Note:This table reports monthly return on book to market sorted portfolios. ill1 denote as 20% most illiquid portfolios where ill5 denote 20% least illiquid portfolio of companies. Ill2 denote as 40% most towards least illiquid portfolios that respectively shows ill3 denotes 60% and ill4 denote as 80% least towards most illiquid portfolios. Where dependent variable is the excess return which is the return of the portfolio minus the risk-free rate at month. where the dependent variable include RP is the market premium calculated as value-weighted market returns in excess minus local market risk-free rates, SMB denote as 20% small market value portfolios minus the return on large market value portfolios where HML is which is the return on 20% high book-to-market value portfolios minus the return on 20% low book-to-market value portfolios. Illiq risk is calculated as 20% most illiquid portfolio minus 20% least illiquid portfolio and Res illiq is calculated as auto regressive process of the illiquidity .

The residual illiquidity is negative and insignificant impact on 20% most illiquid returns while impact is positive and insignificant of illiquidity risk.

From moving toward most illiquid portfolios to least illiquid portfolio the return 20% to 40% are .2% explain by single factor model with the impact is positive

and insignificant. The Farma and French explanatory power is 15% where the impact of size-premium and value-premium is positive and significant. Whereas the Adjusted R^2 of innovation term of illiquidity is .3% which mean .3% of the total variation of portfolio returns explain by the illiquidity risk and residual illiquidity. The effect of the illiquidity risk is positive and residual illiquidity is negative but both insignificant. While enhancing the Farma & French 3 factor model with illiquidity risk and residual illiquidity the model explanatory power is 20% which have overall greater impact of portfolio returns. The impact of size and value-premium is positive and significant, while the illiquidity risk is negative and significant.

Studying the Middle 20 % portfolio having 40% to 60% most toward least illiquid return are .05% of the variation are explain by the CAPM. The impact is positive but insignificant on returns. Whereas Farma and French model is explaining 4% of the variation in most toward least illiquid where the impact of size-premium is positive and insignificant where value-premium is positive and significant. Innovation term and the illiquidity risk explain the 4% of the variation in portfolio returns and their impact is negative but illiquidity risk is insignificant. Addition of Innovation term and the illiquidity risk in Farma & French 3 factor model the explanatory power better among all models. Which shows 13% of the total variation of 3rd percentile illiquid portfolio returns able to predict by these five variables. The impact Farma and French is positive and value-premium is insignificant where the impact of illiquidity risk and residual illiquidity is negative and significant.

The portfolio returns of the 60% to 80% most toward least illiquid are regressed as the result of CAPM shows the explanatory power of model is .1% and the impact is positive and insignificant. The explanatory power of the Farma & French 3 factor model is 6% which means 6% of the total variation in portfolios return can be explain by the Farma & French 3 factor model. The impact of size-premium is positive and value-premium is negative and significant. Separating the residual illiquidity as innovation term and illiquidity risk the result of the model is 13% variation in these variable with the portfolio return. Their impact on returns is significant and negative in illiquidity risk and negatively insignificant in residual illiquidity. Extends Farma and French with additional variables the explanatory

power of the model is 19% at 95% significance level. The impact of innovation term and illiquidity risk is constant but the Farma & French 3 factor model is slightly different. The impact of positive but value-premium is insignificant where the size-premium is positive but significant.

The last percentile 20% least illiquid portfolios returns are explain by the single factor model which explanatory power have .2% and impact is insignificant. The Farma & French 3 factor model Adjusted R^2 is 27% where the impact of size-premium is negative and significant and the impact of value-premium is positive and significant. However the Adjusted R^2 of the next model including variable residual illiquidity and illiquidity risk is .46% and both are significant with negative effect of residual illiquidity and illiquidity risk. Here is a same pattern from the residual illiquidity level to illiquidity risk. Liquidity risk have stronger effect on excess stock return for liquid stocks. Same results are conclude by theAsness et al. (2013) and Easley et al. (2010). Expanding the Farma and French model with illiquidity risk and residual illiquidity the model Adjusted R^2 is 53% which have overall better explanatory power of the 20% least illiquid portfolios return. The impact of size and value-premium is positive and significant, while the additional variable residual illiquidity is negative and insignificant where the illiquidity impact is negative and significant.

