Is Liquidity Risk Priced in Indian Stock Market?

Vanita Tripathi*
Anshi Goel**

Abstract

The study attempts to investigate the pricing of liquidity risk in Indian stock market for the sample of S&P BSE 500 stocks over the period from 1st April 2000 to 31st March 2017, by employing different liquidity measures including – Trading volume, Turnover rate, Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio. The results suggest that liquidity play a significant role in explaining returns for BSE stocks; irrespective of liquidity measure used. It is an important and independent factor to explain equity returns in asset pricing models after controlling for additional risk factors like market, size, value, momentum, profitability, and investments. It provides statistically significant and positive relationship between illiquidity and expected stock returns. Among the various asset-pricing models employed, Liquidity-augmented Fama-French three-factor model turned out to be best in explaining cross section variation in liquidity-sorted portfolio returns of BSE stocks. It is evident that strong liquidity premium exist at Bombay stock exchange, where illiquid stocks outperform liquid stocks, which has strong implications for mutual funds managers, investment analysts as well as small investors who are continuously on lookout for trading strategies that beat the market.

INTRODUCTION

The efficient market hypothesis by Fama (1970) has been challenged in the past few decades by the researchers around the world by detecting cross sectional and time series patterns in stock returns known as financial market anomalies. Financial market anomalies popularly referred a capital asset pricing (CAPM) anomalies, often-cited as criticisms of EMH are: value effect (Stattman, 1980), size effect (Banz, 1981), momentum effect (Jegadeesh & Titman, 1993), and January effect (French, 1980; Keim, 1983; Reinganum, 1983) to name a few. The primary assumption of the efficient market hypothesis (EMH) is the perfect frictionless market, where investors are rational, there are no transactions costs, information is symmetric, investors have homogenous expectations, and therefore markets are efficient. However, as far as financial markets are concerned, this frictionless representation is theoretical abstraction nowhere close to reality. In reality, the financial market is more complex as traders do not arrive simultaneously and information is asymmetric; there are various frictions in the market that affect the price formation process. Stoll (1978) and Amihud & Mendelson (1980) argued that liquidity providers must be compensated for inventory risk and providing immediacy in the market. These frictions generate divergence of stock prices from its true fundamental value. It seems impossible to have frictionless efficient market and in the field of market microstructure, prices are affected by various market frictions and exploring the role of frictions in the price formation process is extremely significant.

Keywords:

Knowledge Sharing, Personality, Emotional Intelligence, Mediation

**Professor, Department of Commerce, Delhi School of Economics, University of Delhi*
E-mail: vanitatripathi1@yahoo.co.in, Mob.: +91 9213269951
***Ph.D. Research Scholar, Department of Commerce, Delhi School of Economics, University of Delhi*
E-mail: anshigoel48@gmail.com, Mob.: +91 9953699983

Liquidity, in general explained as the ability to trade large quantities quickly at low cost with little price impact. This accounts four dimensions to liquidity, that is, trading quantity, trading speed, trading cost, and price impact. "*Investors prefer to commit capital to liquid investments, which can be traded quickly and at low cost whenever the need arises. Investments with less liquidity must offer higher expected returns to attract investors. In equilibrium, the expected returns on capital assets are increasing functions of both risk and illiquidity*" Amihud and Mendelson (1991, p.56). Amihud, Mendelson and Pedersen (2005) identified five factors as a source of stock illiquidity: exogenous transaction costs, inventory risk, demand pressure, search frictions and asymmetric information. These aspects of market make it costly for participants to carry out transactions, which in turn influence the asset prices. Alternatively, these illiquidity sources vary over time so investors face liquidity risk for holding assets. Therefore, investors demand compensation for the extra risk associated to illiquidity in the form of a higher expected return. The hypothesis on the relationship between stock return and stock liquidity was first proposed by Amihud and Mendelson (1986), originate that the stock return is an increasing and concave function of the spread; hence investors require compensation for the cost of illiquidity. Following Amihud and Mendelson (1986), many studies have explored this positive illiquidity–return association using different liquidity proxies. Amihud and Mendelson (1989); Amihud and Mendelson (1991); Brennan and Subrahmanyam (1996); Brennan et al. (1998); Chalmers and Kadlec (1998); Nguyen, Mishra and Ghosh (2007); Chordia et al. (2001, 2009); Datar et al. (1998), Amihud (2002); Pastor and Stambaugh (2003); Acharya and Pedersen (2005); and Liu (2006) all elaborate upon the role of liquidity as a determinant of expected stock returns. For emerging markets, Jun, Marathe and Shawky (2003) examine 27 emerging equity markets; Bekaert et al. (2007) study 18 emerging stock markets; Amihud, Hameed, Kang and Zhang (2015) in 45 countries; Chiang and Zheng (2015) in G7 countries; Chan and Faff (2005) and Limkriangkrai et al. (2008) in Australian stock markets; and Wang and Cheng (2004) and Wang and Kong (2011) in Chinese stock markets, all found a positive return-illiquidity relation in emerging markets supporting Amihud and Mendelson' (1986) argument. In contrast, Constantinides (1986); Heaton and Lucas (1996); and Vayanos (1998) presented model implying that liquidity, indeed have an effect on stock returns, but a second order effect which is somewhat weak in magnitude. Most of the studies have been conducted on the U.S. equity market with very few for the emerging markets, but no work has been done particularly investigating liquidity premium in Indian Stock market.

With the liberalisation and automation of Indian stock market, there have been appreciable changes in Indian equity market in last two decades. Indian capital market has adopted the best possible trading practices like rolling settlement, electronic trading, dematerialisation of shares, innovative financial products, introduction of derivatives, advancement in technology etc. over the years has enhanced liquidity and transparency. The core objective of this study is to examine the pricing of liquidity risk in Indian stock market by employing alternative liquidity measures including Trading volume, Turnover rate, Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio.

The rest of the paper is organised as follows: next section presents the data and methodology used, followed by empirical results and findings of the study and finally the conclusions and implications are discussed.

RESEARCH METHODOLOGY

Data: The sample for the rationale of the study consists of S&P BSE 500 stocks of the Bombay Stock Exchange; which fairly represents the market as it has a broad spectrum of stocks belonging to 20 major industries of the economy and accounts more 90% of the total market capitalisation of the BSE. The sample period ranges from 1st April 2000 to 31st March 2017, not including data prior to 2000 mainly due to the major changes in the market structure of Indian stock market during that period. The data for the analysis have been mainly collected from the CMIE Prowess, Bloomberg, and Thomson Reuters databases and web sources like www.rbi.org.in, and www.bseindia.com, that are widely used and renowned for providing accurate and complete historical data. Two frequencies of data are used, daily data for the estimation of stock liquidity and monthly data for the analysis of asset pricing models.

Monthly closing adjusted share prices (adjusted for stock dividends, rights issues and stock splits) of sample stocks, have been used to calculate the monthly stock returns that are employed for further estimations. Monthly closing index values (S&P BSE 500) have used to calculate monthly return on market portfolio. The cut-off implicit yield on 91 days Treasury Bills from the Reserve Bank of India (RBI) monthly handbook of statistics published at RBI website, have been used as a proxy for risk free return.

The daily data for the sample of BSE stocks have been used to compute different liquidity proxies that includes bid price, ask price, mid price, closing price, volume weighted average price, trading volume, turnover, and no. of outstanding shares. For the estimation of factors in asset pricing models, the study also uses various accounting and financial information regarding the sample companies such as market capitalisation, price-to-book value ratio, operating profit before provisions and contingencies, book equity, and total assets. It is important to specify that the entire data set was not available for all sample companies throughout the sample period of 17 years, therefore effective number of companies used in the analysis ranges from 265 to 490 for both the stock exchanges.

Methodology: In order to investigate the liquidity premium in the Indian equity market, the present study comprehensively employs five liquidity measures for the formation of portfolios. Many measures of liquidity have been proposed, no one measure has been put forth as being superior to other. The operational definitions of these liquidity measures are presented below.

Operational Definition of Alternative Liquidity Measures

S. No.	Liquidity Measure	Operational Definition	Dimensions
1.	Trading Volume	Brennan and Subrahmanyam (1995): Dollar Trading Volume = No. of Shares Traded * Average Price	Trading Quantity, Depth
2.	Turnover Rate	Datar et al. (1998): The ratio of trading volume to the number of shares outstanding	Trading Speed, Immediacy
3.	Relative (Quoted) Spread	Amihud and Mendelson (1986): It is the ask price minus the bid price divided by the average of the bid-ask prices	Transaction cost, Width
4.	Effective Spread	Lee (1993): It is twice the absolute value of the transaction price minus the midpoint of the bid-ask prices	Transaction cost, Width
5.	Amihud Illiquidity Ratio	Amihud (2002): The daily ratio of absolute stock return to its dollar volume, averaged over some period	Price Impact, Resiliency

If liquidity does indeed plays a significant role as expected, then the inclusion of it in the creation of different investment strategies based on factors like size, value, momentum, profitability, and investment should fully explain and capture the effects of abnormal excess risk-adjusted returns.

Construction of Liquidity Portfolios (Dependent Variable): Decile portfolios are created for all the liquidity proxies for each year throughout the sample period for BSE stocks. First, decile portfolios are created based on trading volume as a proxy for liquidity for each year all through the sample period. In June of year (t), securities are sorted (in descending order) according to the average trading volume in the previous year. Subsequently, the sorted stocks are divided into ten portfolios, i.e. P1–P10 and equally weighted monthly returns are estimated for these portfolios for the next twelve-month (July of year t to June of year t+1), and then the excess portfolio return is calculated by subtracting the risk-free rate from the monthly portfolio returns. P1 is the liquid portfolio, which contains 10% of the most liquid stocks while P10 is the illiquid portfolio consisting of 10% of the least liquid stocks, as measured by trading volume. In order to evaluate the economic feasibility of liquidity based investment strategy i.e. buying illiquid stocks (P10) and short selling liquid stocks (P1), a portfolio (P10-P1) consisting of long position in P10 and a short position in P1 is also constructed. Portfolios are rebalanced in June of each year and this continues until the last year of our sample period. This strategy is known as 12/12 strategy i.e. 12 months formation period and 12 months holding period of portfolios. For the inclusion in a portfolio, the stock must have been traded during the year. To check the robustness of results, four more proxies for liquidity viz. Turnover rate, Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio are used. The sample stocks are sorted into ten decile portfolios for each liquidity proxy, in a similar manner as for the trading volume. However, for the formation of liquidity portfolios for Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio, stocks are sorted in ascending order, as they are the measures of illiquidity.

Regression Models: The well-documented models considered in this study are the Standard CAPM model of Sharpe (1964) & Lintner (1965), Fama-French three-factor model (1993), Carhart's four-factor model (1997) and Fama & French five-factor model (2015) to explain cross-sectional variations in equity portfolio returns in the Indian stock market. Further, to analyse the effect of liquidity factor on asset pricing, these models are extended further by augmenting the liquidity (IMV) factor in the Standard CAPM model, Fama & French three-factor model, Carhart's four-factor model and Fama & French five-factor model. Our main motivation for conducting this test is to examine the effect of market frictions – Illiquidity on the expected stock returns of BSE. Ordinary least squares (OLS) time-series regressions are

estimated for each of the liquidity-sorted decile portfolios of BSE on the following factor models:

Model 1: Standard CAPM

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \varepsilon_t$$

Model 2: Fama & French Three-Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \varepsilon_t$$

Model 3: Carhart's Four-Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \beta_{WML}(WML_t) + \varepsilon_t$$

Model 4: Fama & French Five-Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \beta_{RMW}(RMW_t) + \beta_{CMA}(CMA_t) + \varepsilon_t$$

Model 5: Liquidity Augmented Standard CAPM

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{IMV}(IMV_t) + \varepsilon_t$$

Model 6: Liquidity Augmented Fama & French Three Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \beta_{IMV}(IMV_t) + \varepsilon_t$$

Model 7: Liquidity Augmented Carhart's Four Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \beta_{WML}(WML_t) + \beta_{IMV}(IMV_t) + \varepsilon_t$$

Model 8: Liquidity Augmented Fama & French Five Factor Model

$$R_{P_t} - R_{f_t} = \propto + \beta_M (R_{M_t} - R_{f_t}) + \beta_{SMB}(SMB_t) + \beta_{LMH}(LMH_t) + \beta_{RMW}(RMW_t) + \beta_{CMA}(CMA_t) + \beta_{IMV}(IMV_t) + \varepsilon_t$$

where, $R_{P_t} - R_{f_t}$ is portfolio excess return; is the intercept; $R_{M_t} - R_{f_t}$ is market excess return; SMB_t is the size factor; LMH_t is the value factor; WML_t is the momentum factor; RMW_t is the profitability factor; CMA_t is the investment factor; IMV_t is the liquidity factor; ε_t is a residual (random error) term; and the factor sensitivities or loadings, β_M, β_{SMB}, β_{LMH}, β_{WML}, β_{RMW}, β_{CMA}, and β_{IMV} are the slope coefficients in the time series regression for market, size, value, momentum, profitability, investment and liquidity risk factors respectively.

Our null hypothesis is that if liquidity is not priced in Indian stock market at BSE, the above factor models should capture all the variations in the liquidity-sorted portfolio returns and intercepts □ = 0 for all the portfolios. A positive and significant alpha value implies the availability of abnormal portfolio returns. The alternate hypothesis is that if liquidity is priced, the intercepts □ > 0 for illiquid stocks portfolio or jointly different from zero. Similarly, other null hypothesis is that if information is not priced at BSE, the above factor models should capture all the variations in the information-sorted portfolio returns and intercepts □ = 0 for all the portfolios. A positive and significant alpha value implies the availability of abnormal portfolio returns. The alternate hypothesis is that if information is priced, the intercepts □ > 0 for high information asymmetry stocks portfolio or jointly different from zero. The hypothesis is tested at 1%, 5%, and 10% level of significance. Statistically significant values of slope coefficient of various factors would indicate that those factors are important in explaining cross sectional variations in portfolio returns otherwise not. Also, whether independent variable(s) in a particular model significantly explain cross sectional variations in equity portfolio returns or not can be detected by looking at its adjusted value. The higher the value of adjusted the greater is the explanatory power of the independent variable(s) included in the model. If liquidity is priced, the intercepts will be equal to zero in the models controlling for liquidity factor and liquidity beta should be significantly positive for illiquid stocks portfolios indicating the presence of liquidity premium in the Indian stock market.

