



ILLIQUIDITY PREMIUM IN THE INDIAN STOCK MARKET: AN EMPIRICAL STUDY



Shweta Kundlia^{1*}
 Divya Verma²

^{1,2}Guru Gobind Singh Indraprastha University, India.
¹Email: kundlia.shweta@gmail.com Tel: +919711451675
²Email: divya.ipu@gmail.com Tel: +919899841851



(+ Corresponding author)

ABSTRACT

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India has the highest global mean illiquidity ratio (Amihud, Hameed, Kang, & Zhang, 2019), which is the primary motivation for this study. This paper aims to price the traded illiquidity and test the well-documented asset pricing models: the capital asset pricing model and the Fama & French's (1993) three-factor model. The average annual illiquidity premium for the Indian stock market is found to be considerably high when compared to the illiquidity premiums in other developed and developing nations, suggesting that market illiquidity is of more concern to investors in India. It is also found that illiquidity augmented capital asset pricing model and illiquidity augmented Fama & French (1993) three-factor model outperforms the traditional capital asset pricing model and the Fama & French (1993) three-factor models, respectively. It is concluded that illiquidity is definitely a priced component and a key factor in designing asset pricing models for an emerging market such as India's. Findings of the paper contribute to existing literature on liquidity and asset pricing and help investors design better investment strategies.

Contribution/Originality: This study is one of very few studies which have investigated the price of traded illiquidity in an emerging market. This study documents the illiquidity premium in the Indian stock market by showcasing its positive and significant presence in asset pricing models when explaining excess returns on portfolios.

1. INTRODUCTION

The ease of transferring business ownership is an important corporate characteristic. This activity is facilitated by the market structure in which it operates (Bernstein, 1987) and is generally referred to as market liquidity of stocks or capital assets. Since ownership transfers in markets come with liquidity costs, the illiquidity effect is priceable and should be considered in the valuation of capital assets as it influences required rate of returns on capital (Amihud & Mendelson, 1986; Datar, Naik, & Radcliffe, 1998). The impact of liquidity on the cost of capital has raised the importance of liquidity as a characteristic, since the required rate of return on stocks affect the capital allocation of the companies (Amihud & Mendelson, 1991; Lipson & Mortal, 2009).

Trading mechanisms and market structure play a major role in defining stock's liquidity (Harris, 2003; Kyle, 1985). However, developed markets are more structured, transparent, and liquid. Emerging markets still lack adequate infrastructure for easy tradability of stocks, and high liquidity costs exist in these markets. Due to the

presence of market frictions and liquidity costs, investors expect higher returns as compensation for such risks (Amihud, Mendelson, & Pedersen, 2005). The foundation of pricing illiquidity is laid down by Amihud & Mendelson (1986). They found a positive relationship between bid-ask spread and expected excess stock returns for NYSE stocks. In contrast to the findings of Amihud & Mendelson (1986), some studies found that the significant positive illiquidity-return relationship is seasonal and non-significant in non-January months (Chan & Faff, 2003; Eleswarapu & Reinganum, 1993). On the other hand, many studies denied the seasonality in positive illiquidity-stock returns relationship and confirmed that a positive illiquidity premium exists and needs to be priced in asset pricing models (Brennan, Chordia, & Subrahmanyam, 1998; Datar et al., 1998; Eleswarapu, 1997).

Numerous empirical studies found the presence of systematic illiquidity premium in explaining excess stock returns, even after adjusting for other risk factors. Marcelo & Quirós (2006) studied illiquidity premium in the Spanish stock market by augmenting the illiquidity factor in the Fama & French (1993) three-factor model and confirmed that the existing asset pricing models fail to capture illiquidity premium in excess stock returns. They also concluded that illiquidity premium is a key component in designing asset pricing models. Few studies suggest that a four-factor model, i.e., liquidity risk factor along with the three Fama-French risk factors (market, size and value), perform best when pricing assets (Amanda & Husodo, 2015; Hoang & Phan, 2019; Lam & Tam, 2011). Liu (2006) studied the price of liquidity in US stock markets and found that liquidity augmented capital asset pricing model, i.e., the two-factor model is the best model to explain excess stock returns. The study concluded that the two-factor model subsumes the effect of size and book-to-market factor. Literature also suggests that illiquidity premium is higher for small-sized stocks (Chordia, Huh, & Subrahmanyam, 2009) and stronger for distressed stocks (Rahim & Nor, 2007). Variations in excess returns on small stocks is popularly known as the “small firm effect” and is partially due to the market illiquidity risk (Amihud, 2002). Zhong & Takehara (2020) suggested that though illiquidity is priced in Japan, the illiquidity premium overlaps book-to-market and size premiums. This unravels the importance of illiquidity premium in explaining excess stock returns and helps to decipher the equity premium puzzle.

