Risk Premium on Indian Stock Returns

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Abstract

The current study seeks to examine the effect of a stock's liquidity risk, as proxied by the trading volume of the stock, on its returns. It is found that in the 13 year period between 1999 and 2012, stocks with low trading volume earn a premium of 3.95 per cent a month over high trading volume stocks. This translates to a premium of 47 per cent a year. A liquidity factor formed from the returns of a hedge portfolio of high and low trading volume based stocks is found to significantly affect the returns of the stocks. This significance persists upon adjustment for the factors of market risk, size and the book-to-market value of the company. The results are also robust to testing on sub-samples as well as during different conditions of the market. The tests reveal that liquidity is indeed an important factor that should be taken into account when pricing the returns of Indian stocks.

JEL Classification: G12

Keywords: Liquidity, Asset Pricing, Trading Volume, Stock Returns, Indian Stock Market

Introduction

Liquidity, in its simplest sense, is the ease with which assets can be sold in the market. While the importance of liquidity is well-established in the case of physical assets, it was not so in the case of financial ones. A reason that has been put forward for this is the small magnitude of transactions cost incurred in trading a security as compared to physical assets like real estate. However, this opinion changed in the year 1986 when Professors Amihud and Mendelson established that the return of a stock increased in direct proportion to its bid-ask spread, the latter being a proxy for the stock's (il)liquidity. The effect was substantial and significant. In the thirty years since Amihud and Mendelson's study, the relationship between liquidity and the returns of stocks has been studied innumerable times. While most markets have been found to offer affirmatory evidence there have been exceptions. The current study aims to find out whether India belongs to the category of the former or the latter.

As previously mentioned, since it was first validated, the liquidity-return relation (L-R hereafter) has been examined many times and found to hold good across many markets of the world. Amihud and Mendelson (1986, A-M hereafter) were the first ones to study it and revealed that it held good for stocks traded on the New York Stock Exchange. Some of the earliest studies that followed A-M include the

ones by Brennan and Subrahmanyam (1996), Brennan, Chordia and Subrahmanyam (1998) who also studied stocks traded on Amex and Nasdaq; Chordia, Roll and Subrahmanyam (2000) and Acharya and Pederson (2005). Apart from North America, other developed markets amongst those studied are Japan (Hu, 1997), Australia (Marshall and Young, 2005), Switzerland (Loderer and Roth, 2005), and Taiwan (Chuang and Lee, 2011). Emerging markets too have been subject to examination in the L-R context. One of the earliest of such studies was by Rouwenhurst (1998) whose sample included countries from East, West, South and Central Asia, Latin America, and Africa. Jun, Marathe and Shawky (2002) study27 emerging markets from the regions of Asia, Middle East and Africa, Europe and Latin America; Bekaert, Harvey and Lundblad (2006) study 18 emerging markets of the world belonging to the regions of Asia-Pacific, Africa and Latin America; Wang and Kong (2011) studying the Chinese stock market and Lichewski and Voronkova (2010) study the Polish stock market.

As seen above, a substantial body of literature has found a direct relation between liquidity and the returns of a stock. However, there have been studies which either do not find a relation between the two variables or find the illiquidity of the stock to have an inverse effect on its price. Examples include Donadelli and Prosperi (2012) who study 13 developed and 19 emerging markets of the world, classified among the regions of Asia (including India), Africa, Latin America and Eastern Europe; Zaremba and Konieczka (2014) studying the Warsaw stock exchange; and most famously Eleswarapu and Reinganum (1993) who had found the liquidity-return relation restricted to the month of January. A second point gleaned from literature is that among the existing studies at least half are based on the US market. Of the other half a substantial portion is dedicated to other developed markets of the world. The studies which do cover emerging markets study them as part of representative groups instead of standalone markets. In the case of India, the exception is nearly absolute. Though India has been part of studies before, only one so far, by Amihud, Hameed, Kang and Zhang (2015) has covered stock level liquidity in India. However, the authors adjust for risk using factors aggregated for the region and the globe. In an emerging market like India which is still highly segmented, risk factors formed from locally traded stocks are likely to yield better results.