Time-series data often exhibits both autocorrelation and heteroskedasticity. However, the Ordinary Least Squares (OLS) methodology depends on the assumption that the regressors are exogenous, with the errors are homoskedastic and serially uncorrelated. If not considered, it may lead to estimates that are statistically inefficient and possibly may produce misleading inferences. One of the most popular estimators in the field of econometrics is Newey and West (1987), an autocorrelation-consistent as well as heteroskedasticity-consistent estimator of the variance-covariance matrix of the Ordinary Least Squares (OLS) estimator. All regressions models employed in the study

are estimated using the Newey-West (1987) procedure that automatically corrects for any autocorrelation and heteroscedasticity in the data.

Construction of Risk Factors (Independent variables): Fama & French (2015) instigate that model's performance is not sensitive to the way its factors are defined. Therefore, for the construction of risk factors considered essential for the asset pricing in Indian Stock Market, this study follows Fama & French (1993) approach of mimicking portfolios.

The Market Risk Premium (R_{Mt} - R_{ft}) that is Excess Return on Market Portfolio is calculate by subtracting risk free return (cut-off implicit yield on 91 days Treasury Bills) from the monthly return on market portfolio; S&P BSE 500 index taken as proxies of market portfolio for Bombay Stock Exchange.

Market capitalisation and price-to-book value (P/B) ratio are used as proxies for the size and value respectively. For the construction of size and value factor, at the June end of each year, the sample stocks are independently sorted into two size portfolios (Small (S) and Big (B)) on the basis of market capitalisation (50:50 split) and three value portfolios (Low (L), Medium (M), and High (H)) based on P/B Ratio on a 30:40:30 divide. Six portfolios (S/L, S/M, S/H, B/L, B/M, & B/H) are formed at the intersection of size and value. The equally weighted average monthly returns on the six portfolios are estimated for the next twelve-month (July of year t to June of year t+1). Portfolios are rebalanced each year and it continues throughout the sample period. (Size Factor) is the difference between the returns on diversified portfolios of small stocks and big stocks, while (Value Factor) is measured as the difference between the returns on diversified portfolios of low and high P/B stocks.

$$SMB = \frac{(S/L + S/M + S/H)}{3} - \frac{(B/L + B/M + B/H))}{3}$$

$$LMH = \frac{(S/L + B/L)}{2} - \frac{(S/H + B/H)}{2}$$

In order to create momentum factor controlled for size, each year June end, the sample stocks are independently sorted into two size portfolios (Small (S) and Big (B)) on the basis of market capitalisation (50:50 split) and three momentum portfolios (Winners (W), Neutral (N), and Losers (L)) with prior performance based on average past twelve months excess returns on 30:40:30 divide. Six portfolios (S/W, S/N, S/L, B/W, B/N, & B/L) are formed at the intersection of size and prior performance. The equally weighted average monthly returns on the six portfolios are calculated for the next twelve-month (July of year t to June of year t+1). Portfolios are rebalanced each year and it continues throughout the sample period. (Momentum Factor) is calculated as the average returns on the portfolios of winners minus losers stocks based on past year performance.

$$WML = \frac{(S/W + B/W)}{2} - \frac{(S/L + B/L)}{2}$$

For the construction of profitability and investment factor, operating profitability (calculated as revenue minus cost of goods sold, minus selling, general and administrative expenses, minus interest expenses, all divided by book equity) is used as a proxy of profitability, while change in total assets [as a proxy of investment. The profitability and investment factors of the 2×3 sorts, RMW and CMA, are constructed in the same way as for LMH (Value Factor) except the second sort is on operating profitability (Robust minus Weak) and investment strategy (Conservative minus Aggressive) respectively. To estimate profitability and investment factors controlled for size, each year June end, first the sample stocks are independently sorted into two size portfolios (Small (S) and Big (B)) on the basis of market capitalisation (50:50 split). Then, three portfolios based on operating profitability (Robust (R), Neutral (N), and Weak (W)) and based on investments (Conservative (C), Neutral (N), and Aggressive (A)) on a 30:40:30 divide independently. Six portfolios (S/R, S/N, S/W, B/R, B/N, & B/W) are formed at the intersection of size and operating profitability. Another six portfolios (S/C, S/N, S/A, B/C, B/N, & B/A) are formed at the intersection of size and investment. The equally weighted average monthly returns on these portfolios are calculated for the next twelve-month (July of year t to June of year t+1). (Profitability Factor) is the returns on the diversified portfolios of robust minus weak profitability stocks, and (Investment Factor) is the difference between the returns on diversified portfolios of the stocks of low and high investment firms, also known as conservative and aggressive investment stocks.

$$RMW = \frac{(S/R + B/R)}{2} - \frac{(S/W + B/W)}{2}$$

$$CMA = \frac{(S/C + B/C)}{2} - \frac{(S/A + B/A)}{2}$$

IMV_t is estimated for each of the liquidity measure; Trading Volume, Turnover rate, Quoted Spread, Effective Spread, and Amihud Illiquidity Ratio independently. For the construction of liquidity factor controlled for size, at the June end of each year, the sample stocks are

independently sorted into two size portfolios (Small (S) and Big (B)) on the basis of market capitalisation (50:50 split) and three liquidity portfolios (Very Liquid (V), Moderately Liquid (N), and Illiquid (I)) based on a 30:40:30 divide using each liquidity measure independently. Six portfolios (S/V, S/N, S/I, B/V, B/N, & B/I) are formed at the intersection of size and liquidity. The equally weighted average monthly returns on the six portfolios are calculated for the next twelve-month (July of year t to June of year t+1). Portfolios are rebalanced each year and it continues all through the sample period. (Liquidity Factor) is the average returns on the portfolios of illiquid stocks minus the average returns on the portfolios of very liquid stocks.

$$IMV = \frac{(S/I + B/I)}{2} - \frac{(S/V + B/V)}{2}$$

It may be noted that financial year in India is defined as April of year t to March of year t+1. However, to avoid look ahead bias, the portfolios formation is performed in each year June end with the assumption that data is available to investors at the time of investment decision.

While testing asset-pricing models, portfolio analysis is taken rather than individual stocks. The betas of individual stocks can be difficult to estimate with high accuracy, due to relatively high stock-specific risk, and potential structural and cyclical changes over time. These problems can be mitigated by forming portfolios of stocks and periodically re-balancing these portfolios (Blume (1970)). This approach yields relatively accurate and stable beta estimates.

Impact of Economic Conditions – Boom and Recession Period: We investigate the impact of different economic conditions i.e. boom and recession period on the liquidity effect in Indian stock market at BSE. It is contended that stock returns are cyclical in nature, provide higher risk adjusted returns during recession than the boom period. Market frictions are generally higher in recession period due to awful nature of economic environment; therefore investors may require a higher premium on stocks. To capture the liquidity effect during different economic conditions, we decompose the alphas and slope coefficients of market factors of different portfolios in the boom and recession period, by using dual beta model (Bhardwaj and Brooks, 1993) constructed by incorporating a single dummy variable (D) in the standard CAPM model. For the creation of dummy variable (D), boom and recessionary periods for Indian economy are adopted as identified by Federal Reserve Bank of St. Louis. Different dates for boom and recession periods are given below:

Recessionary Periods	Boom Periods
July 2000 – January 2003	February 2003 – September 2007
October 2007 – March 2009	April 2009 – January 2011
February 2011 – July 2013	August 2013 – April 2016
May 2016 – March 2017	

Dummy variable (D) is formed by assigning 0 for the boom period months and 1 for the recession period months. Following modified dual beta version of the factor models are estimated to capture the impact of boom and recession period economic conditions.

Dummy Variable Regression for the liquidity-sorted decile portfolios:

$$R_P - R_f = \alpha_0 + \alpha_1 D + \beta_0 (R_M - R_f) + \beta_1 D.(R_M - R_f) + \varepsilon_t$$

EMPIRICAL RESULTS & FINDINGS

The descriptive statistics of monthly excess returns of decile portfolios for BSE stocks sorted on the five alternate liquidity measures viz. Trading Volume, Turnover rate, Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio over the total sample period are presented in Table I. It is evident from the table that mean monthly excess return of illiquid stocks portfolio (P10) is much higher than liquid stocks portfolio (P1), for alternative liquidity proxies. An examination of t-statistics reveals that the mean monthly excess returns of all the portfolios are significant except for P1 i.e. liquid stocks portfolios. In case of portfolios formed on trading volume, the mean excess return on P10 is found to be 3.84% per month as against 0.66% per month on P1. This clearly provides that an investor can earn liquidity premium of 3.18% per month, about 38% per annum, by adopting a long short strategy by buying P10 and selling P1, which is quite robust. Using turnover rate, relative spread, effective spread, and amihud illiquidity measure, the monthly liquidity premiums are found to be 0.80%, 3.36%, 1.97%, and 2.92% respectively. However, high returns on illiquid stocks portfolio may not favour the implementation of long short strategy. From the perspective of portfolio manager's it seems more feasible to go long on illiquid stocks which promise a mean monthly return in the range of 2.42% to 4.06% for the alternate liquidity measures. Illiquid stocks provide returns, which is almost two to three times returns on liquid stocks depending on the different liquidity measures used. The existence of liquidity premium at Bombay stock exchange (BSE) is

confirmed as the mean monthly excess returns increase almost monotonically from P1 to P10; irrespective of liquidity measure used. This indicates positive relationship between illiquidity and expected return. The standard deviation also exhibits a similar pattern with large values for illiquid stock portfolios, especially for effective spread and amihud illiquidity measure. However, there is no significant difference in return variability of portfolios sorted on trading volume, turnover rate, and relative spread. The skewness and kurtosis values of portfolios indicate positive skewness (skewed to right) and leptokurtic distribution (fatter tails). Additionally, Jarque-Bera statistics and p values in the table show that the null hypothesis of normality cannot be accepted at 1% level of significance.

Table II provides descriptive statistics of the explanatory variables in the time series regressions. It is observed that mean returns of all the liquidity factors and other risk factors are mostly positive and significant (except RMW). The skewness values exhibit that all explanatory variables are positively skewed, except RM-RF, WML, RMW, and IMV (turnover rate) are negatively skewed. The kurtosis values greater than three implies leptokurtic distribution (fatter tails) and Jarque-Bera statistics, and its p values in the table indicate that the null hypothesis of normality cannot be accepted at 1% level of significance.

The correlations between the risk factors or explanatory variables employed in the study are reported in Table III. A high degree of correlation was observed between size factor and liquidity factors from trading volume, quoted spread and Amihud illiquidity. Further, high degree of correlation was observed between liquidity factors derived from trading volume, turnover, quoted spread and Amihud illiquidity, with the exception of effective spread. All other correlation coefficients being well below 0.5, does not detect any extremely high value of the correlation coefficient that may give rise to concerns of multicollinearity problem in asset pricing models.

The return behaviour of portfolios sorted on alternate liquidity measures was in conformity with the risk story i.e. P10 the illiquid stocks portfolio provides higher returns than P1 the liquid stocks portfolio. A mere confirmation of liquidity premium at BSE may not be exciting for the investors who are in search of abnormal profits. A more important issue is to verify the existence of observed liquidity premium in Indian stock market through asset pricing models, using five alternate liquidity proxies to confirm the robustness of results. Table IV, V, VI, VII, & VIII present results of the asset pricing models on liquidity portfolios derived from trading volume, turnover rate, relative (quoted) spread, effective spread and amihud illiquidity measure respectively, to check relationship between liquidity and equity returns at Bombay Stock Exchange.

First, the standard CAPM model is employed, where excess portfolio returns are regressed on the excess return for the market factor. It is clear that intercept value (i.e. α - measure of abnormal returns) increases monotonically as one move from liquid to illiquid stocks portfolio (i.e. P1 to P10), irrespective of liquidity measure used. The illiquid stocks portfolio (P10) based on trading volume provide a statistically significant abnormal return of 3.09% per month against abnormal return of -0.30% per month for liquid stocks portfolio (P1). The monthly abnormal returns generated by illiquid stocks portfolios based on turnover rate, relative (quoted) spread, effective spread, and amihud illiquidity measure are found to be 1.71%, 3.29%, 2.42% and 3.01% against liquid stocks portfolios are 0.52%, -0.21%, 0.67% and 0.06% respectively. The monthly abnormal returns generated by long short investment strategy i.e. P10-P1 based on trading volume, turnover rate, relative (quoted) spread, effective spread, and amihud illiquidity measure are found to be 3.4%, 1.19%, 3.5%, 1.74%, & 2.95% respectively. These findings indicate that the illiquid stocks outperform liquid stocks portfolio over the study period. The null hypothesis (i.e. $\alpha = 0$) is rejected as intercept value for portfolios are positive and statistically significant. As one move from P1 to P10, the value of alpha increases sharply and for liquid stocks portfolios it is even negative (see the alpha values of P1 based on trading volume and relative spread which are -0.0030 and -0.0021 respectively). This implies that while illiquid stocks portfolios earn statistically significant positive abnormal returns; the liquid stocks portfolios may provide lower than what they should, given their level of risk. These findings indicate the presence of a strong liquidity premium at Bombay Stock Exchange (BSE) irrespective of the liquidity measure used. A glance at the adjusted value reveals the fact that the market factor is important in capturing a large amount of variation in common stock returns especially for the liquid stock portfolios. It must be noted that the coefficient of determination (value) is low for illiquid stocks portfolios (e.g. on an average it is 67.4% for P10 as against 87.6% for P1) suggesting that the portfolios of illiquid stocks have larger unexplained variations in their returns. Mostly, the market beta "" is larger than one and highly significant across portfolios. Market beta

decreases as one move from liquid to illiquid stocks portfolios (P1 to P10) in case of trading volume, turnover rate and relative spread based portfolios, indicating that market risk of liquid stocks is higher than that of illiquid stocks. However, market beta increases from P1 to P10 in case of portfolios based on effective spread and there is no large difference between the market beta coefficient of liquid and illiquid stocks portfolio based on amihud illiquidity measure. In case of long short investment strategy portfolio i.e. P10-P1, market beta are found to be negative but with very low value of ; except for effective spread based portfolio. These empirical results show the presence of a strong liquidity effect (i.e. illiquid stocks portfolio outperforming the portfolio of liquid stocks) at BSE over the study period (2000-2017), whatever be the liquidity measure used.

It is clearly visible that market factor (excess return on market portfolio) captures the most part of cross-sectional variations in equity returns at BSE, but not all. Large CAPM alphas may not imply abnormal performance of portfolios; it actually represents compensations for missing risk factors. Therefore, we extend our analysis by employing well-known multifactor models i.e. Fama-French three-factor model (1993), Carhart's four-factor model (1997), and Fama & French five-factor model (2015).