The role of the market illiquidity premium factor was found to be significant and positively priced in the developed markets of US, Hong Kong, Australia and Spain (Chan & Faff, 2005; Keene & Peterson, 2007; Lam & Tam, 2011; Miralles, Quirós, & Miralles, 2004), while it is not significantly priced in the developed markets of Portugal and Norway (Leirvik, Fiskerstrand, & Fjellvikås, 2017; Miralles-Quiros, Miralles-Quiros, & Oliveira, 2017). Empirical studies on emerging markets in Vietnam, Taiwan, Croatia, Indonesia and Poland have found that the illiquidity premium factor is significant and positively priced (Amanda & Husodo, 2015; Chen, Tai, & Cho, 2019; Ganja, 2019; Hoang & Phan, 2019; Minović & Živković, 2014).

India has the highest global mean illiquidity ratio of 3.028, followed by Poland and Romania (Amihud et al., 2019), which motivated us to study premium associated with illiquidity in the Indian stock market. This study has found that the average annual illiquidity premium for the Indian stock market stands at approximately 23%, which is quite high when compared to illiquidity premiums in other markets, such as the US – 2.04% to 4% (Amihud & Noh, 2020; Keene & Peterson, 2007), Spain – 2.54% (Miralles et al., 2004), Australia – 4% (Chan & Faff, 2005), Vietnam – 0.11% (Hoang & Phan, 2019), Indonesia – 7.68% (Amanda & Husodo, 2015), and Taiwan – 16% (Chen et al., 2019). High illiquidity premium in the Indian stock market suggests that stock market illiquidity is of more concern to investors in India than elsewhere.

In an international traded illiquidity factor study by Amihud et al. (2019) it was found that annual illiquidity premium in emerging markets is 13.32%, which is considerably higher than the annual illiquidity premium of 8.58% in developed markets. In addition, the Asia-Pacific region was found to be high on market illiquidity where India accounts for the highest average illiquidity. Thus, it is imperative to test the illiquidity premium in the Indian stock market. This study tests two widely used asset pricing models for illiquidity premium in the Indian stock market, considering the high illiquidity in the emerging market of India. The main objective of this paper is to price the

traded illiquidity factor, which is the differential return premium on illiquid stocks over liquid stocks. The paper constructs and tests the traded illiquidity factor, which is similar to Liu (2006); Amihud et al. (2019) and Chen et al. (2019). Traded illiquidity tested in the paper is different from the non-traded illiquidity factor, which is a systematic risk of innovations in market illiquidity, tested by Pástor & Stambaugh (2003) and Acharya & Pedersen (2005). The paper aims to determine the systematic illiquidity premium for the Indian stock market using the traded illiquidity factor. This paper also investigates well-documented asset pricing models: the capital asset pricing model (CAPM) and the Fama & French (1993) three-factor (FFTF) model for illiquidity premium, and constructs the illiquidity factor augmented CAPM and illiquidity factor augmented FFTF models to price systematic traded illiquidity in the Indian stock market.

The rest of the paper is designed as follows: Section two explains the methodology used in the study, section three details the results and analysis, section four concludes the paper, and section five provides future scope for research.

2. METHODOLOGY

The main objective of the paper is to study the systematic illiquidity premium for the Indian stock market. This paper studies two well-documented asset pricing models – CAPM and FFTF – for the presence of systematic illiquidity premium.

2.1. Data

Data for variables such as returns, closing prices, volumes traded, market equity and book equity was collected from the Centre for Monitoring Indian Economy Prowess IQ database for stocks listed on the National Stock Exchange (NSE) from October 2000 to September 2019. The study is based on companies which have been continuously listed on NSE since 1999 to avoid any survivorship bias (Dash & Mahakud, 2014). Stocks which were traded at least 50 days in a year were included to ensure that the stocks under study were investable (Agarwalla, Jacob, & Varma, 2014). For the construction of the market factor, Nifty 50 returns were used as a proxy for market risk and the treasury bill rate was used as a proxy for the risk-free rate of return.