TABLE 4.10: Comparison of Adjusted R^2 and Significance level of all model (illiquidity).

	CAPM		**FF3**		**Illiq**		**Five Factor**	
	Adj.R2	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**	**Adj.R2**	**F Sig**
ill1	0.000	0.300	0.274	0.000	0.157	0.000	0.279	0
ill2	0.002	0.445	0.151	0.000	0.003	0.296	0.202	0.000
ill3	0.005	0.185	0.043	0.017	0.040	0.013	0.138	0.000
ill4	0.001	0.286	0.062	0.004	0.138	0.000	0.190	0.000
ill5	0.015	0.059	0.273	0.000	0.461	0.000	0.539	0.000

Note:This table reports Comparison of Adjusted R^2 and Significance level based on illiquidity sorted portfolio. ill1 denote as 20% most illiquid portfolios where ill5 denote 20% least illiquid portfolio of companies. Ill2 denote as 40% most towards least illiquid portfolios that respectively shows ill3 denotes 60% and ill4 denote as 80% least towards most illiquid portfolios .

The bellow mention results are the regress on the base of illiquidity portfolios where the Five factor model have significant results and explain return from all regressed model. While moving simplest to complex model the Adjusted R^2 is higher. The liquidity test to measure excess returns explaining mixed results for the portfolios and same at significance level. CAPM is insignificant for all excess return either it least or most illiquid portfolios return and CAPM unable to capture the effect on excess returns and poor explaining the returns. The study is supported the evidence about CAPM by Fama and French (1992) where the Fama and French three factor model is explain better model from CAPM and significant results from all portfolios. A relevant evidence in Pakistan market by Hassan and Javed (2011) are found that the Fama and French model estimating returns more than CAPM.

Chapter 5

Conclusion

This currect study examines relationship between the illiquidity and excess return in Pakistan. In literature, liquidity has the same importance as the other stocks characteristics or traditional fundamental factor like size, book to market and market return. Illiquidity examined in empirical literature widely since illiquidity is consider as a risk factor. Investor not compensate on expected return as investor required higher liquidity premium on investing in least liquid stocks. As literature evidence in developed countries the liquidity determine the market quality and the co-moments of the assets pricing. It seems in literature the results are different on base of different characteristic in different market. Lesmond (2005), Bekaert et al. (2007), Amihud (2002) and Acharya and Pedersen (2005) are studies in developed market, Very few of the studies are examined in the emerging and developing countries for illiquidity impact on assets pricing. This present is entirely focused on Pakistani stock market which is nearly inflectional market and consider as emerging market is stock market. Campaigning the issue, this study are conducted the impact of illiquidity on excess return of Pakistani Stock market based on CAPM , Fama & French 3 factor model with the portfolio approach. We used the daily and monthly closing stock prices of 100 non-financial companies listed in (PSX) Pakistan stock Exchange for sample period is 14 years stock prices data from June 2002 to June 2016. A portfolio approach on quantile basis has been used to construction of variables where an appropriate measured of illiquidity measure by Amihud (2002) used. The dependent variable is used the portfolios

returns and independent variable include the Fama & French 3 factor model the illiquidity risk and innovation term on the firm level liquidity are used that derived from the Amihud illiquidity by Chiang and Zheng (2015).

The descriptive results of the portfolio are supported by the theory and consistent with the literature. The small stock portfolios are the outperformed from the big stock portfolios where the value stock having high book to market value are out performed from the growth stock and for illiquidity sorted portfolios evidence supported as investment is long term horizon in illiquid stock are less risky from the investment in liquid stock and the relation is exist for investor requires a higher return on the least liquid stock. Both the correlation and VIF test are examines to identify the correlation between the independent variable. After the measure we estimate coefficient of the regression can be significantly estimated due to no multicollinearity in model.