In Fama-French three-factor model (1993), excess portfolio returns are regressed on the market, size, and value factor. With the inclusion of size and value factor in the standard CAPM model, results show that there has been considerable improvement in adjusted values, especially for illiquid stocks portfolios (on an average it is 86.7% for P10 as against 90.2% for P1). Alpha values reduce substantially and become insignificant for almost all portfolios except for illiquid stocks portfolios for which alpha values are still significant. Market beta remains positive and significant throughout, but slightly decreases in magnitude. Overall, size and value factors are positive and highly significant for all the portfolios except size coefficient being negative for P1 (liquid stocks portfolio) in case of trading volume, relative spread and amihud illiquidity measure based portfolios. Size coefficient (increases as one move from P1 to P10, which implies that illiquid stocks portfolios tend to load more strongly on size factor as compared to liquid stocks portfolios. However, there is only marginal difference in value coefficient () across portfolios. Hence, this implies that size, value, and market factor together can better explain cross-sectional variations in liquidity sorted portfolios at BSE than the market factor alone, irrespective of liquidity measure used.

The standard CAPM and Fama-French three-factor model do explain a major part of returns on liquidity sorted portfolios. However, the returns for some of the illiquidity portfolios have still not been fully explained, we further extend the Fama-French three-factor model into Carhart's four-factor model by adding an additional risk factor i.e. momentum factor. The results illustrate that there is no substantial improvement in adjusted values. Alpha values remain quite stable and are still significant for illiquid stocks portfolios. There is no apparent effect on market, size, and value factors coefficient; overall, they are still positive and highly significant across portfolios. Momentum factor coefficient (is insignificant throughout the portfolios except for liquid stocks portfolios, where it is negative and significant. This implies that WML factor does not play a significant role in explaining expected stock returns at BSE.

Further, we further extend the Fama-French three-factor model into Fama-French five-factor model by adding two additional risk factors i.e. profitability and investment factor. The additional risk factors i.e. RMW and CMA does not play any significant role to explain cross-sectional variations in portfolio returns at BSE, except for liquid stocks portfolios, where are negative and significant. With the inclusion of profitability and investment factor in Fama-French three-factor model, there is no significant improvement in adjusted values, alpha values remain quite stable and are still significant for illiquid stocks portfolios and no visible effect on market, size, and value factors coefficient. Therefore, among various models, Fama-French three-factor model (based on market, size, and value factors) turned out to be best in explaining cross sectional variation in liquidity-sorted portfolios returns. However, the returns for some of the illiquidity portfolios have still not been fully explained, we further extend our analysis to test the importance of liquidity by augmenting liquidity factor (IMV) in the Standard CAPM model of Sharpe (1964) & Lintner (1965), Fama-French three-factor model (1993), Carhart's four-factor model (1997), and Fama & French five-factor model (2015).

With the inclusion of liquidity factor in the asset pricing models, there has been considerable improvement in adjusted values, indicating that there is a relevant improvement in the explaining variability of portfolio returns by liquidity-adjusted models. Alpha values reduce and market, size, and value factor continues

CONCLUSION

We investigated the role of liquidity in pricing of stock returns in Indian stock market for the sample of S&P BSE 500 stocks over the period from 1st April 2000 to 31st March 2017, In order to test and compare abnormal performance of the liquidity-sorted portfolios, well-documented models considered in this study are the Standard CAPM model of Sharpe (1964) & Lintner (1965), Fama-French three-factor model (1993), Carhart's four-factor model (1997), and Fama & French five-factor model (2015). These models are extended further to test for the role of liquidity in Indian stock market by augmenting the liquidity (IMV) factor in the Standard CAPM model, Fama & French three-factor model, Carhart's four-factor model, and Fama & French five-factor model. We have found statistically significant and positive relationship between illiquidity and expected returns of BSE stocks, consistent with Amihud and Mendelson (1986) idea of existence of liquidity premium in U.S. equity market. It is evident that strong liquidity premium exist at BSE, where illiquid stocks outperform liquid stocks. The strength of results are proved using five alternate liquidity measures viz. Trading volume, Turnover rate, Relative (Quoted) Spread, Effective Spread, and Amihud Illiquidity Ratio. Overall, the results suggest that liquidity is an important and independent factor to explain equity returns in asset pricing models after controlling for additional risk factors like market, size, value, momentum, profitability, and investments. Among the various asset-pricing models employed, Liquidity-augmented Fama-French three-factor model turned out to be best in explaining cross section variation in liquidity-sorted portfolio returns of Bombay Stock Exchange stocks. Also, the economic conditions - boom and recession does have an impact on liquidity premium at Bombay Stock Exchange as abnormal returns on illiquid stocks portfolios are significantly higher in boom period relative to recessionary period. All the liquidity measures provide significant evidence for the pricing of liquidity risk in Indian stock market at BSE. This has positive implications for mutual funds managers, investment analysts as well as small investors. The investment analysts and small investors can follow the simple ranking rule to form liquidity-sorted portfolios rather than rely on complex fundamental and technical analysis for investment management. The evidence on liquidity effect in Indian stock market sheds serious doubts about the level of market efficiency (semi-strong form). Availability of extra normal returns by using liquidity based investment strategy implies that the Indian stock market is not efficient in semi strong form as publicly available information can be used to reap superior returns in Indian stock market.

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Table I: Descriptive Statistics of Liquidity Sorted Portfolios

Portfolios	P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
L1: Trading Volume											
Mean	0.0066	0.0109	0.0149	0.0163	0.0180	0.0193	0.0252	0.0247	0.0303	0.0384	0.0318
t-stat.	0.949	1.700*	2.358**	2.548**	2.876***	3.099***	3.959***	3.895***	4.539***	5.882***	5.426***
Std. Dev.	0.0986	0.0911	0.0897	0.0908	0.0917	0.0881	0.0901	0.0899	0.0947	0.0925	0.0682
Skewness	0.3518	0.4447	0.1702	0.0925	0.3166	0.3860	0.3840	0.1411	0.7677	0.3979	0.0679
Kurtosis	6.1491	7.6799	5.6724	5.7889	6.7296	6.3905	7.1128	4.0582	6.0782	3.9216	3.7687
Jarque-Bera	87.1997	190.0458	60.7822	65.4294	119.8545	101.2647	146.6013	10.0443	99.1010	12.4180	5.1038
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066	0.0000	0.0020	0.0779
L2: Turnover Rate											
Mean	0.0162	0.0203	0.0193	0.0189	0.0189	0.0173	0.0239	0.0215	0.0223	0.0242	0.0080
t-stat.	1.958*	2.908***	3.015***	2.965***	3.060***	2.915***	3.822***	3.611***	3.923***	4.296***	5.520***
Std. Dev.	0.0912	0.0992	0.0908	0.0902	0.0876	0.0840	0.0887	0.0844	0.0805	0.0860	0.0651
Skewness	0.3468	0.0950	0.1640	0.3708	0.0981	0.1474	0.5756	0.4332	0.1662	0.3866	-0.8189
Kurtosis	6.6412	4.7643	5.9036	7.8267	7.0515	4.8636	6.0966	4.7863	4.4313	4.7767	6.6231
Jarque-Bera	115.0656	26.3714	71.5081	127.2437	137.7939	29.8148	91.4070	33.0079	18.0819	31.4432	132.6412
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
L3: Relative (Quoted) Spread											
Mean	0.0069	0.0111	0.0151	0.0176	0.0187	0.0194	0.0218	0.0252	0.0275	0.0406	0.0336
t-stat.	1.058	1.765*	2.196**	2.769***	3.011***	3.069***	3.451***	4.045***	4.354***	5.908***	5.827***
Std. Dev.	0.0931	0.0889	0.0976	0.0902	0.0882	0.0895	0.0895	0.0884	0.0894	0.0975	0.0680
Skewness	0.2341	0.0745	0.5068	0.1233	0.1655	0.2748	0.3704	0.3007	0.2943	0.6822	0.9646
Kurtosis	5.2160	5.8692	7.9028	5.4257	5.6936	5.3963	5.6852	5.6083	4.7547	5.7649	8.1047
Jarque-Bera	42.9625	69.1305	209.9165	49.7890	61.6827	50.6198	64.9821	60.0059	28.6880	79.6119	249.4106
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
L4: Effective Spread											
Mean	0.0137	0.0157	0.0187	0.0171	0.0160	0.0160	0.0226	0.0215	0.0269	0.0334	0.0197
t-stat.	2.590**	2.420**	2.843***	2.704***	2.636***	2.499**	3.659***	3.468***	3.856***	4.723***	3.728***
Std. Dev.	0.0748	0.0922	0.0932	0.0899	0.0862	0.0907	0.0875	0.0878	0.0991	0.1002	0.0532
Skewness	0.0967	0.3548	0.2008	0.3821	0.3991	0.1677	0.2976	0.0782	0.3606	0.0985	0.4075
Kurtosis	5.4492	6.4008	5.8998	7.6613	7.5358	4.7699	4.9010	4.4297	6.1663	4.5389	4.3488
Jarque-Bera	50.5530	101.0783	71.7740	186.8638	177.6363	27.1775	33.2342	17.3249	88.3191	20.1578	20.8000
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001

L5: Amihud Illiquidity ratio											
Mean	0.0093	0.0106	0.0166	0.0163	0.0156	0.0198	0.0241	0.0267	0.0265	0.0386	0.0292
t-stat.	1.491	1.699*	2.622***	2.470**	2.494**	3.190***	3.937***	4.010***	4.416***	5.324***	5.061***
Std. Dev.	0.0888	0.0886	0.0899	0.0935	0.0884	0.0879	0.0869	0.0944	0.0906	0.1027	0.0659
Skewness	0.2416	0.2048	0.2362	0.6368	0.1946	0.1841	0.1793	0.2150	0.1779	0.5344	0.7118
Kurtosis	4.7193	6.7250	6.5544	8.7669	5.4171	5.5464	5.9862	4.9920	5.3369	4.9620	6.3554
Jarque-Bera	26.7111	117.6126	107.6746	292.1119	50.1977	55.4387	34.1164	34.7816	46.7968	41.8075	111.3281
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	201	201	201	201	201	201	201	201	201	201	201

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table II: Descriptive Statistics of Risk Factors

Factors	Mean	t-stat.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Observations
RM-RF	0.0076	1.846*	0.0745	-0.1976	5.4575	51.8885	0.0000	201
SMB	0.0074	5.792***	0.0182	0.7600	5.3158	64.2637	0.0000	201
LMH	0.0062	3.461***	0.0253	1.3782	8.5356	320.2614	0.0000	201
WML	0.0029	1.896*	0.0215	-0.6378	5.1303	51.6329	0.0000	201
RMW	-0.0016	-1.161	0.0194	-1.5730	10.2042	517.5502	0.0000	201
CMA	0.0023	2.377**	0.0139	0.5499	4.8574	39.0254	0.0000	201
IMV (Trading Volume)	0.0100	6.044***	0.0236	0.3455	5.3299	49.4620	0.0000	201
IMV (Turnover Rate)	0.0019	1.831*	0.0220	-0.4817	6.0829	87.3694	0.0000	201
IMV (Relative Spread)	0.0101	6.518***	0.0220	0.3335	4.3628	19.2800	0.0001	201
IMV (Effective Spread)	0.0053	4.391***	0.0172	0.1588	4.8047	28.1230	0.0000	201
IMV (Amihud Illiquidity Ratio)	0.0092	5.595***	0.0218	1.2726	8.3984	298.3205	0.0000	201

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table III: Correlation Matrix of Risk Factors

Factors	Rm- Rf	SMB	LMH	WML	RMW	CMA	IMV (Trading Volume)	IMV (Turnover)	IMV (Relative Spread)	IMV (Effective Spread)	IMV (Amihud Illiquidity)
Rm- Rf	1.00										
SMB	0.064	1.00									
LMH	0.327***	0.601***	1.00								
WML	0.041	-0.219***	-0.414***	1.00							
RMW	-0.415***	-0.583***	-0.757***	0.365***	1.00						
CMA	-0.041	0.534***	0.543***	-0.213***	-0.571***	1.00					
IMV (Trading Volume)	-0.286***	0.784***	0.300***	0.001	-0.254***	0.490***	1.00				
IMV (Turnover)	-0.562***	0.090	-0.109	0.038	0.161**	0.283***	0.599***	1.00			
IMV (Relative Spread)	-0.280***	0.741***	0.225***	0.040	-0.200***	0.388***	0.952***	0.593***	1.00		
IMV (Effective Spread)	0.229***	0.075	0.156**	-0.149**	-0.087	-0.131*	-0.140**	-0.338***	-0.085	1.000	
IMV (Amihud Illiquidity)	-0.115	0.825***	0.413***	-0.029	-0.423***	0.498***	0.899***	0.430***	0.891***	-0.193***	1.00

Note: ** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table IV: Regression Results of Trading Volume Sorted Portfolios

Factor		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
Model 1: Standard CAPM												
Constant		-0.0030	0.0021	0.0063	0.0077	0.0094	0.0112	0.0170	0.0169	0.0225	0.0309	0.0340
	t-stat.	-1.7040*	1.1400	3.4085***	3.5073***	3.6126***	3.6824***	5.7156***	4.6362***	5.5169***	6.9500***	6.5501***
Market		1.2689	1.1557	1.1347	1.1301	1.1214	1.0599	1.0627	1.0252	1.0246	0.9736	-0.2953
	t-stat.	24.7624***	23.4352***	34.1352***	29.2685***	22.2975***	21.2482***	19.0215***	23.4349***	19.8562***	17.8597***	-3.4503***
Adjusted		0.9196	0.8925	0.8874	0.8597	0.8298	0.8015	0.7703	0.7207	0.6447	0.6133	0.0995
Model 2: Fama-French Three Factor Model												
Constant		-0.0026	0.0012	0.0012	0.0019	0.0019	0.0013	0.0055	0.0026	0.0034	0.0122	0.0149
	t-stat.	-1.3537	0.6845	0.7890	0.7852	0.5627	0.6232	2.7517***	1.3702	1.8711*	3.9365***	3.6301***
Market		1.2248	1.0993	1.0723	1.0828	1.0781	0.9958	1.0026	0.9659	0.9479	0.9149	-0.3098
	t-stat.	26.4348***	23.5311***	37.7510***	26.6111***	21.8823***	20.3671***	17.4975***	34.0420***	28.0347***	20.5252***	-4.0336***
Size		-0.3776	-0.2711	0.3124	0.5363	0.9500	1.0376	1.3179	1.7431	2.3454	2.4246	2.8023
	t-stat.	-2.2624**	-1.8707*	2.2383**	2.7537***	6.8179***	7.2465***	7.6156***	11.6140***	19.2832***	10.6437***	9.0440***
Value		0.4502	0.5453	0.5176	0.3495	0.2548	0.4299	0.3549	0.2871	0.3585	0.1851	-0.2651
	t-stat.	3.0731***	3.9922***	5.7749***	2.9858***	1.4756	3.2611***	3.0221***	2.4884**	1.6657*	1.2202	-1.1530
Adjusted		0.9263	0.9055	0.9205	0.8909	0.8842	0.8909	0.8798	0.8834	0.9091	0.8706	0.5847