2.2. Illiquidity Measure

The illiquidity measure developed by Amihud (2002) was computed for the purpose of this study and was used to measure the extent to which price varies due to trading volumes. Amihud's (2002) illiquidity ratio is the best price impact liquidity measure for emerging markets (Ahn, Cai, & Yang, 2018; Będowska-Sójka, 2018). Moreover, Kyle's (1985) price impact measure of liquidity is best explained by Amihud's (2002) illiquidity ratio (Goyenko, Holden, & Trzcinka, 2009; Hasbrouck, 2009). For the purpose of this study, Amihud's (2002) illiquidity ratio for the Indian stock market is calculated by Equation 1:

$$Illiq_{i,t} = \frac{1}{n} \sum_{t=1}^n \frac{|r_{i,t}|}{RsVol_{i,t}} \quad (1)$$

Here, n is the number of trading days on which stock i is traded, $r_{i,t}$ is the return on stock i for day t and $RsVol_{i,t}$ is the value of stocks traded in a day of stock i .

2.3. Variables

In order to test asset pricing models, three characteristic-based risk factors are constructed based on illiquidity, size, and value. Illiquidity factor (IML) traded is the differential return between illiquid and liquid stocks and is constructed by following the methodology of Amihud (2019). In order to construct IML, illiquidity quintiles are formed within volatility terciles, i.e., portfolios are constructed by first sorting the stocks into three volatility

categories and then within each volatility portfolio, five illiquidity portfolios are formed. In this manner, 15 illiquidity portfolios are constructed every year at the end of month m . Stock returns one month ahead of portfolio formation month m are used to construct IML. This is done to avoid any short-term momentum or reversal effects of illiquidity. Additionally, six size-value mimicking portfolios were formed following Fama & French (1993) to construct size factor (SMB) and value factor (HML). All characteristic risk factors were computed using value weighted average stock returns. In addition to the characteristic-based risk factors, market factor (RMrf) (Sharpe; 1964; Linter, 1965) was also constructed. For pricing systematic illiquidity and testing asset pricing models, univariate illiquidity decile portfolios were created. Excess portfolio returns on illiquidity deciles are denoted as P1, P2, P3, P4, P5, P6, P7, P8, P9 and P10. These range from excess returns on most illiquid stocks' portfolio (P1) to least illiquid stocks' portfolio (P10).

2.4. Model Specifications

In accordance with previous studies (Chan & Faff, 2005; Marozva, 2019; Miralles et al., 2004; Rahim & Nor, 2007), the current paper studies the role of systematic illiquidity in asset pricing models. First, the traditional asset pricing models of CAPM and FTF were tested using models in Equations 2 and 3, respectively. Then illiquidity factor augmented CAPM and illiquidity factor augmented FTF models were tested using Equations 4 and 5, respectively.

$$(r_i - r_f)_t = \beta_0 + \beta_{RMrf,i} * RMrf_t \quad (2)$$

$$(r_i - r_f)_t = \beta_0 + \beta_{RMrf,i} * RMrf_t + \beta_{SMB,i} * SMB_t + \beta_{HML,i} * HML_t \quad (3)$$

$$(r_i - r_f)_t = \beta_0 + \beta_{RMrf,i} * RMrf_t + \beta_{IML,i} * IML_t \quad (4)$$

$$(r_i - r_f)_t = \beta_0 + \beta_{RMrf,i} * RMrf_t + \beta_{SMB,i} * SMB_t + \beta_{HML,i} * HML_t + \beta_{IML,i} * IML_t \quad (5)$$

Following the Fama & French (1993), monthly excess portfolio returns on decile portfolios are estimated by the multiple time series regression approach of Black, Jensen, & Scholes (1972). The efficiency of asset pricing models was assessed by testing intercepts of the regression models. The Gibbons, Ross, & Shanken (1989) (GRS) test was used to ascertain whether the model intercepts jointly approach zero. The time series results were further confirmed by the cross-sectional regression analysis given by Fama & MacBeth (1973).