The effects of the illiquidity are vary on different market condition or the characteristics of stock. The regression results explains the effects of different market factor that effecting the excess return where we conclude the one factor model CAPM is insignificantly effects to explains the excess returns in all the portfolios. CAPM consider the poor performance model to estimate the stock return in the study and results are supported by the literature. The Fama & French 3 factor model is explaining the excess return and significant for all the portfolio where the Adjusted R2 is higher from the CAPM. Literature after nineties are supporting the Fama and French (1992) factor size and value stock are explaining the excess returns from CAPM. Acharya and Pedersen (2005), Dempsey (2010) Iqbal and Brooks (2007) , Bartholdy and Peare (2005) had same results are concluded. The innovation term and illiquidity risk have mixed results as vary on different characteristics of the stock. The liquidity risk on market level have strong effect on the excess return for big stocks and the liquidity Innovation effect is less profound in large firm stocks where a strong increase have in liquidity while investing a shorter time in small stock. The market illiquidity risk is great positive effects on excess stock return for small stock while the negative effect of firm level liquidity innovation term on excess stock return in Pakistan stock market. Results finding

are supported byPástor and Stambaugh (2003), Amihud (2002) and Ghysels and Pereira (2008). These statistics for book-market portfolio for the residual illiquidity or the innovation term co-efficient is greater from the absolute vale and nearly significant for value stock. That indicate the liquidity factor are effected by the high book market or the value stock these evidence are supported by the previous studies by the Fama and French (1993). While in liquidity sorted portfolio the co-efficient for the residual illiquidity and liquidity risk is significant for more illiquid stock and liquid stock as well which explains the illiquidity factor have stronger effect on the most illiquid and liquid stock. These results are supported by the literature Asness et al. (2013) and Easley et al. (2010) examines the same outcome. Where the model explanation have different patron in portfolios but better expatiation in illiquid and liquid stocks at significant level. These results suggest the consistent sign in the behavior of market that illiquidity risk lead investor to demand the greater risk premium. Where the comparison of all model the five factor model where the Five factor model have significant results and explain returns from all regressed model.

Recommendation

At investment prospective investor can change the investment plan on basis of liquidity, size and value. The study will assist them the actual position of the investor at organization level and individual investor. For the risk averse investor illiquid stock are preferable for long term investment as high return can earned with minimum risk. While the investment in short term horizon investor can invest the valued portfolio to earn high return. Hence the study is valuable informational resource for investment purpose.

Research Direction and Limitation

Empirical research can be carried out in furthers increase the sample size for long period of time.

As the study focused on the emerging market like Pakistan. The same parameter

would be used in different emerging countries.

This study include the one proxy Amihud illiquidity measure is used, further many other proxies like turnover, trading volume can be predicted in their comparison.

The market anomalies like momentum anomalies and volatility can be added in the model on same data.

The study conclude only non financial companies stock prices, same pattern for financial companies stock can also be studied.

The current study is limited data from the period 2002 as long term data more than last two decades are not available electronically.

The daily stock prices are used to measure illiquidity variable as for the smooth movement of returns.

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Appendix

TABLE 5.1: List of Companies:

S. No.	**Company Names**	Symbol
1	Pakistan National Shipping Corporation	PNSC
2	Pakistan Oilfields Ltd.	POL
3	Pakistan Paper Prouducts Ltd.	PPP
4	Premium Textile Mills Ltd.	PRET
5	Pakistan Refinery Ltd.	PRL
6	Prosperity Weaving Mills Limited	PRWM
7	Pakistan Services Ltd	PSEL
8	Pak Suzuki Motor Co. Ltd.	PSMC
9	Pakistan State Oil Co. Ltd.	PSO
10	Pakistan Telecommunication	PTC
11	Reliance Cotton Spinning Mills Ltd.	RCML
12	Rafhan Maize Products Ltd.	RMPL
13	Sapphire Fibers Ltd.	SFL
14	Shell Pakistan Limited	SHEL
15	Shezan International Ltd.	SHEZ
16	Shahmurad Sugar Mills Ltd.	SHSML
17	Siemens Pakistan Engineering Co. Ltd.	SIEM
18	Sitara Chemical Industries Ltd.	SITC
19	Sana Industries Ltd.	SNI
20	Sui Southern Gas Co. Ltd	SSGC
21	Shabbir Tiles and Ceramics Ltd.	STCL
22	Tariq Glass Limited	TGL
23	Thal Limited.	THALL
24	Treet Corporation Ltd.	TREET
25	Tri-Pack Films Limited	TRIPF
26	Tandlianwala Sugar Mills Limited	TSML
27	AL- Abbas Sugar Mills Limited.	AABS
28	Abbot Laboatories (Pakistan) Ltd.	ABOT
29	Adam Sugar Mills Ltd.	ADAMS
30	Artistic Denim Mills Limited	ADMM
31	Agriauto Industries Limited	AGIL
32	AL-Ghazi Tractors Ltd.	AGTL
33	Al-Noor Sugar Mills Ltd.	ALNRS
34	Apollo Textile Mills Ltd.	APOT
35	Atlas Battery Limited	ATBA