Model 3: Carhart Four Factor Model												
Constant		-0.0002	0.0018	0.0015	0.0017	0.0018	0.0012	0.0058	0.0013	0.0032	0.0113	0.0115
	t-stat.	-0.1233	0.9840	0.9547	0.7453	0.8535	0.6127	2.9828***	0.6890	1.7162*	4.2006***	3.5834***
Market		1.2587	1.1079	1.0767	1.0801	1.0880	0.9951	1.0067	0.9485	0.9456	0.9024	-0.3563
	t-stat.	29.4388***	23.8094***	37.1908***	25.8770***	22.0484***	20.4313***	17.8322***	30.2507***	25.1542***	20.8789***	-4.9495***
Size		-0.3177	-0.2560	0.3202	0.5315	0.9674	1.0365	1.3240	1.7125	2.3413	2.4025	2.7203
	t-stat.	-2.0979**	-1.8590*	2.2664**	2.6084***	7.0478***	7.1423***	7.6111***	10.8695***	19.0615***	10.4049***	9.5318***
Value		0.1961	0.4811	0.4846	0.3698	0.1810	0.4347	0.3240	0.4170	0.3757	0.2790	0.0829
	t-stat.	1.4763	4.0271***	4.5832***	2.7220***	0.9794	2.8834***	2.3873**	2.8575***	1.5450	1.5713	0.3670
Momentum		-0.5558	-0.1403	-0.0722	0.0445	-0.1614	0.0104	-0.0674	0.2842	0.0376	0.2053	0.7612
	t-stat.	-4.2297***	-1.4613	-0.5615	0.3016	-1.1338	0.0805	-0.5507	2.1332**	0.3095	1.2824	3.6102***
Adjusted		0.9377	0.9077	0.9220	0.8904	0.8848	0.8904	0.8794	0.8865	0.9087	0.8718	0.6224
Model 4: Fama-French Five Factor Model												
Constant		-0.0004	0.0023	0.0010	0.0017	0.0004	0.0007	0.0066	0.0012	0.0048	0.0118	0.0.123
	t-stat.	-0.2457	1.1071	0.6290	0.6839	0.8417	0.3489	2.9012***	0.6266	2.5220**	3.9106***	3.0990***
Market		1.1487	1.0549	1.0658	1.0827	1.0816	1.0189	0.9812	0.9783	0.9166	0.9468	-0.2018
	t-stat.	28.8422***	28.7228***	37.9375***	25.1194***	21.8236***	20.2840***	19.1016***	27.1682***	22.2428***	16.8935***	-2.5020**
Size		-0.4012	-0.2692	0.3659	0.5673	1.0384	1.0364	1.2457	1.8953	2.2681	2.3541	2.7554
	t-stat.	-2.4197**	-1.7611*	2.6768***	2.6037***	6.6168***	7.1766***	7.4587***	11.1035***	19.3645***	9.1299***	7.8188***
Value		0.3334	0.4978	0.5811	0.3903	0.3756	0.4544	0.2353	0.5023	0.2212	0.1278	-0.2056
	t-stat.	2.1448**	3.3470***	4.8579***	2.8158***	2.2974**	2.5644**	1.2914	3.7559***	1.5904	0.9080	-1.1564
Profitability		-0.7684	-0.4214	0.0288	0.0513	0.1827	0.2193	-0.3267	0.3761	-0.4297	0.1864	0.9548
	t-stat.	-3.5462***	-1.7437*	0.1540	0.1983	0.6505	0.7998	-1.0483	1.7352*	-1.5742	0.7552	3.0126***
Investment		-0.8268	-0.5223	-0.2135	-0.0815	-0.1883	0.2729	-0.0624	-0.2492	-0.1642	0.5550	1.3818
	t-stat.	-2.8884***	-1.8302*	-0.8866	-0.2757	-0.5509	0.8233	-0.1575	-0.8576	-0.9385	2.1487**	3.4094***
Adjusted		0.9366	0.9090	0.9205	0.8900	0.8844	0.8911	0.8802	0.8866	0.9107	0.8730	0.6251
Model 5: Standard CAPM + Liquidity Factor												
Constant		0.0016	0.0046	0.0034	0.0030	0.0027	0.0016	0.0073	0.0014	0.0007	0.0079	0.0062
	t-stat.	0.7465	1.8499*	1.6284	1.2041	0.9660	0.5924	2.4856**	0.5880	0.2596	3.3573***	3.3336***
Market		1.2292	1.1348	1.1584	1.1693	1.1782	1.1409	1.1451	1.1554	1.2086	1.1678	-0.0613
	t-stat.	29.1345***	26.2451***	33.7219***	29.0526***	22.6744***	20.7149***	18.8871***	28.6838***	22.8158***	36.1384***	-1.7748*
Liquidity		-0.4385	-0.2308	0.2618	0.4330	0.6283	0.8951	0.9106	1.4389	2.0332	2.1468	2.5854
	t-stat.	-3.4614***	-1.7410*	1.8111*	3.3963***	4.9730***	7.8264***	6.2152***	14.5384***	8.5248***	16.9557***	28.7369***
Adjusted		0.9294	0.8953	0.8913	0.8720	0.8532	0.8537	0.8217	0.8512	0.8835	0.8889	0.8350

Model 6: Fama-French Three Factor Model + Liquidity Factor												
Constant		0.0014	0.0044	0.0032	0.0029	0.0025	0.0013	0.0070	0.0012	0.0004	0.0077	0.0062
	t-stat.	0.8369	2.2625**	2.0339**	1.2094	1.0608	0.6288	3.2916***	0.6197	0.2084	3.8840***	3.4166***
Market		1.0949	0.9999	1.0099	1.0528	1.0347	0.9945	0.9551	1.0088	1.0422	1.0558	-0.0391
	t-stat.	37.1959***	27.5495***	41.6846***	25.8380***	25.3197***	21.4810***	20.0469***	28.1951***	32.5022***	23.2884***	-0.7680
Size		1.1877	0.9261	1.0640	0.8976	1.4733	1.0530	1.8903	1.2252	1.2089	0.7274	-0.4602
	t-stat.	4.8988***	3.6042***	5.8299****	2.6618***	5.3109***	3.4068***	5.2231***	4.1452***	4.6219***	1.7739*	-1.1581
Value		0.2820	0.4166	0.4368	0.3106	0.1986	0.4283	0.2933	0.3427	0.4807	0.3675	0.0855
	t-stat.	2.5031**	5.5871***	4.5808***	2.6853***	1.2185	3.0887***	2.4023**	2.3748**	2.6795***	3.4147***	0.9198
Liquidity		-1.3707	-1.0484	-0.6580	-0.3163	-0.4581	-0.0135	-0.5012	0.4535	0.9951	1.4861	2.8568
	t-stat.	-7.8334***	-4.7656***	-4.6066***	-1.4254	-1.8882*	-0.0560	-1.7366*	2.2680**	4.3091***	5.8510***	12.7627***
Adjusted		0.9547	0.9246	0.9281	0.8943	0.8873	0.8904	0.8838	0.8866	0.9250	0.9083	0.8367
Model 7: Carhart Four Factor Model + Liquidity Factor												
Constant		0.0023	0.0041	0.0030	0.0025	0.0027	0.0013	0.0069	0.0006	0.0009	0.0080	0.0057
	t-stat.	1.3647	2.1053**	1.8964*	1.0981	1.1341	0.6054	3.2694***	0.3170	0.4751	4.2110***	3.3782***
Market		1.1281	0.9896	1.0014	1.0388	1.0427	0.9928	0.9502	0.9853	1.0640	1.0696	-0.0584
	t-stat.	38.6915***	27.6902***	38.4541***	24.4826***	26.7530***	23.7098***	22.3653***	25.1512***	36.3015***	24.6140***	-1.1325
Size		1.0394	0.9723	1.1019	0.9602	1.4373	1.0605	1.9122	1.3305	1.1115	0.6655	-0.3738
	t-stat.	4.7633***	3.6030***	6.1169***	3.0232***	5.1521***	3.5660***	5.3227***	4.4155***	4.4329***	1.6660*	-0.9905
Value		0.1650	0.4530	0.4667	0.3600	0.1702	0.4342	0.3106	0.4258	0.4038	0.3187	0.1536
	t-stat.	1.3947	5.7400***	4.1486***	2.7857***	0.9977	2.8386***	2.2108**	2.6438***	2.1308**	2.7165***	1.5057
Momentum		-0.2981	0.0928	0.0762	0.1259	-0.0722	0.0149	0.0440	0.2117	-0.1958	-0.1244	0.1737
	t-stat.	-2.7677***	1.0681	0.5965	0.8424	-0.5003	0.1248	0.3498	1.5105	-1.5896	-1.0120	1.5197
Liquidity		-1.2127	-1.0976	-0.6984	-0.3830	-0.4198	-0.0214	-0.5245	0.3413	1.0989	1.5520	2.7647
	t-stat.	-7.3284***	-4.7647***	-4.8559***	-1.7696*	-1.6871*	0.0925	-1.8057*	1.6571*	4.7234***	6.1720***	12.5526***
Adjusted		0.9574	0.9246	0.9280	0.8922	0.8870	0.8898	0.8832	0.8879	0.9261	0.9084	0.8380
Model 8: Fama-French Five Factor Model + Liquidity Factor												
Constant		0.0025	0.0047	0.0027	0.0025	0.0016	0.0009	0.0078	0.0033	0.0019	0.0082	0.0057
	t-stat.	1.5922	2.2856**	1.7180*	1.0484	0.6572	0.4271	3.2905***	0.0161	0.9826	3.8610***	3.0277***
Market		1.0615	0.9853	1.0181	1.0591	1.0475	1.0123	0.9464	1.0132	0.9988	1.0515	-0.0099
	t-stat.	33.4610***	27.3622***	36.8102***	24.2764***	23.2592***	19.9819***	18.9079***	24.5334***	33.0528***	22.5624***	-0.1956
Size		0.9982	0.8481	1.1329	0.9458	1.5863	1.1428	1.8033	1.3353	0.9487	0.6729	-0.3253
	t-stat.	5.0117***	3.4050***	5.8067***	2.7420***	5.9786***	4.3081***	5.6839***	4.5654***	3.6945***	1.6058	-0.7936
Value		0.2024	0.3932	0.5093	0.3548	0.3243	0.4444	0.1831	0.5547	0.3447	0.2852	0.0825
	t-stat.	1.6681*	3.6656***	4.2337***	2.4517***	2.0229**	2.4151**	0.9943	4.0190***	2.8261***	2.0036**	0.8087

Profitability		-0.4998	-0.2070	0.1760	0.1239	0.2878	0.2397	-0.2197	0.2686	-0.6828	-0.1361	0.3637
	t-stat.	-3.0729***	-1.0637	0.9631	0.5066	1.1323	0.9545	-0.8264	1.1373	-3.1198***	-0.6668	2.1399**
Investment		-0.4535	-0.2242	-0.0089	0.0194	-0.0422	0.3013	0.0863	-0.3986	-0.5162	0.1064	0.5600
	t-stat.	-2.2631**	-0.9747	-0.0395	0.0681	-0.1353	0.9666	0.2440	-1.3733	-2.5604**	0.5431	2.7976***
Liquidity		-1.2341	-0.9853	-0.6763	-0.3337	-0.4831	-0.0938	-0.4917	0.4938	1.1634	1.4825	2.7167
	t-stat.	-9.5832***	-5.0913***	-4.4151***	-1.5678	-2.2275**	-0.4409	-1.9066*	2.7067***	6.1016***	6.1221***	12.7675***
Adjusted		0.9579	0.9247	0.9279	0.8913	0.8877	0.8907	0.8837	0.8902	0.9311	0.9079	0.8425

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table V: Regression Results of Turnover Sorted Portfolios

Factor		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
Model 1: Standard CAPM												
Constant		0.0052	0.0109	0.0110	0.0114	0.0116	0.0095	0.0159	0.0141	0.0151	0.0171	0.0119
	t-stat.	1.7317*	4.1159***	4.2074***	4.6540***	4.1154***	3.7580***	5.1023***	4.3439***	5.3703***	5.6060***	2.9163***
Market		1.4436	1.2322	1.1177	1.1049	1.0825	1.0211	1.0463	0.9724	0.9332	0.9281	-0.5155
	t-stat.	21.7672***	36.1960***	26.0296***	23.0949***	22.0137***	25.8917***	24.2724***	22.8370***	24.5839***	20.4875***	-5.9014***
Adjusted		0.8405	0.8554	0.8404	0.8320	0.8462	0.8190	0.7716	0.7346	0.7445	0.7464	0.3446
Model 2: Fama-French Three Factor Model												
Constant		-0.0037	0.0019	0.0028	0.0030	0.0030	0.0010	0.0051	0.0021	0.0049	0.0066	0.0103
	t-stat.	-1.3067	0.9662	1.2632	1.5396	1.4273	0.6719	2.4713**	1.1563	2.1980**	2.9630***	2.5491**
Market		1.3922	1.1614	1.0737	1.0509	1.0457	0.9593	0.9628	0.9087	0.8775	0.8667	-0.5255
	t-stat.	21.2127***	40.4529***	25.1564***	23.1351***	19.6208***	31.3318***	23.0446***	30.7430***	24.2676***	19.9604***	-5.8552***
Size		0.9854	0.8545	0.8933	0.7398	0.8959	0.8334	1.0319	1.3647	1.1492	1.1609	0.1754
	t-stat.	4.6951***	4.8183***	5.6341***	4.0003***	6.5862***	7.4524***	5.4233***	7.5813***	5.8042***	7.1138***	0.6166
Value		0.3233	0.5162	0.2698	0.3811	0.2040	0.4382	0.6053	0.3803	0.3382	0.3881	0.0647
	t-stat.	1.8051*	3.7394***	1.4379***	2.0900**	1.9480*	3.0383***	3.2350***	3.2943***	1.6905*	2.0679**	0.2047
Adjusted		0.8813	0.9188	0.8923	0.8819	0.8959	0.8939	0.8848	0.8707	0.8529	0.8663	0.3424
Model 3: Carhart Four Factor Model												
Constant		-0.0018	0.0018	0.0041	0.0023	0.0023	0.0016	0.0047	0.0032	0.0041	0.0061	0.0080
	t-stat.	-0.6101	0.8740	1.9301*	1.1172	1.1016	1.0259	2.1682**	1.8504*	1.9721*	2.8697***	2.0946***
Market		1.4176	1.1602	1.0922	1.0413	1.0367	0.9673	0.9565	0.9242	0.8668	0.8601	-0.5574
	t-stat.	22.8759***	37.8386***	25.3953***	22.5203***	19.2767***	29.9270***	22.6837***	29.9875***	21.5270***	19.5062***	-6.5173***
Size		1.0302	0.8524	0.9259	0.7229	0.8822	0.8475	1.0207	1.3920	1.1393	1.1494	0.1191
	t-stat.	4.9040***	4.8412***	6.2116***	4.0163***	6.5895***	7.7361***	5.2699***	8.2799***	5.4036***	6.9834***	0.4243