3. RESULTS AND ANALYSIS

Descriptive statistics for the risk factors are given in Table 1. The mean monthly illiquidity premium in the Indian stock market is 1.43%, which is higher than the other premium factors and is analogous to the mean monthly illiquidity premium of emerging markets (Amihud et al., 2019). Results show positive mean monthly risk premiums of 0.54%, 0.75% and 0.59% for market, size and value, respectively. Time series variations in market and illiquidity factors are quite high as the standard deviation is above 6%.

Table 2 gives the descriptive statistics of excess returns on illiquidity decile portfolios. P1 indicates the excess returns on the most illiquid stocks and P10 gives the excess returns on the least illiquid stocks. The mean monthly excess return on P1, the most illiquid portfolio, is 2.67%, and on P10, the least illiquid portfolio, is 0.75%. The excess returns on portfolios decrease monotonically with increases in the liquidity of stock portfolios. This shows that an annual illiquidity risk premium of approximately 23% exists between illiquid and liquid stock portfolios, which are considerably high.

Table 1. Descriptive statistics of risk factors.

	RMrf	SMB	HML	IML
Mean	0.549952	0.754406*	0.595178*	1.43608***
t-value	1.286425	1.779213	1.723751	3.25288
Median	0.29864	-0.061147	0.325621	0.29048
Maximum	21.48436	21.39522	19.68999	27.0172
Minimum	-16.98069	-13.77567	-9.511938	-13.949
Std. Dev.	6.015512	5.966361	4.858533	6.21216
Skewness	-0.025472	0.677389	0.872877	0.91145
Kurtosis	3.601395	3.730971	4.926398	4.8986
Jarque-Bera	3.005239	19.55038	55.75897	57.1533
Probability	0.222546	0.000057	0	0
Obs.	198	198	198	198

Notes: RMrf is the market factor, SMB is the size factor, HML is the value factor, and IML is the illiquidity factor. RMrf is the excess returns on market, SMB is the differential return between large and small stocks, HML is the differential return between growth and value stocks, and IML is the return differential between liquid and illiquid stocks. Significance level at 1% is denoted by *** and significance at 10% is denoted by *.

Table 2. Descriptive statistics of excess returns over illiquidity decile portfolios.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Mean	2.679	2.237	2.016	2.025	1.806	1.912	1.921	1.502	1.542	0.755
t-value	2.638	3.439	3.268	3.573	3.287	3.675	3.354	2.633	2.865	1.666
Median	0.920	2.316	2.146	2.209	1.804	1.601	2.072	1.572	1.854	0.500
Maximum	51.737	29.029	33.098	28.104	34.680	30.321	41.446	34.408	31.739	31.395
Minimum	-39.660	-23.741	-21.357	-16.997	-17.544	-21.565	-22.007	-28.952	-21.405	-18.433
Std. Dev.	14.293	9.152	8.678	7.977	7.734	7.321	8.061	8.027	7.571	6.382
Skewness	0.644	0.159	0.221	0.223	0.369	0.039	0.958	0.195	0.119	0.324
Kurtosis	4.584	3.204	3.948	3.399	4.502	4.099	7.722	7.022	4.402	5.563
Jarque-Bera	34.413	1.181	9.031	2.959	23.102	10.010	214.261	134.705	16.694	57.637
Probability	0.000	0.554	0.011	0.228	0.000	0.007	0.000	0.000	0.000	0.000
Obs.	198	198	198	198	198	198	198	198	198	198

Notes: The table gives summary statistics for decile portfolios constructed using univariate sorting. P1 represents the summary statistics for expected excess returns on most illiquid stocks' portfolio and P10 represents summary statistics for the expected excess returns on least illiquid stocks' portfolio.