Overall, liquidity is an important factor whose impact on the returns of stocks must be assessed. However, extant literature is biased in favour of the US and other developed markets of the world. Emerging markets have been studied in aggregate. More importantly, the evidence that is available is mixed and therefore a separate study on India is in order to find out if this effect exists here with adjustments being made for risk factors formed from locally traded stocks. The importance of such a study is emphasized due to the status of this country as the fastest growing emerging market of the world.

The current study aims to fill the gaps mentioned above. We attempt to find whether liquidity is a significant factor affecting the returns of Indian stocks and whether an illiquidity premium, is any, exists in the case of India. The use of trading volume as a liquidity proxy is prompted by its efficiency as well as ease of use. Studies such as Stoll (1978) and Subrahmanyam (1995) find it to be an important determinant of liquidity. Brennan et al (1998) and Chordiaet al (2000) find trading volume to be highly correlated with such high frequency liquidity measures as the bid-ask spread as well with other proxies like the turnover ratio. Employing the portfolio approach

we examine the time-series effects of liquidity on the returns of stocks. We adjust for risk using the well-established CAPM, a 'market and liquidity' model, the Fama-French model and a fourth 'liquidity-augmented' four-factor model. We find that illiquid Indian stocks earn a substantial premium over liquid ones, and that liquidity as risk factor, is priced in India. The results are robust to the adjustment for market risk, size and the book-to-market value, as well as to testing during different market conditions and in a sub-sample analysis.

The rest of the paper is organized as follows. Section two outlines the methodology employed. Section three deals with the results and section four concludes.

Methodology

The sample consists of all BSE 500 stocks (93 per cent of the universe by capitalization), between April 1999 and March 2012. The data are obtained from CMIE Prowess and are of daily frequency.

We proxy liquidity through the daily trading volume of a stock, measured in million rupees. It is calculated as follows,

Trading volume = numbers of shares traded (opening price of stock + closing price of stock) 2

Every year stocks are sorted on their annual trading volume and aggregated into 10 equal sized portfolios. The first portfolio consists of the most illiquid stocks (least liquid) and the last one has the least illiquid stocks (most liquid). Subsequently, average monthly returns for these portfolios are calculated.

In the preliminary analysis we calculate the average returns for all portfolios over the entire sample period to observe for a liquidity premium if any. Secondly, we run time-series regressions of these returns to adjust for the well-known risk factors said to affect the returns of stocks. This is done in the context of the following three models-

I. The CAPM

$Rpt - Rft = ap + bpRM\text{-}Rf + \varepsilon pt$

Where (Rpt – Rft) is excess portfolio returns; apis the intercept term,

RM-Rf is excess market return where RM is the market return represented by the BSE sensex and Rf is the risk-free rate represented by the yield on the 91 days treasury bill (RBI).bpis the slope coefficient of this factor ε pt is the error term assumed to have zero mean, constant variance and serially uncorrelated.

II.'Market and liquidity'model

$Rpt - Rft = ap + bpRM\text{-}Rf + \psi PLIQt + \varepsilon pt$

Where LIQ is the liquidity factor formed from the difference in returns of 20 per cent of the most illiquid stocks and 20 per cent of the most liquid stocks in the sample. This follows the methodology of S. Kim, D. Kim and Shin (2012).

ψ Pis the slope coefficient of the liquidity factor.

III. The Fama-French three-factor model

$Rpt - Rft = ap + bpRM\text{-}Rf + spSMBt + hpHMLt + \varepsilon pt$

Where SMB (Small Minus Big) represents the size factor and HML (High Minus Low) represents the book-to-market value of the stock. These factors are formed as follows. In a particular year all stocks in the sample are divided into two groups based on their median market capitalization. The groups are referred to as Small and Big (the stocks with size less than the median size being categorized as small and the ones with market cap larger than the median categorized as large). The two size based groups are again divided into three book-to-market based groups classified as high, medium and low BM groups. This brings the total number of portfolios to six. SMB is the difference between returns of the small and large size based groups while HML is the difference in the returns of the high and low book-to-market based portfolios.

Sp and hp are the slope coefficients of the size and book-to-market factors respectively.

IV.The liquidity augmented four-factor model

$Rpt - Rft = ap + bpRM\text{-}Rf + spSMBt + hpHMLt + \psi PLIQt + \varepsilon pt$

To check the soundness of our results we also carry out two tests of robustness. The first is a sub-period test where the entire sample period is divided into two equal sub-periods and the same tests are run during both periods. The second test divides the sample period on the basis of the condition of the market i.e. whether the market is in an upswing or in a downswing. Positive market excess return denotes the former state while negative excess market returns imply the latter. The pattern of results obtained if found similar to that of the full period would confirm that the results are not driven by the period in which the test is conducted or the state of the market during which they were carried out.