Value		0.1331	0.5252	0.1312	0.4528	0.2708	0.3783	0.6525	0.2644	0.4183	0.4370	0.3038
	t-stat.	0.6994	3.6632***	0.7263	2.3043**	2.2329**	2.4980**	3.2580***	1.7805*	1.6679*	2.0408**	0.9587
Momentum		-0.4159	0.0197	-0.3031	0.1569	0.1462	-0.1310	0.1033	-0.2534	0.1751	0.1069	0.5228
	t-stat.	-1.9487*	0.1735	-2.7889***	1.2984	1.1450	-0.9643	0.9634	-1.7288*	1.0007	0.8440	2.3094**
Adjusted		0.8836	0.9184	0.8958	0.8825	0.8964	0.8943	0.8847	0.8734	0.8539	0.8663	0.3629
Model 4: Fama-French Five Factor Model												
Constant		0.0001	0.0022	0.0021	0.0033	0.0021	-0.0005	0.0054	0.0019	0.0055	0.0074	0.0073
	t-stat.	0.0181	0.9016	0.8291	1.6137	0.9916	-0.3511	2.3817**	0.9510	2.3783**	3.1984***	1.8389*
Market		1.2709	1.1575	1.0616	1.0471	1.0450	0.9861	0.9484	0.9261	0.9052	0.8704	-0.4004
	t-stat.	21.6488***	33.8182***	27.3524***	21.1871***	25.4494***	31.1314***	21.8083***	25.0555***	20.5740***	18.2638***	-4.5232***
Size		0.9050	0.8300	1.0365	0.7089	1.0280	0.9624	1.0497	1.3189	0.9534	1.0297	0.1246
	t-stat.	4.1881***	3.9051***	5.4452***	4.0320***	7.1089***	7.6083***	5.1753***	6.6828***	4.9176***	5.8518***	0.4261
Value		0.0805	0.4794	0.4457	0.3360	0.3752	0.6391	0.6126	0.3392	0.1103	0.2188	0.1382
	t-stat.	0.3803	3.8767***	2.9811***	2.0973**	2.5358**	4.5413***	3.4402***	2.1266**	0.7658	1.4054	0.4960
Profitability		-1.2968	-0.0785	0.1266	-0.0885	0.2137	0.4747	-0.1077	0.0888	-0.0663	-0.1858	1.1109
	t-stat.	-4.3840***	-0.3082	0.4761	-0.3258	1.0113	2.5076**	-0.3978	0.3681	-0.2495	-0.8106	3.0311***
Investment		-1.2064	0.0182	-0.5119	0.0356	-0.3442	-0.0218	-0.2141	0.3214	0.8301	0.3839	1.5904
	t-stat.	-3.0088***	0.0749	-1.8844*	0.1116	-1.0958	-0.1111	-0.7300	1.2364	3.0336***	1.8209*	3.2705***
Adjusted		0.8978	0.9181	0.8959	0.8809	0.8983	0.8974	0.8843	0.8709	0.8649	0.8694	0.4103
Model 5: Standard CAPM + Liquidity Factor												
Constant		0.0093	0.0129	0.0128	0.0114	0.0114	0.0091	0.0145	0.0111	0.0112	0.0133	0.0039
	t-stat.	3.8578***	4.9997***	5.1672***	5.03637***	4.4103***	3.7880***	5.6827***	4.2759***	5.2300***	5.8980***	2.0574**
Market		1.2287	1.1300	1.0110	1.0511	1.0419	1.0412	1.1194	1.1293	1.1377	1.1300	-0.0986
	t-stat.	17.3700***	18.3295***	18.1223***	20.2224***	22.6975***	19.0529***	12.6271***	15.7813***	21.2100***	18.0905***	-2.6413***
Liquidity		-1.2930	-0.6151	-0.6420	-0.3236	-0.2441	0.1210	0.4396	0.9442	1.2308	1.2455	2.5085
	t-stat.	-4.0427***	-2.1371***	-3.1817***	-1.5580	-1.1666	0.6717	1.0832	3.2811***	4.9886***	4.3007***	21.3941***
Adjusted		0.8803	0.8676	0.8564	0.8354	0.8480	0.8187	0.7787	0.7751	0.8213	0.8223	0.8376
Model 6: Fama-French Three Factor Model + Liquidity Factor												
Constant		-0.0005	0.0036	0.0045	0.0040	0.0038	0.0012	0.0047	0.0006	0.0028	0.0045	0.0051
	t-stat.	-0.2771	1.9663*	2.2465**	1.9823**	1.7566*	0.7407	2.0417**	0.3502	1.6780*	2.5784**	2.3202**
Market		1.1355	1.0212	0.9332	0.9670	0.9753	0.9486	0.9983	1.0275	1.0525	1.0376	-0.0979
	t-stat.	30.8877***	30.5970***	20.7043***	23.7415***	24.3872***	29.8128***	23.4543***	30.4621***	35.5346***	28.6245***	-2.3977**
Size		1.2159	0.9804	1.0195	0.8151	0.9612	0.8430	1.0011	1.2580	0.9921	1.0074	-0.2084
	t-stat.	8.5739***	7.3627***	8.2257***	4.3268***	8.4484***	7.7031***	5.4359***	7.9555***	7.6654***	7.5642***	-1.3866
Value		0.3268	0.5181	0.2717	0.3822	0.2049	0.4384	0.6048	0.3787	0.3358	0.3858	0.0589
	t-stat.	2.6119***	5.5366***	2.3870**	2.6226***	2.2598**	3.1572***	3.5814***	3.9089***	3.3705***	3.9606***	0.5870

Liquidity		-1.5204	-0.8305	-0.8323	-0.4966	-0.4171	-0.0633	0.2102	0.7038	1.0365	1.0126	2.5330
	t-stat.	-10.7712***	-7.7414***	-7.5879***	-2.8682***	-3.1370***	-0.4412	1.0737	5.7246***	8.7635***	8.7524***	20.8980***
Adjusted		0.9344	0.9416	0.9194	0.8913	0.9028	0.8936	0.8861	0.8930	0.9069	0.9185	0.8382
Model 7: Carhart Four Factor Model + Liquidity Factor												
Constant		0.0004	0.0031	0.0054	0.0031	0.0030	0.0017	0.0044	0.0020	0.0026	0.0045	0.0041
	t-stat.	0.1752	1.7013*	2.7440***	1.5521	1.3992	1.0612	1.8696*	1.1766	1.4942	2.4419**	1.9124*
Market		1.1556	1.0112	0.9505	0.9488	0.9587	0.9591	0.9916	1.0560	1.0480	1.0387	-0.1169
	t-stat.	32.6893***	32.4904***	30.2651***	23.0461***	23.3166***	28.1844***	24.9641***	32.3593***	33.4009***	29.1925***	-2.8642***
Size		1.2369	0.9700	1.0377	0.7959	0.9438	0.8540	0.9930	1.2880	0.9874	1.0085	-0.2284
	t-stat.	8.8114***	7.3457***	9.1436***	4.3337***	8.5496***	7.9438***	5.2595***	9.4749***	7.4056***	7.5354***	-1.6705*
Value		0.2168	0.5728	0.1764	0.4824	0.2958	0.3809	0.6413	0.2223	0.3604	0.3800	0.1631
	t-stat.	1.2541	5.5165***	1.5867	2.9830***	2.8004***	2.6337***	3.6216***	2.1223**	2.8840***	3.2814***	1.3441
Momentum		-0.2404	0.1195	-0.2082	0.2188	0.1984	-0.1255	0.0797	-0.3417	0.0537	-0.0126	0.2277
	t-stat.	-1.3879	1.1785	-2.1490**	1.6873*	1.5811	-0.9194	0.8049	-2.9145***	0.4562	-0.1222	1.8619*
Liquidity		-1.4885	-0.8464	-0.8048	-0.5256	-0.4433	-0.0467	0.1996	0.7491	1.0294	1.0343	2.5029
	t-stat.	-10.5794***	-8.4132***	-7.3717***	-3.0758***	-3.3848***	-0.3307	1.0459	6.1998***	8.7567***	8.8818***	21.2470***
Adjusted		0.9356	0.9418	0.9210	0.8929	0.9042	0.8938	0.8858	0.8984	0.9066	0.9181	0.8419
Model 8: Fama-French Five Factor Model + Liquidity Factor												
Constant		0.0025	0.0038	0.0035	0.0043	0.0028	-0.0004	0.0049	0.0007	0.0038	0.0056	0.0030
	t-stat.	1.2053	1.8664*	1.6103	2.1734**	1.2430	-0.2732	1.9837**	0.3154	2.1733**	2.7964***	1.4286
Market		1.0721	1.0303	0.9488	0.9703	0.9910	0.9771	0.9863	1.0246	1.0404	1.0142	-0.0578
	t-stat.	27.2115***	29.6112***	29.5396***	22.1601***	27.2763***	31.1153***	21.6239***	25.7203***	33.5436***	27.7740***	-1.0966
Size		1.0147	0.9002	1.0988	0.7513	1.0578	0.9674	1.0287	1.2645	0.8788	0.9503	-0.0553
	t-stat.	8.0413***	5.9218***	7.1581***	4.3438***	8.6754***	7.8263***	4.9729***	6.3648***	6.5608***	6.7202***	-0.3941
Value		-0.0099	0.4215	0.3943	0.3010	0.3506	0.6350	0.6299	0.3841	0.1719	0.2843	0.3058
	t-stat.	-0.0747	3.8121***	3.2442***	1.9965**	2.4253**	4.5109***	3.6837***	2.8986***	1.5050	2.3940**	2.3248**
Profitability		-1.0382	0.0868	0.2733	0.0112	0.2841	0.4864	-0.1571	-0.0392	-0.2421	-0.3729	0.6653
	t-stat.	-5.1295***	0.4742	1.4977	0.0488	1.4060	2.4870**	-0.5951	-0.1506	-1.2573	-1.9862**	5.3202***
Investment		-0.3769	0.5489	-0.0412	0.3558	-0.1186	0.0156	-0.3725	-0.0895	0.2661	-0.2161	0.1544
	t-stat.	-1.4449	2.7200***	-0.1809	1.1826	-0.3748	0.0691	-1.1363	-0.3270	1.1576	-1.1803	0.6923
Liquidity		-1.4533	-0.9298	-0.8246	-0.5610	-0.3953	-0.0656	0.2774	0.7200	0.9881	1.0513	2.5046
	t-stat.	-13.8684***	-8.3141***	-7.8064***	-3.3589***	-2.7936***	-0.4464	1.4136	6.3025***	9.7608***	9.7235***	20.7406***
Adjusted		0.9432	0.9440	0.9200	0.8919	0.9039	0.8970	0.8866	0.8920	0.9092	0.9204	0.8495

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table VI: Regression Results of Relative (Quoted) Spread Sorted Portfolios