3.1. Time Series Evidence

Table 3 gives the results of the capital asset pricing model (CAPM) and the illiquidity factor augmented CAPM. First, Equation 2 was tested to find whether CAPM captures the excess returns on decile portfolios and it was found that though the market factor of the model is significant in explaining the excess returns for all the decile portfolios, the intercepts remain significant for all portfolios except for the excess returns on the most liquid portfolio, i.e., P10. This indicates the presence of unexplained variables, as the excess returns on decile portfolios are not fully explained by the market factor. The CAPM results also show that the intercepts are not only positive and significant, but the intercept values also tend to decline with the increase in liquidity of stock portfolios. It was also observed that the goodness of fit for the models improved from P1 to P10, indicating that the CAPM model is weak in explaining the excess returns on portfolios with high illiquidity. In order to check the price of illiquidity, the illiquidity factor was augmented in the CAPM and Equation 4 was tested. The CAPM model improved as the illiquidity factor was augmented and most of the intercept values became insignificant. Illiquidity was found to be significant in explaining excess returns of nine decile portfolios, i.e., 90% of the stocks in our sample. β_{IML} were high for decile portfolios with high illiquidity and tended to decrease with an increase in liquidity of stock portfolios, while the market factor was able to completely explain the excess returns on the most liquid stocks in the P10 portfolio which accounted for 10% of total stocks in our sample. It was also observed that the R-squared values of all the models increased when the illiquidity factor augmented CAPM was run. In addition, a Gibbons Ross Shanken (GRS) test was employed to test the joint significance of intercept terms for all the models. The p-value for the GRS test on the CAPM model was 3.86%, which is less than 5%, suggesting that the intercepts of CAPM model are jointly not equal to zero. On the other hand, the p-value for the GRS test on the illiquidity factor augmented CAPM model was 37.98%, which indicates that intercept terms on portfolios are equal to zero. Thus, in the Indian context, excess returns on stocks cannot be explained completely by the CAPM and the illiquidity factor augmented CAPM performed better.

Table 3. CAPM: test for illiquidity premium.

CAPM											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	
β_0	2.011911**	1.665918***	1.480594***	1.52014***	1.270997***	1.413336***	1.393779***	0.948466**	0.939264***	0.198965	
β_{RMrf}	1.213601***	1.038561***	0.972713***	0.918494***	0.973576***	0.906729***	0.959542***	1.006986***	1.095506***	1.01195***	
R ²	0.260873	0.465971	0.454599	0.479777	0.573484	0.555028	0.512703	0.569434	0.757653	0.909695	
GRS statistic				1.9706732				p-value			0.03862623
Illiquidity factor in the augmented CAPM											
β_0	-0.078471	0.581183	0.504288	0.689097**	0.603721*	0.929719***	0.879031**	0.539428	0.720776***	0.165378	
β_{RMrf}	1.398381***	1.134446***	1.059014***	0.991955***	1.03256***	0.949479***	1.005043***	1.043143***	1.114819***	1.014919***	
β_{IML}	1.384857***	0.718626***	0.646793***	0.550558***	0.442064***	0.320391***	0.341016***	0.270984***	0.144746***	0.022251	
R ²	0.617091	0.699924	0.665373	0.660544	0.697472	0.627697	0.580611	0.612677	0.771524	0.910156	
GRS statistic				1.0797489				p-value			0.3798113

Notes: The table shows the results of the CAPM model for illiquidity premium. For the purpose of the study, excess returns on illiquidity decile portfolios were regressed by the market factor (RMrf) and the illiquidity factor (IML). RMrf is the excess returns on market and IML is the return differential between illiquid and liquid stocks. All the risk factors were tested for multicollinearity using the variance inflation factor (VIF) and it was found that multicollinearity did not exist. Significant coefficients are marked with *** for 1% significance, ** for 5% and * for 10%.

Table 4. FTF: test for illiquidity premium.

FTF											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	
β_0	1.103102	1.14333***	0.915792***	1.026079***	0.84762***	1.057046***	1.034922***	0.629062*	0.717493***	0.148144	
β_{RMrf}	0.897704***	0.876289***	0.798527***	0.765829***	0.83861***	0.792606***	0.837806***	0.892057***	1.015039***	0.99359***	
β_{SMB}	0.926301***	0.777846***	0.855784***	0.744849***	0.585873***	0.486161***	0.403738***	0.276139***	0.18327***	0.043002	
β_{HML}	0.644733***	0.042035	0.025182	0.027054	0.093444	0.087854	0.203677**	0.292836***	0.214666***	0.047848	
R ²	0.52862	0.723961	0.79497	0.786697	0.797727	0.730553	0.646857	0.673282	0.814038	0.913857	
GRS statistic				2.7190416				p-value			0.00386582
Illiquidity factor augmented FTF											
β_0	-0.06589	0.706147**	0.675915**	0.841274***	0.719821***	1.036729***	0.947644***	0.57435*	0.751761***	0.175444	
β_{RMrf}	1.193496***	0.98691***	0.859224***	0.81259***	0.870947***	0.797747***	0.85989***	0.905901***	1.006368***	0.986682***	
β_{SMB}	0.246663*	0.523673***	0.716323***	0.637405***	0.511572***	0.474349***	0.352995***	0.24433***	0.203193***	0.058874*	
β_{HML}	0.566562***	0.0128	0.009141	0.014696	0.084898	0.086495	0.19784**	0.289177***	0.216957***	0.049674	
β_{IML}	1.09017***	0.407705***	0.223702***	0.172344***	0.119183**	0.018948	0.081394	0.051023	-0.031958	-0.02546	
R ²	0.664362	0.770267	0.810474	0.797589	0.803269	0.730709	0.649236	0.674225	0.814453	0.914228	
GRS statistic				1.8099378				p-value			0.06146152