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36	Atlas Honda Limited	ATLH
37	Attock Refinery Ltd.	ATRL
38	Bata Pakistan Ltd.	BATA
39	Biafo Industries Limited	BIFO
40	Bannu Woollen Mills Limited	BNWN
41	Burshane LPG (Pakistan) Limited	BPL
42	Buxly Paints Ltd.	BUXL
43	Bestway Cement Limited	BWCL
44	Chashma Sugar Mills Limited.	CHAS
45	Cherat Cement Company Limited	CHCC
46	Clover Pakistan Limited.	CLOV
47	Colgate Palmolive (Pakistan) Ltd.	COLG
48	Crescent Steel & Allied	CSAP
49	Din Textile Mills Limited	DINT
50	Ellcot Spinning Mills Ltd.	ELSM
51	Engro Corporation Ltd.	ENGRO
52	Faran Sugar Mills Ltd.	FRSM
53	Fazal Cloth Mills Ltd.	FZCM
54	Gadoon Textile Mills Ltd.	GADT
55	Gul Ahmed Textile Mills Limited	GATM
56	Ghani Glass Mills Limited	GHGL
57	Ghandhara Nissan Limited	GHNL
58	Gillette Pakistan Limited	GLPL
59	The General Tyre & Rubber Company of Pakistan Limited	GTYR
60	Gharibwal Cement Limited	GWLC
61	Habib Sugar Mills Ltd.	HABSM
62	Highnoon Laboratories Limited	HINNON
63	Hub Power Company Limited	HUBC
64	I.C.I Pakistan Ltd.	ICI
65	Indus Dyeing Manufacturing Co. Ltd.	IDYM
66	International Industries Ltd.	INIL
67	Ismail Industries Ltd.	ISIL
68	Janana-de-Malucho Textile Mills Ltd.	JDMT
69	JDW Sugar Mills Limited	JDWS
70	Khyber Tobacco Co. Ltd.	KHTC

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71	Kohat Cement Limited	KOHC
72	Kohinoor Energy Limited	KOHE
73	Kohinoor Spinning Mills Ltd.	KOSM
74	Kohinoor Textile Mills Ltd.	KTML
75	Leather Up Industries Ltd.	LEUL
76	Lucky Cement Limited	LUCK
77	Mari Petroleum Company Limited	MARI
78	Merit Packaging Limited	MARIT
79	Mitchell's Fruit Farms Limited	MFFL
80	Mirpurkhas Sugar Mills Ltd.	MIRKS
81	Maple Leaf Cement Factory Limited	MLCF
82	Mehran Sugar Mills Limited	MRNS
83	Masood Textile Mills Limited	MSOT
84	Millat Tractors Limited	MTL
85	Murree Brewery Company Ltd	MUREB
86	Nagina Cotton Mills Ltd.	NAGC
87	Nestle Pakistan Ltd.	NESTLE
88	Nimir Industrial Chemicals Limited	NICL
89	Nishat Mills Limited	NML
90	Noon Sugar Mills Ltd.	NONS
91	National Refinery Limited	NRL
92	Otsuka Pakistan Limited.	OTSU
93	Pak Elektron Ltd.	PAEL
94	Pak Datacom Limited	PAKD
95	Pakistan Tobacco Co. Ltd.	PAKT
96	Pakistan Gum and Chemiclas Ltd.	PGCL
97	Pakistan International Airlines Corp.	PIAA
98	Pioneer Cement Limited	PIOC
99	Packages Limited	PKGS
100	Philip Morris (Pakistan) Ltd. (Formerly Lakson Tobacco)	PMPK