Factor		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
Model 1: Standard CAPM												
Constant		-0.0021	0.0025	0.0058	0.0090	0.0105	0.0111	0.0137	0.0175	0.0197	0.0329	0.0350
	t-stat.	-1.7158*	1.2660	2.1389**	4.1823***	3.6199***	4.4077***	4.3256***	5.7337***	5.3759***	6.5888***	5.1713***
Market		1.1919	1.1270	1.2191	1.1208	1.0806	1.0800	1.0537	1.0158	1.0175	1.0084	-0.1835
	t-stat.	29.8794***	30.5158***	23.5730***	28.9587***	24.9565***	26.1354***	22.1155***	18.8941***	22.1766***	19.6065***	-2.6710***
Adjusted		0.9098	0.8915	0.8656	0.8568	0.8330	0.8082	0.7683	0.7314	0.7176	0.5921	0.0355
Model 2: Fama-French Three Factor Model												
Constant		-0.0026	-0.0007	0.0020	0.0027	0.0027	0.0013	0.0017	0.0043	0.0045	0.0127	0.0154
	t-stat.	-1.2298	-0.3662	1.0075	1.3151	1.1147	0.7200	0.9544	2.0107**	2.2021**	4.0595***	3.5070***
Market		1.1424	1.0733	1.1216	1.0677	1.0305	1.0412	0.9818	0.9630	0.9858	0.9229	-0.2194
	t-stat.	33.2413***	29.1425***	23.4568***	30.1602***	23.3228***	26.2599***	21.2169***	18.8767***	30.3067***	19.8811***	-3.3030***
Size		-0.2745	0.1038	-0.1325	0.5838	0.8115	1.2091	1.3042	1.6223	2.0782	2.4498	2.7244
	t-stat.	-1.5261	0.7507	-0.7565	3.7657***	5.1437***	7.9046***	9.5558***	10.6253***	15.3825***	11.2081***	8.2351***
Value		0.4839	0.4682	0.8954	0.3948	0.3355	0.1778	0.4617	0.2460	-0.0080	0.4223	-0.0616
	t-stat.	3.3469***	3.8159***	6.2302***	2.9046***	2.6540***	1.1101	3.2175***	2.3211**	-0.0983	1.7273*	-0.1908
Adjusted		0.9191	0.9103	0.9069	0.8959	0.8872	0.8833	0.8921	0.8738	0.8947	0.8697	0.5437
Model 3: Carhart Four Factor Model												
Constant		-0.0004	0.0004	0.0019	0.0029	0.0031	0.0019	0.0012	0.0038	0.0039	0.0119	0.0123
	t-stat.	-0.2148	0.1907	0.8900	1.5013	0.2580	1.0349	0.6647	1.8456*	1.7819*	4.0968***	3.3268***
Market		1.1736	1.0893	1.1196	1.0708	1.0358	1.0487	0.9741	0.9571	0.9776	0.9119	-0.2616
	t-stat.	38.0688***	30.1216***	23.1776***	30.9472***	23.2675***	27.8930***	20.7441***	18.5183***	29.3486***	19.2993***	-4.0753***
Size		-0.2195	0.1319	-0.1360	0.5892	0.8208	1.2223	1.2906	1.6120	2.0639	2.4304	2.6500
	t-stat.	-1.2933	1.0001	-0.7675	3.7626***	5.1692***	8.1023***	9.3570***	10.3620***	14.5053***	10.9938***	8.3341***
Value		0.2504	0.3489	0.9103	0.3716	0.2962	0.1216	0.5196	0.2900	0.0528	0.5046	0.2542
	t-stat.	2.0161**	2.9111***	6.0032***	2.7807***	2.2961**	0.7068	3.2658***	2.4273**	0.5086	1.9041*	0.8125
Momentum		-0.5106	-0.2609	0.0326	-0.0506	-0.0859	-0.1228	0.1265	0.0961	0.1332	0.1800	0.6907
	t-stat.	-4.5003***	-2.4011**	0.2546	-0.3396	-0.8612	-0.9105	0.9700	0.7994	1.2298	1.2121	3.7050***
Adjusted		0.9299	0.9130	0.9064	0.8955	0.8869	0.8834	0.8922	0.8736	0.8950	0.8703	0.5795
Model 4: Fama-French Five Factor Model												
Constant		-0.0005	0.0003	0.0017	0.0017	0.0026	0.0019	0.0019	0.0046	0.0035	0.0134	0.0140
	t-stat.	-0.2517	0.1445	0.7927	0.8315	1.0573	0.9310	1.0035	1.9541*	1.6286	4.2917***	3.0806***
Market		1.0755	1.0407	1.1201	1.0837	1.0249	1.0369	0.9839	0.9415	0.9985	0.9120	-0.1634
	t-stat.	30.2961***	31.5724***	28.9395***	26.0707***	20.4301***	19.7029***	21.3425***	21.8527***	29.5742***	14.6359***	-1.8984*

Size		-0.3227	0.0682	-0.0821	0.6632	0.8569	1.1438	1.2708	1.6580	2.1722	2.3957	2.7185
	t-stat.	-1.6577*	0.4780	-0.4217	3.9091***	4.6676***	7.1943***	9.2018***	10.8174***	13.3184***	9.6358***	7.1059***
Value		0.3448	0.3845	0.9604	0.5178	0.3892	0.0866	0.4198	0.2691	0.1305	0.3384	-0.0064
	t-stat.	2.3761**	2.5052**	6.6738***	3.7118***	2.1583**	0.5224	2.7298***	1.7395*	1.1390	2.0522**	-0.0292
Profitability		-0.7219	-0.3718	0.0704	0.2871	0.0231	-0.1516	-0.0368	-0.1453	0.2811	-0.1963	0.5256
	t-stat.	-3.7813***	-1.5939	0.3039	1.2384	0.0773	-0.5602	-0.1340	-0.6563	1.3754	-0.5525	1.2589
Investment		-0.6557	-0.2877	-0.1487	-0.0193	-0.1830	0.1189	0.1106	-0.3431	-0.0943	0.0123	0.6681
	t-stat.	-2.6465***	-1.3492	-0.4212	-0.0719	-0.7057	0.3689	0.3186	-1.0726	-0.3950	0.0443	1.8809*
Adjusted		0.9277	0.9119	0.9063	0.8963	0.8866	0.8829	0.8912	0.8741	0.8954	0.8690	0.5521
Model 5: Standard CAPM + Liquidity Factor												
Constant		0.0021	0.0028	0.0054	0.0036	0.0036	0.0022	0.0013	0.0023	0.0012	0.0067	0.0046
	t-stat.	0.9739	1.0634	1.6166	1.6368	1.2369	0.8560	0.4922	0.9176	0.4667	2.2059**	1.7647*
Market		1.1592	1.1244	1.2222	1.1629	1.1336	1.1483	1.1494	1.1325	1.1594	1.2099	0.0507
	t-stat.	32.5414***	29.9552***	23.2922***	29.9077***	23.0418***	26.8900***	22.2480***	22.2932***	29.5648***	29.3662***	1.6110
Liquidity		-0.3958	-0.0311	0.0376	0.5103	0.6415	0.8260	1.1587	1.4124	1.7175	2.4383	2.8341
	t-stat.	-3.3831***	-0.2240	0.2271	6.0085***	5.0299***	7.1381***	5.6094***	11.5931***	14.9573***	10.1537***	17.6512***
Adjusted		0.9175	0.8910	0.8650	0.8705	0.8560	0.8445	0.8413	0.8449	0.8821	0.8715	0.8111
Model 6: Fama-French Three Factor Model + Liquidity Factor												
Constant		0.0018	0.0025	0.0046	0.0032	0.0033	0.0021	0.0008	0.0019	0.0011	0.0059	0.0040
	t-stat.	0.9983	1.2409	2.0977**	1.6680*	1.3433	0.9854	0.4221	0.8916	0.5135	2.8848***	1.7561*
Market		1.0509	1.0075	1.0698	1.0574	1.0200	1.0251	1.0012	1.0102	1.0546	1.0595	0.0086
	t-stat.	40.5484***	26.7912***	23.3670***	25.1330***	21.1804***	24.5502***	21.8689***	18.7899***	31.2790***	26.8393***	0.3216
Size		0.9957	1.0172	0.5873	0.7269	0.9572	1.4329	1.0355	0.9668	1.1229	0.5540	-0.4414
	t-stat.	4.9290***	5.7148***	3.0432***	2.0427**	3.7191***	5.5108***	5.1943***	3.7027***	5.5444***	1.6232	-1.3096
Value		0.2530	0.3022	0.7646	0.3688	0.3090	0.1371	0.5105	0.3652	0.1655	0.7668	0.5137
	t-stat.	2.2937**	3.4241***	6.4541***	2.6098***	2.2817**	0.8075	3.4300***	3.1020***	1.3540	4.1572***	3.1983***
Liquidity		-1.1764	-0.8459	-0.6667	-0.1325	-0.1348	-0.2073	0.2489	0.6070	0.8847	1.7557	2.9321
	t-stat.	-8.3112***	-5.7065***	-3.8381***	-0.5356	-0.7331	-1.0010	1.4192	3.0427***	6.3448***	7.1404***	12.4993***
Adjusted		0.9434	0.9238	0.9136	0.8957	0.8869	0.8835	0.8927	0.8804	0.9093	0.9192	0.8228
Model 7: Carhart Four Factor Model + Liquidity Factor												
Constant		0.0026	0.0027	0.0041	0.0033	0.0034	0.0023	0.0006	0.0020	0.0012	0.0064	0.0037
	t-stat.	1.4414	1.3369	1.9005*	1.7057*	1.3769	1.1235	0.3183	0.9477	0.5510	3.0220***	1.6450
Market		1.0809	1.0175	1.0518	1.0600	1.0264	1.0340	0.9928	1.0129	1.0593	1.0780	-0.0028
	t-stat.	40.1991***	27.1434***	23.3090***	25.8898***	20.3103***	27.1112***	21.0623***	18.8862***	32.3530***	27.1802***	-0.0599
Size		0.8711	0.9756	0.6621	0.7160	0.9305	1.3962	1.0702	0.9556	1.1034	0.4773	-0.3938
	t-stat.	4.4013***	5.8307***	3.2597***	2.0291**	3.4507***	5.5723***	4.9513***	3.6304***	5.6745***	1.3826	-1.1741

Value		0.1421	0.2652	0.8311	0.3591	0.2853	0.1044	0.5414	0.3551	0.1482	0.6984	0.5562
	t-stat.	1.3159	2.5489**	6.2612***	2.5796**	2.1241**	0.5948	3.4964***	2.9200***	1.1532	3.7808***	3.5529***
Momentum		-0.3050	-0.1018	0.1830	-0.0267	-0.0652	-0.0900	0.0850	-0.0275	-0.0477	-0.1880	0.1169
	t-stat.	-2.6946***	-1.0397	1.4695	-0.1853	-0.6099	-0.6616	0.5986	-0.2278	-0.4692	-2.1766**	1.2068
Liquidity		-1.0306	-0.7972	-0.7542	-0.1197	-0.1036	-0.0642	0.2082	0.6202	0.9075	1.8455	2.8762
	t-stat.	-6.9528***	-5.7406***	-4.2270***	-0.4937	-0.5230	-0.8020	1.09960	2.9509***	7.0272***	7.2071***	12.1125***
Adjusted		0.9467	0.9239	0.9143	0.8952	0.8865	0.8833	0.8925	0.8829	0.9089	0.9200	0.8293
Model 8: Fama-French Five Factor Model + Liquidity Factor												
Constant		0.0031	0.0030	0.0040	0.0023	0.0030	0.0025	0.0011	0.0024	0.0006	0.0072	0.0041
	t-stat.	1.6280	1.3327	1.7768*	1.1705	1.2242	1.1426	0.5731	1.0108	0.2565	3.6848***	1.7450*
Market		1.0062	0.9893	1.0766	1.0730	1.0165	1.0242	1.0002	0.9831	1.0543	1.0277	0.0215
	t-stat.	35.9723***	29.0060***	27.1810***	22.8305***	18.7402***	19.4899***	22.3665***	20.5007***	30.2073***	23.9360***	0.4212
Size		0.8749	0.9578	0.6697	0.8485	1.0025	1.3635	0.9915	0.9388	1.2081	0.3952	-0.4797
	t-stat.	4.5931***	5.3583***	3.2950***	2.3496**	4.1037***	4.7198***	4.1046***	3.5341***	5.1700***	1.1065	-1.2424
Value		0.1742	0.2578	0.8533	0.4914	0.3685	0.0553	0.4596	0.3715	0.2679	0.6233	0.4491
	t-stat.	1.4336	1.8942*	6.4704***	3.4381***	1.8838*	0.3109	3.0505***	2.4303**	2.3078**	4.1775***	3.4148***
Profitability		-0.5396	-0.2364	0.1848	0.3153	0.0452	-0.1182	-0.0793	-0.2548	0.1344	-0.5008	0.0388
	t-stat.	-3.7130***	-1.1016	0.8963	1.4277	0.1597	-0.4434	-0.2781	-1.1440	0.6191	-1.8759*	0.2468
Investment		-0.5248	-0.1905	-0.0666	0.0009	-0.1671	0.1429	0.0800	-0.4217	-0.1997	-0.2062	0.3186
	t-stat.	-2.3585**	-0.9568	-0.1980	0.0035	-0.6561	0.4565	0.2299	-1.3296	-0.7994	-1.0364	1.8083*
Liquidity		-1.0910	-0.8103	-0.6849	-0.1687	-0.1326	-0.1001	0.2544	0.6551	0.8782	1.8223	2.9134
	t-stat.	-8.8315***	-5.7804***	-4.0686***	-0.7155	-0.7949	-0.9452	1.3832	3.5102***	6.5412***	7.3579***	12.0849***
Adjusted		0.9483	0.9241	0.9134	0.8963	0.8863	0.8830	0.8919	0.8818	0.9096	0.9215	0.8289

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table VII: Regression Results of Effective Spread Sorted Portfolios

Factor		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
Model 1: Standard CAPM												
Constant		0.0067	0.0073	0.0102	0.0087	0.0080	0.0075	0.0144	0.0134	0.0180	0.0242	0.0174
	t-stat.	3.0773***	2.4495**	3.5748***	4.3295***	3.1155***	2.6940***	5.6239***	4.4606***	5.2903***	7.0716***	3.2210***
Market		0.9050	1.1047	1.1042	1.1070	1.0513	1.1155	1.0729	1.0574	1.1762	1.2070	0.3020
	t-stat.	29.6727***	23.9247***	21.6435***	20.4151***	17.1460***	27.9132***	24.1706***	24.5351***	18.2686***	25.5221***	5.5279***
Adjusted		0.8110	0.7961	0.7782	0.8415	0.8239	0.8387	0.8329	0.80043	0.7814	0.8043	0.1744