Notes: The table shows the results of the FTF model for illiquidity premium. For the purpose of the study, excess returns on illiquidity decile portfolios were regressed by the market factor (RMrf), size factor (SMB), value factor (HML), and illiquidity factor (IML). RMrf is the excess returns on market, SMB is the differential return between large and small stocks, HML is the differential return between growth and value stocks, and IML is the return differential between liquid and illiquid stocks. All the risk factors were tested for multicollinearity using the variance inflation factor (VIF) and it was found that multicollinearity did not exist. Significant coefficients are marked with *** for 1% significance, ** for 5% and * for 10%.

The paper also tested the Fama & French (1993) three-factor asset pricing model for illiquidity premium and the results are shown in Table 4. First, the Fama & French (1993) three-factor model was run to test whether the excess returns on decile portfolios can be explained by FTF risk factors. It was found that the coefficients of market factor and size factor are significant for most of the excess returns on portfolio, while value factor is able to explain excess returns significantly for a smaller number of portfolios. Market factor explains the excess portfolio returns and its coefficients increase with the increase in liquidity of stocks. Thus, market factor has greater relevance in explaining excess returns on liquid stocks. On the other hand, size factor significantly explains excess returns on 90% of stocks and β_{SMB} decreases when investigating the explanation of excess returns on liquid stocks. The intercepts of the models remain significant apart from the excess returns on extreme portfolios. This is an indication that the FTF model is not able to explain the excess returns on most of the portfolios. When the illiquidity factor was augmented in the FTF model, it was found that intercept values reduced but remained significant for most of the models. Excess returns on portfolios are explained significantly by illiquidity factor for five portfolios which are high on illiquidity, namely P1, P2, P3, P4 and P5. It was also observed that β_{IML} is the highest for the most illiquid portfolio and β_{SMB} becomes insignificant in explaining the excess returns on P1 when the illiquidity factor is augmented with the FTF model. The R-squared of the models improved when the illiquidity factor augmented FTF model was run. When the GRS test was run on the FTF model, the p-value was 0.38%, which is less than 5% and thus the intercepts of the FTF model are significant and are jointly not equal to zero. On the other hand, the p-value for the GRS test on the illiquidity factor augmented FTF model was 6.14%, which indicates that intercept terms on portfolios tend to be jointly equal to zero. Thus, in an Indian context, excess returns on stocks cannot be explained completely by the FTF model and the illiquidity factor augmented FTF model performed better.

From the time series evidence, it can be concluded that the illiquidity factor in the Indian stock market is definitely priceable and should be considered while constructing asset pricing models. Results of the study have found that the illiquidity factor augmented in the CAPM and in the FTF models performed better than the CAPM and FTF models, respectively.

3.2. Cross-sectional Evidence

In this section, a traditional two-step (Fama & French, 1993) cross-sectional regression model was performed in order to test the performance of the two asset pricing models – CAPM and FTF. Cross-sectional significance and presence of illiquidity premium was also tested by augmenting the illiquidity factor in the CAPM and FTF models, respectively. The models tested in this section are:

$$r_{i,t} = \gamma_0 + \gamma_1 * \beta_{RMrf,i} \quad (6)$$

$$r_{i,t} = \gamma_0 + \gamma_1 * \beta_{RMrf,i} + \gamma_4 * \beta_{IML,i} \quad (7)$$

$$r_{i,t} = \gamma_0 + \gamma_1 * \beta_{RMrf,i} + \gamma_2 * \beta_{SMB,i} + \gamma_3 * \beta_{HML,i} \quad (8)$$

$$r_{i,t} = \gamma_0 + \gamma_1 * \beta_{RMrf,i} + \gamma_2 * \beta_{SMB,i} + \gamma_3 * \beta_{HML,i} + \gamma_4 * \beta_{IML,i} \quad (9)$$

Equations 6 and 8 test cross-sectional evidence for the CAPM and FTF models, respectively, while Equations 7 and 9 give cross-sectional evidence for illiquidity factor augmented CAPM and FTF models, respectively. The results for two-step (Fama & MacBeth, 1973) cross-sectional regression are given in Table 5 and they suggest that the CAPM is not a good model as the market risk factor was not found to be significant and the R-squared value is very low at only 8.65%, which is the lowest of all the R-squared values of the models tested. The FTF model performed well in the Indian stock market as both the size and value factors turned out to be significant in

explaining the cross-sectional excess returns on portfolios. The R-squared value of the FFTF model is good and the model explains 88.89% of the excess returns on the portfolios. When the illiquidity factor is augmented in the CAPM, it shows that γ_4 is significant and thus the illiquidity factor is priced. The illiquidity factor augmented FFTF model was not able to explain the excess portfolio returns and, jointly, all the factors became insignificant in the cross-sectional regression.

Cross-sectional evidence fails to price the illiquidity factor with FFTF model but it was found to be priced when augmented in the CAPM. In this section, the illiquidity factor augmented CAPM performed best out of all the models and the F-statistic value of the model is the highest of all at 17.50 and the R-squared value is also good at 83.33%, thus explaining the cross-sectional results.

Table 5. Cross-sectional asset pricing tests.

	γ_0	γ_1	γ_2	γ_3	γ_4	R-squared	F-statistic
CAPM	0.175142	1.648419				0.086569	0.758189
Illiquidity factor augmented CAPM	2.795234***	-1.60833*			1.595058***	0.833336	17.50033
FFTF	1.742498	-0.83216	1.269577***	0.899771**		0.888921	16.00526
Illiquidity factor augmented FFTF	0.678761	0.073538	1.875196	1.415426	0.626518	0.900129	11.26616

Notes: The table shows the results of the FFTF model for illiquidity premium. For the purpose of the study, excess returns on illiquidity decile portfolios are regressed by the market factor (RMrf), size factor (SMB), value factor (HML) and illiquidity factor (IML). RMrf is the excess returns on market, SMB is the differential return between large and small stocks, HML is the differential return between growth and value stocks, and IML is the return differential between liquid and illiquid stocks. Significant coefficients are marked with *** for 1% significance, ** for 5% and * for 10%.

4. CONCLUSION

The main objective of the paper was to test the illiquidity factor in the traditional asset pricing models and the systematic illiquidity premium for the Indian stock market was studied. This paper investigated two well-documented asset pricing models: the capital asset pricing model and the Fama & French (1993) three-factor model for illiquidity premium. It was found that a positive and significant illiquidity premium exists in the Indian market. Average annual illiquidity premium for the Indian stock market stands at approximately 23%, which is considerably high when compared to the illiquidity premiums in other developed and developing nations. When the CAPM and FFTF models were tested, it was found that the models were not able to explain the excess portfolio returns completely, and joint significance of intercept terms suggests that the models have significant non-zero joint intercepts. On the other hand, the illiquidity factor augmented CAPM and augmented FFTF model outperformed the CAPM and FFTF model, respectively. Illiquidity factor augmented models, when tested for intercept terms suggested that the models' joint intercept tended to be equal to zero. Thus, illiquidity is definitely a priced component and a key factor in designing asset pricing models for the Indian stock market. The findings of the paper also suggest that the illiquidity factor augmented CAPM is the best model as it proves to be the best in both the time series analysis and the cross-sectional analysis.

The findings of the paper are of great relevance as they contribute to the literature of asset pricing and help to design robust asset pricing models for emerging nations such as India. Knowledge of the significance of positive illiquidity premium in the Indian stock market can help investors make better investment decisions. Portfolio managers and financial advisors can design portfolios taking the liquidity risk appetite of their clients into consideration.

5. SCOPE FOR FUTURE RESEARCH

The illiquidity factor constructed and tested in the paper represents characteristic risk associated with liquidity. This illiquidity factor can be tested for market conditions such as tight funding or monetary liquidity. A time-varying characteristic illiquidity factor can be modeled to capture the variations in illiquidity in times of uncertainty and crisis. Illiquidity can also be studied with other important risk factors such as momentum, profitability and investment.

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