Model 2: Fama-French Three Factor Model												
Constant		0.0002	-0.0024	-0.0008	0.0011	0.0003	-0.0009	0.0057	0.0035	0.0058	0.0149	0.0147
	t-stat.	0.1008	-1.1487	-0.3581	0.5088	0.1514	-0.3786	2.6200***	1.7831*	2.5530**	4.1685***	3.1311***
Market		0.8804	1.0239	1.0409	1.0712	0.9939	1.0681	1.0120	0.9994	1.0942	1.1382	0.2627
	t-stat.	29.8280***	22.1793***	19.7317***	19.1163***	16.3995***	29.9812***	30.0523***	36.0164***	18.2090***	22.9403***	4.6840***
Size		0.8228	0.8953	1.2343	0.8970	0.7576	0.9400	0.8859	1.0804	1.2571	0.9045	0.0817
	t-stat.	4.7583***	5.1071***	7.0747***	5.6843***	4.7587***	6.1639***	7.3536***	9.0685***	6.6709***	3.4351***	0.2593
Value		0.1049	0.6000	0.3944	0.1951	0.4088	0.2935	0.4226	0.3692	0.5597	0.4910	0.3860
	t-stat.	0.6034	3.1447***	2.2437**	2.1276**	3.3385***	2.5221**	4.0035***	2.3992**	3.5592***	2.3272**	1.1361
Adjusted		0.8592	0.8845	0.8756	0.8877	0.8836	0.8973	0.9056	0.8914	0.8905	0.8676	0.2033
Model 3: Carhart Four Factor Model												
Constant		-0.0002	-0.0025	-0.0015	0.0014	0.0008	0.0001	0.0059	0.0038	0.0075	0.0146	0.0148
	t-stat.	-0.0988	-1.2342	-0.6250	0.6520	0.3868	0.0708	2.8682***	1.9813**	3.4182***	4.4550***	3.7580**
Market		0.8744	1.0224	1.0305	1.0756	1.0008	1.0833	1.0153	1.0028	1.1186	1.1334	0.2589
	t-stat.	32.2891***	20.4824***	19.1367***	19.0136***	16.2739***	30.3101***	31.1842***	35.5321***	18.7951***	23.5851***	5.0458***
Size		0.8123	0.8925	1.2160	0.9046	0.7698	0.9668	0.8917	1.0864	1.3000	0.8961	0.0870
	t-stat.	4.7349***	4.9701***	6.7741***	5.6082***	4.8364***	6.3015***	7.2529***	9.0547***	7.2598***	3.3467***	0.2638
Value		0.1496	0.6117	0.4722	0.1627	0.3570	0.1795	0.3979	0.3438	0.3777	0.5270	0.3774
	t-stat.	0.8887	2.7293***	2.2109**	1.1387	2.8075***	1.5436	3.6131***	2.3797**	2.8109***	2.2369**	1.1055
Momentum		0.0977	0.0256	0.1702	-0.0707	-0.1131	-0.2493	-0.0540	-0.0557	-0.3980	0.0787	-0.0104
	t-stat.	0.6092	0.1541	0.9542	-0.4508	-0.8554	-2.1308**	-0.4663	-0.4194	-3.3412***	0.4343	-0.0367
Adjusted		0.8591	0.8840	0.8762	0.8874	0.8837	0.8996	0.9052	0.8910	0.8960	0.8671	0.2038
Model 4: Fama-French Five Factor Model												
Constant		-0.0002	-0.0021	0.0008	0.0028	0.0003	-0.0008	0.0051	0.0027	0.0060	0.0147	0.0149
	t-stat.	-0.1038	-0.8918	0.3230	1.1614	0.1558	-0.0335	2.2046**	1.3443	2.5076**	3.9249***	3.3262**
Market		0.9220	1.0241	1.0102	1.0146	0.9730	1.0543	1.0174	0.9926	1.0697	1.1268	0.2048
	t-stat.	23.1468***	22.0689***	16.5073***	22.7745***	21.5407***	27.0634***	26.1664***	29.3383***	20.2618***	19.1966***	2.7522***
Size		0.7298	0.8644	1.1123	0.8694	0.8333	0.8705	0.9395	1.2322	1.3186	0.9807	0.2509
	t-stat.	3.3507***	4.4092***	6.1648***	4.7102***	5.1895***	5.1503***	6.6735***	9.8701***	6.1644***	3.4446***	0.6717
Value		0.0286	0.5593	0.1984	0.0949	0.4854	0.1861	0.4997	0.5624	0.6135	0.5789	0.5502
	t-stat.	0.1761	3.2233***	1.2432	0.7362	3.0047***	1.2569	4.1399**	3.3631***	3.0057***	2.6095***	1.6917*
Profitability		0.2408	-0.0505	-0.5003	-0.5885	-0.0723	-0.2493	0.1429	0.1914	-0.1303	0.0197	-0.2211
	t-stat.	0.9677	-0.1918	-1.6066	-2.4084**	-0.3411	-1.1625	0.7001	1.0505	-0.4528	0.0749	-0.5080
Investment		0.7262	0.0822	-0.0423	-0.5889	-0.4402	0.0191	-0.0752	-0.4728	-0.4451	-0.3303	-1.0566
	t-stat.	2.7576***	0.2642	-0.1055	-1.7889*	-1.3022	0.0718	-0.3737	-1.7324*	-1.2908	-1.1195	-2.3862**
Adjusted		0.8676	0.8835	0.8781	0.8939	0.8852	0.8973	0.9052	0.8954	0.8915	0.8676	0.2414

Model 5: Standard CAPM + Liquidity Factor												
Constant		0.0112	0.0118	0.0144	0.0106	0.0070	0.0071	0.0132	0.0088	0.0138	0.0167	0.0055
	t-stat.	4.5748***	3.2396***	4.1664***	4.9721***	2.7895***	2.4231**	4.4740***	3.0196***	3.6554***	5.4417***	2.9144***
Market		0.9530	1.1534	1.1487	1.1280	1.0410	1.1119	1.0599	1.0075	1.1313	1.1273	0.1743
	t-stat.	32.8937***	25.2806***	23.3216***	21.7023***	16.8669***	29.6229***	24.8299***	28.0728***	18.3511***	31.2365***	6.0887***
Liquidity		-0.9040	-0.9167	-0.8384	-0.3958	0.1947	0.2280	0.2446	0.9405	0.9468	1.5030	2.4071
	t-stat.	-4.7279***	-2.9350***	-2.7567***	-1.6674*	0.7843	0.2678	0.9739	3.4656***	2.5045**	7.4864***	15.9209***
Adjusted		0.8515	0.8232	0.8001	0.8462	0.8245	0.8380	0.8343	0.8359	0.8010	0.8672	0.7505
Model 6: Fama-French Three Factor Model + Liquidity Factor												
Constant		0.0046	0.0024	0.0036	0.0033	-0.0009	-0.0007	0.0051	-0.0001	0.0026	0.0086	0.0039
	t-stat.	2.1751**	1.2833	1.7521*	1.8454*	-0.0451	-0.3169	2.2763**	-0.1128	1.2143	3.6247***	2.0974**
Market		0.9260	1.0734	1.0865	1.0938	0.9896	1.0696	1.0058	0.9609	1.0618	1.0735	0.1474
	t-stat.	35.9495***	27.1253***	23.7555***	20.4360***	15.9526***	29.4467***	29.4282***	40.9175***	17.5056***	28.8729***	5.0745***
Size		0.8341	0.9075	1.2456	0.9026	0.7566	0.9404	0.8844	1.0708	1.2491	0.8885	0.0544
	t-stat.	5.8795***	7.2755***	7.5118***	6.3939***	4.6659***	6.1756***	7.3334***	8.8310***	7.4582***	4.8106***	0.3501
Value		0.1608	0.6605	0.4502	0.2227	0.4035	0.2953	0.4151	0.3221	0.5200	0.4117	0.2509
	t-stat.	1.4299	6.5452***	3.4012***	2.6400***	3.5036***	2.5331**	4.1439***	4.4681***	4.6837***	4.4404***	2.8933***
Liquidity		-0.9809	-1.0618	-0.9797	-0.4851	0.0923	0.0933	0.1321	0.8273	0.8964	1.3907	2.3745
	t-stat.	-6.1949***	-9.6440***	-7.9629***	-3.7111***	0.7090	0.2389	1.0260	6.4345***	5.4804***	9.0261***	15.3717***
Adjusted		0.9073	0.9217	0.9064	0.8955	0.8833	0.8968	0.9057	0.9161	0.9040	0.9217	0.7645
Model 7: Carhart Four Factor Model + Liquidity Factor												
Constant		0.0047	0.0029	0.0033	0.0040	0.0004	0.0005	0.0053	-0.0004	0.0042	0.0073	0.0025
	t-stat.	2.1540**	1.6345	1.5311	2.1467**	0.2034	0.2200	2.5167**	-0.2647	2.0005**	3.1378***	1.3039
Market		0.9276	1.0806	1.0830	1.1029	0.9967	1.0873	1.0085	0.9577	1.0837	1.0561	0.1285
	t-stat.	35.7964***	26.8464***	23.6543***	20.5839***	15.7786***	29.3227***	31.0239***	39.3402***	18.1962***	30.0555***	4.0530***
Size		0.8366	0.9191	1.2400	0.9171	0.7679	0.9687	0.8886	1.0658	1.2840	0.8607	0.0241
	t-stat.	5.9511***	7.2920***	7.4347***	6.5120***	4.7210***	6.3556***	7.1868***	8.5219***	8.2199***	4.6082***	0.1811
Value		0.1507	0.6129	0.4733	0.1633	0.3570	0.1795	0.3977	0.3428	0.3770	0.5254	0.3793
	t-stat.	1.2608	4.9199***	2.9945**	1.3177	2.8811***	1.5733	3.7220***	4.3370***	3.2623***	4.9037***	4.0836***
Momentum		-0.0226	-0.1062	0.0515	-0.1325	-0.1038	-0.2583	-0.0386	0.0463	-0.3190	0.2537	0.2854
	t-stat.	-0.1995	-0.9669	0.4115	-0.9226	-0.7812	-2.1711**	-0.3268	0.3749	-2.9159***	2.0860**	2.1946**
Liquidity		-0.9845	-1.0787	-0.9715	-0.5062	0.0758	0.0841	0.1260	0.8346	0.8457	1.4311	2.4199
	t-stat.	-6.1623***	-9.0294***	-8.2324***	-3.7858***	0.5964	0.5484	0.9860	5.9295***	5.1557***	9.5397***	16.3292***
Adjusted		0.9069	0.9218	0.9060	0.8957	0.8833	0.8993	0.9053	0.9158	0.9073	0.9236	0.7737

Model 8: Fama-French Five Factor Model + Liquidity Factor												
Constant		0.0037	0.0024	0.0050	0.0051	0.0002	-0.0004	0.0047	-0.0005	0.0032	0.0088	0.0051
	t-stat.	1.6457	1.1541	2.2393**	2.4129**	0.0899	-0.0163	1.9643*	-0.3369	1.3121	3.4839***	2.5429**
Market		0.9571	1.0653	1.0474	1.0353	0.9717	1.0547	1.0131	0.9634	1.0445	1.0741	0.1170
	t-stat.	32.8931***	30.0182***	21.6262***	27.0263***	20.9063***	26.6883***	24.9994***	32.8430***	18.9842***	27.9118***	3.9521***
Size		0.8241	0.9750	1.2124	0.9251	0.8299	0.8716	0.9279	1.1538	1.2509	0.8390	0.0148
	t-stat.	4.8590***	7.4451***	6.7808***	5.6473***	5.0158***	5.1439***	6.5675***	9.3432***	6.6856***	4.2363***	0.1298
Value		0.1829	0.7402	0.3621	0.1859	0.4798	0.1878	0.4807	0.4342	0.5027	0.3471	0.1642
	t-stat.	1.7451*	5.6937***	2.3347**	1.3848	2.9980***	1.2977	4.0117***	4.2188***	3.0157***	2.5609**	1.5973
Profitability		0.2971	0.0155	-0.4406	-0.5553	-0.0743	-0.2487	0.1359	0.1446	-0.1708	-0.0649	-0.3621
	t-stat.	1.5786	0.0888	-1.9968**	-2.4933**	-0.3530	-1.1626	0.6648	0.9437	-0.6183	-0.3338	-2.1061**
Investment		0.4066	-0.2925	-0.3814	-0.7775	-0.4286	0.0155	-0.0359	-0.2071	-0.2155	0.1499	-0.2566
	t-stat.	2.5649**	-1.1360	-1.1707	-2.4556**	-1.1844	0.0590	-0.1787	-0.8181	-0.5680	0.6114	-1.3084
Liquidity		-0.9439	-1.1068	-1.0014	-0.5568	0.0342	0.0507	0.1158	0.7846	0.8779	1.4184	2.3623
	t-stat.	-6.9171***	-9.8640***	-7.4509***	-3.8571***	0.2233	0.0810	0.9262	6.3840***	5.0124***	8.4144***	15.2815***
Adjusted		0.9101	0.9221	0.9088	0.9037	0.8847	0.8968	0.9052	0.9165	0.9037	0.9213	0.7676

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table VIII: Regression Results of Amihud Illiquidity Ratio Sorted Portfolios

Factor		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
Model 1: Standard CAPM												
Constant		0.0006	0.0020	0.0080	0.0075	0.0072	0.0116	0.0162	0.0184	0.0188	0.0301	0.0295
	t-stat.	1.7539*	1.2795	3.7770***	2.6398***	3.1099***	4.4907***	5.0955***	5.3130***	5.2469***	6.2500***	4.2484***
Market		1.1450	1.1311	1.1289	1.1443	1.0886	1.0704	1.0335	1.0935	1.0001	1.1040	-0.0409
	t-stat.	30.4669***	26.2867***	27.1134***	19.6328***	28.4843***	24.3008***	24.1730***	22.8602***	18.8721***	19.1367***	-0.5544
Adjusted		0.9222	0.9045	0.8741	0.8302	0.8406	0.8212	0.7841	0.7427	0.6750	0.6394	0.0016
Model 2: Fama-French Three Factor Model												
Constant		0.0012	-0.0008	0.0028	0.0005	-0.0007	0.0026	0.0053	0.0036	0.0025	0.0105	0.0093
	t-stat.	0.6947	-0.0053	1.6410	0.2358	-0.4184	1.4001	2.3162**	1.7839*	1.0959	3.2111***	2.2676**
Market		1.1059	1.0866	1.0698	1.0653	1.0340	1.0318	0.9762	1.0248	0.9421	1.0236	-0.0823
	t-stat.	33.5290***	25.6375***	25.3061***	19.9734***	28.1827***	23.3485***	26.8733***	23.7732***	17.9872***	19.0336***	-1.2489
Size		-0.3739	-0.0152	0.3570	0.4949	0.8213	1.0883	1.2459	1.7451	2.0675	2.4073	2.7855
	t-stat.	-2.7546***	-0.1040	2.8705***	2.9704***	6.4738***	7.5252***	8.9426***	11.3528***	11.8276***	10.6420***	9.7825***
Value		0.4045	0.4026	0.4811	0.6407	0.3744	0.1929	0.3389	0.3715	0.2299	0.3835	-0.0210
	t-stat.	2.8237***	2.7633***	4.1293***	4.3123***	2.7159***	1.4462	2.8537***	2.7692***	1.4654	1.8140*	-0.0716
Adjusted		0.9289	0.9151	0.9062	0.8847	0.8996	0.8882	0.8899	0.9029	0.8814	0.8754	0.5751

Model 3: Carhart Four Factor Model												
Constant		0.0031	0.0011	0.0030	0.0010	-0.0005	0.0029	0.0051	0.0030	0.0028	0.0092	0.0060
	t-stat.	1.8996*	0.8003	1.6731*	0.4337	-0.3061	1.4776	2.1660**	1.4812	1.1821	3.0373***	1.7377*
Market		1.1321	1.1032	1.0716	1.0719	1.0368	1.0358	0.9727	1.0159	0.9464	1.0054	-0.1267
	t-stat.	39.0353***	25.7370***	25.1819***	20.1665***	28.9449***	23.7559***	27.9961***	23.1911***	17.5287***	18.4481***	-2.0053**
Size		-0.3276	0.0140	0.3602	0.5065	0.8262	1.0953	1.2397	1.7294	2.0750	2.3753	2.7062
	t-stat.	-2.6400***	0.1016	2.8137***	3.0019***	6.4397***	7.6900***	9.1011***	11.5016***	12.1145***	10.7085***	10.6180***
Value		0.2079	0.2783	0.4675	0.5914	0.3537	0.1632	0.3650	0.4382	0.1980	0.5194	0.3114
	t-stat.	1.6787*	2.2062**	3.4746***	3.8655***	2.1379**	1.2228	3.1701***	2.9419***	1.0940	2.1977**	1.2002
Momentum		-0.4298	-0.2720	-0.0296	-0.1077	-0.0451	-0.0649	0.0570	0.1458	-0.0696	0.2971	0.7270
	t-stat.	-3.3219***	-2.8463***	-0.2284	-0.9623	-0.3167	-0.6085	0.3804	1.1946	-0.6284	1.7284*	3.6519***
Adjusted		0.9372	0.9182	0.9057	0.8846	0.8992	0.8879	0.8895	0.9033	0.8811	0.8779	0.6188
Model 4: Fama-French Five Factor Model												
Constant		0.0027	0.0003	0.0031	0.0001	-0.0012	0.0018	0.0046	0.0041	0.0043	0.0113	0.0086
	t-stat.	1.5666	0.1969	1.6321	0.0659	-0.6659	0.8812	1.9234*	1.8817*	1.6936*	3.3650***	2.0313**
Market		1.0541	1.0660	1.0508	1.0450	1.0469	1.0329	1.0140	1.0069	0.8979	1.0161	-0.0379
	t-stat.	33.0127***	27.6840***	25.2131***	23.5210***	22.9336***	23.5658***	23.4014***	23.0423***	19.9665***	16.3092***	-0.5127
Size		-0.3928	0.0107	0.3874	0.6301	0.8550	1.1984	1.2011	1.7376	1.9673	2.3174	2.7103
	t-stat.	-2.8841***	0.0704	2.5423**	3.5105***	6.5551***	7.0183***	7.4616***	10.5736***	10.7752***	9.1263***	8.6667***
Value		0.3212	0.4140	0.4998	0.7967	0.4334	0.3398	0.3221	0.3414	0.0477	0.2562	-0.0649
	t-stat.	2.2835**	2.4057**	3.7034***	4.6980***	2.6123***	2.2985**	2.4484**	1.9674*	0.3246	1.6046	-0.2019
Profitability		-0.5274	-0.1526	-0.1310	0.0349	0.1802	0.1965	0.2856	-0.1834	-0.5920	-0.2232	0.3042
	t-stat.	-2.9034***	-0.7692	-0.5700	0.1350	0.6191	0.8325	1.1816	-0.7208	-2.1776**	-0.6719	0.8614
Investment		-0.5548	-0.3071	-0.3010	-0.5863	0.0630	-0.2729	0.5566	-0.1883	-0.2557	0.1459	0.7007
	t-stat.	-2.7709***	-1.2498	-1.1290	-1.7761*	0.1911	-0.9992	2.1577**	-0.5782	-0.8632	0.4654	2.0456**
Adjusted		0.9345	0.9155	0.9064	0.8884	0.8991	0.8895	0.8933	0.9025	0.8855	0.8753	0.5830
Model 5: Standard CAPM + Liquidity Factor												
Constant		0.0033	0.0019	0.0040	0.0014	-0.0002	0.0037	0.0051	0.0019	0.0007	0.0069	0.0036
	t-stat.	1.6029	1.1399	1.9724**	0.4845	-0.1182	1.6105	1.9824**	0.9095	0.2918	2.9924***	1.5666
Market		1.1354	1.1315	1.1431	1.1665	1.1155	1.0987	1.0733	1.1524	1.0653	1.1873	0.0518
	t-stat.	31.3283***	26.6647***	27.4049***	19.7207***	29.7809***	24.5068***	27.4074***	32.1897***	24.2194***	28.8001***	1.4920
Liquidity		-0.2828	0.0112	0.4203	0.6565	0.7973	0.8376	1.1763	1.7425	1.9272	2.4630	2.7458
	t-stat.	-2.4494**	0.1447	4.3916***	6.2286***	7.9139***	6.5231***	11.9244***	18.5368***	17.0735***	19.0257***	28.9653***
Adjusted		0.9266	0.9040	0.8838	0.8527	0.8784	0.8634	0.8700	0.9029	0.8882	0.9105	0.8142

Model 6: Fama-French Three Factor Model + Liquidity Factor												
Constant		0.0028	0.0013	0.0034	0.0007	-0.0008	0.0028	0.0045	0.0014	0.0006	0.0065	0.0036
	t-stat.	1.7868*	0.9198	1.9449*	0.3265	-0.4845	1.4487	1.9570*	0.7277	0.0317	2.9826***	1.4778
Market		1.0704	1.0575	1.0567	1.0605	1.0372	1.0271	0.9943	1.0728	0.9952	1.1093	0.0389
	t-stat.	34.8509***	22.4623***	23.5696***	19.6541***	26.3835***	22.3748***	26.0974***	26.0028***	20.1310***	24.8335***	0.9423
Size		0.4637	0.6704	0.6651	0.6079	0.7478	1.1998	0.8185	0.6110	0.8161	0.3854	-0.0782
	t-stat.	2.0840**	2.4698**	2.7479***	1.7967*	2.5964**	3.9850***	3.0729***	2.1616**	2.3459**	1.1270	-0.2589
Value		0.3620	0.3678	0.4654	0.6349	0.3781	0.1872	0.3606	0.4291	0.2934	0.4861	0.1241
	t-stat.	3.0669**	3.2706***	4.5095***	4.3116***	2.5812**	1.4220	2.7274***	4.3282***	2.7492***	4.1120***	1.1017
Liquidity		-0.8012	-0.6558	-0.2947	-0.1080	0.0703	0.1066	0.4087	1.0848	1.1969	1.9339	2.7352
	t-stat.	-4.4494***	-3.5118***	-1.5575	-0.4329	0.2952	0.4668	1.9677*	5.5196***	5.4014***	9.2887***	14.1290***
Adjusted		0.9400	0.9223	0.9072	0.8843	0.8992	0.8879	0.8925	0.9208	0.9053	0.9244	0.8146
Model 7: Carhart Four Factor Model + Liquidity Factor												
Constant		0.0039	0.0019	0.0033	0.0011	-0.0006	0.0030	0.0045	0.0016	0.0011	0.0067	0.0028
	t-stat.	2.4245**	1.3322	1.8733*	0.4637	-0.3706	1.4943	2.0047**	0.8660	0.5423	3.0773***	1.1957
Market		1.0960	1.0713	1.0545	1.0685	1.0424	1.0312	0.9960	1.0776	1.0213	1.1145	0.0184
	t-stat.	38.9904***	21.9890***	23.0935***	19.7202***	27.0044***	22.5739***	26.6838***	26.2766***	21.0439***	26.0257***	0.5172
Size		0.3397	0.6038	0.6757	0.5693	0.7223	1.1799	0.8107	0.5878	0.6895	0.3604	0.02064
	t-stat.	1.7035*	2.2329**	2.8036***	1.6704*	2.5810**	3.8619***	2.7114***	2.0313**	2.2233**	1.1004	0.0783
Value		0.2279	0.2959	0.4769	0.5933	0.3506	0.1657	0.3522	0.4040	0.1566	0.4591	0.2311
	t-stat.	1.9551*	2.7683***	3.9037***	3.9922***	2.0795**	1.3120	2.9101***	3.8559***	1.4992	3.3678***	2.0123**
Momentum		-0.3106	-0.1666	0.02667	-0.0965	-0.0637	-0.0498	-0.0195	-0.0581	-0.3171	-0.0627	0.2478
	t-stat.	-2.7628***	-1.5730	0.2145	-0.7838	-0.4363	-0.4472	-0.1152	-0.4373	-3.0113***	-0.4917	2.8827***
Liquidity		-0.6506	-0.5750	-0.3076	-0.0612	0.1012	0.1125	0.4182	1.1130	1.3506	1.9643	2.6150
	t-stat.	-4.1269***	-2.9209***	-1.5995	-0.2309	0.4218	0.3465	1.7169*	5.3780***	6.4417***	10.1643***	14.7198***
Adjusted		0.9438	0.9231	0.9067	0.8841	0.8989	0.8874	0.8919	0.9206	0.9089	0.9241	0.8178
Model 8: Fama-French Five Factor Model + Liquidity Factor												
Constant		0.0044	0.0017	0.0037	0.0002	-0.0014	0.0020	0.0038	0.0016	0.0016	0.0070	0.0025
	t-stat.	3.0000***	1.1050	1.9314*	0.0936	-0.7552	0.9282	1.6093	0.8730	0.7239	3.1493***	1.0229
Market		1.0222	1.0400	1.0397	1.0439	1.0501	1.0306	1.0288	1.0525	0.9472	1.0950	0.0727
	t-stat.	35.1183***	27.0723***	23.9509***	23.8230***	21.9187***	22.7772***	22.3902***	24.9431***	23.4112***	21.8795***	1.6230
Size		0.3968	0.6553	0.6597	0.6589	0.7771	1.2557	0.8340	0.6109	0.7481	0.3662	-0.0305
	t-stat.	2.2674**	2.4497**	2.7260***	2.0191**	2.6742***	4.2924***	2.9132***	2.1951**	2.2558**	1.0759	-0.0903
Value		0.2419	0.3492	0.4725	0.7938	0.4412	0.3341	0.3590	0.4546	0.1702	0.4523	0.2104
	t-stat.	2.2273**	2.2234**	3.5028***	4.6101***	2.5885**	2.2208**	2.5624**	3.0751***	1.3927	3.2178***	1.8969*

Profitability		-0.5522	-0.1728	-0.1395	0.0340	0.1826	0.1947	0.2971	-0.1481	-0.5538	-0.1620	0.3901
	t-stat.	-2.9951***	-0.8941	-0.6331	0.1331	0.6261	0.8348	1.2500	-0.6741	-2.9809***	-0.8525	2.8273***
Investment		-0.4411	-0.2143	-0.2618	-0.5822	0.0518	-0.2646	0.5037	-0.3505	-0.4312	-0.1350	0.3061
	t-stat.	-2.3904**	-0.7981	-0.9619	-1.7265*	0.1558	-0.9624	1.9226*	-1.1854	-1.6993*	-0.5776	1.4783
Liquidity		-0.7849	-0.6406	-0.2707	-0.0286	0.0773	0.0869	0.3648	1.11998	1.2118	1.9394	2.7243
	t-stat.	-5.7929***	-3.3515***	-1.4711	-0.1272	0.3342	0.2751	1.6777*	6.1275***	5.7241***	9.9250***	15.3726***
Adjusted		0.9449	0.9223	0.9072	0.8879	0.8987	0.8890	0.8952	0.9215	0.9096	0.9240	0.8177

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table IX: Regression Results of Standard CAPM of Liquidity-Sorted Portfolios of BSE in Boom and Recession Periods

Portfolios		P1 (Liquid)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (Illiquid)	P10-P1
L1: Trading Volume												
Boom		-0.0049*	0.0007	0.0058*	0.0073**	0.0137***	0.0115***	0.0191***	0.023***	0.0277***	0.0384***	0.0434***
		1.2424***	1.1577***	1.1607***	1.1404***	1.1499***	1.099***	1.0868***	1.0711***	1.0623***	1.0318***	-0.2106**
Recession		0.0005	0.0038	0.0057	0.0078	0.0026**	0.0091	0.0133	0.0068**	0.014*	0.0185**	0.0179***
		1.3145	1.1637	1.1073	1.1209	1.0553	1.0110	1.0186	0.9248	0.9406	0.8479*	-0.4665**
L2: Turnover Rate												
Boom		0.0066	0.0119***	0.0129***	0.0112***	0.0152***	0.0133***	0.0159***	0.016***	0.0171***	0.0189***	0.0122**
		1.402***	1.2321***	1.1151***	1.148***	1.0908***	1.0586***	1.0899***	1.0321***	0.9725***	0.968***	-0.4339***
Recession		0.0051	0.0097	0.0080	0.0076	0.0043**	0.0027**	0.0140	0.0089	0.0109*	0.0131*	0.0080*
		1.4823	1.2254	1.1047	1.0480	1.0385	0.9475	0.9943	0.8868*	0.8720	0.8674	-0.6149*
L3: Relative (Quoted) Spread												
Boom		-0.0038	0.0004	0.0038	0.0115***	0.0099***	0.0152***	0.0163***	0.0213***	0.0245***	0.0411***	0.0449***
		1.1873***	1.1193***	1.2582***	1.1546***	1.0803***	1.0793***	1.0846***	1.0602***	1.0667***	1.0497***	-0.1376
Recession		0.0003	0.0055	0.0068	0.0043	0.0113	0.0057*	0.0091	0.0105*	0.0112**	0.0202**	0.0199***
		1.2101	1.1518	1.1879	1.0619	1.0853	1.0497	0.9978	0.9342	0.9229	0.8974	-0.3127
L4: Effective Spread												
Boom		0.0054*	0.0071*	0.0093**	0.0086**	0.0093**	0.0081**	0.0148***	0.022***	0.0205***	0.0321***	0.0266***
		0.9624***	1.1448***	1.1373***	1.1331***	1.0806***	1.1207***	1.1444***	1.0389***	1.2015***	1.1688***	0.2064***
Recession		0.0061	0.0058	0.0101	0.0076	0.0050	0.0064	0.0107	0.0028***	0.0135*	0.0154***	0.0092**
		0.847*	1.0587	1.0718	1.0763	1.0068	1.1047	0.9846**	1.0148	1.1269	1.1932	0.3461
L5: Amihud Illiquidity ratio												
Boom		-0.0004	0.0013	0.0076**	0.0082**	0.0111***	0.0143***	0.0178***	0.0227***	0.0231***	0.0347***	0.0351***
		1.1524***	1.1384***	1.155***	1.1579***	1.0866***	1.0944***	1.0814***	1.1251***	0.9878***	1.1872***	0.0348
Recession		0.0017	0.0025	0.0075	0.0061	0.0023*	0.0071	0.0121	0.0113*	0.0138*	0.0205*	0.0188**
		1.144	1.1272	1.1012	1.1233	1.0622	1.0218	0.9645	1.0234	0.9829	0.9707*	-0.1733

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.