Overall our criteria to judge whether liquidity is indeed a factor affecting the returns of Indian stocks is to observe whether illiquid stocks are earning a premium over liquid ones. Secondly, the four-factor liquidity augmented model would perform best in terms of the significance of the intercepts as well as the adjusted R squared values. Hence, of the models compared the best explanatory power would be of the one which has no significant intercepts but has the highest average adjusted R squared values.

Results

Descriptive statistics and correlations

Table 1 presents the descriptive statistics of the trading volume sorted portfolios. Trading volume representing average liquidity steadily increases from Rs.1.63 million for the most illiquid portfolio(P1) to Rs. 523 million for the most liquid portfolio (P10). Average size of the companies as expected shows a fairly smooth, increasing trend, being Rs. 1,016 million for P1and Rs. 68,816 million for P10. The average book-to-market ratio is highest for the most illiquid companies(2.06) and lowest for the most liquid ones (0.53). This is intuitively logical as illiquid companies are likely to be undervalued possibly due to being neglected and considered unviable. All these descriptive statistics are thus on expected lines.

Table 1.

The table contains the descriptive statistics of the 10 portfolios sorted on trading volume (million rupees) for the period between April 1999 and March 2012. 'P1-P10' is the hedge portfolio formed from the difference in the returns of 20 per cent of the most illiquid and 20 per cent of the least illiquid stocks. The daily trading volume of every stock listed on the BSE 500 for the given period is calculated as the product of the share price and the average of the opening and closing prices for the day. Daily trading volume values are then averaged at the end of March every year for the preceding 12 months. Stocks are then sorted in ascending order of these values. They are subsequently divided into 10 portfolios with P1 being the least liquid (most illiquid) and

P10 being the most liquid (least illiquid) portfolio. Av. TV is the average trading volume of all the companies in a portfolio over the entire sample period. Av. Size is the average market capitalization in million rupees, over the entire period for all the companies in a portfolio. Av. BM is the average book-to-market ratio of all the companies in a given portfolio, for the entire period.

Table 1.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10
Mean	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.00	0.04
Median	0.03	0.03	0.04	0.04	0.02	0.03	0.02	0.01	0.02	0.01	0.03
Maximum	0.45	0.36	0.52	0.48	0.59	0.49	0.47	0.57	0.51	0.49	0.41
Minimum	-0.24	-0.24	-0.31	-0.33	-0.34	-0.34	-0.31	-0.32	-0.38	-0.36	-0.15
Std. Dev.	0.11	0.10	0.10	0.11	0.11	0.10	0.10	0.12	0.10	0.11	0.09
Skewness	0.55	0.39	0.48	0.09	0.65	0.21	0.14	0.91	0.25	0.28	0.74
Kurtosis	3.74	4.00	6.36	5.02	7.60	5.92	5.57	7.80	7.16	5.71	4.41
Av. TV	1.63	3.58	5.85	9.06	13.27	19.43	29.42	48.24	101.23	523.29	
Av. Size	1,016.95	1,611.48	1,993.12	2,411.74	4,039.40	5,893.32	7,740.21	11,516.15	22,081.77	68,616.13	
Av. BM	2.06	1.07	0.98	0.98	0.77	0.78	0.73	0.65	0.57	0.53	

Table 2 contains the descriptive statistics of the explanatory variables. We compare the values for the Indian market with those of the US, treating the latter as a benchmark owing to its position of being the most developed and stable market in the world. Average value of the excess market return (RM-Rf) is 0.87per cent (t= 1.23) per month. The pre sub-prime crisis excess

market return values for the US was 0.41per cent (Keene and Peterson, 2007). Compared to this value, the return in India is roughly twice. The monthly size premium (SMB) and the average monthly book-to-market value premium (HML) are 1.79per cent (t= 5.70) and 1.94 per cent (t= 4.74) respectively. While the SMB value for India is more than eight times that of the US market (0.21per cent, Keene and Peterson, 2007), the HML value is four times that of the US (0.43per cent, Keene and Peterson, 2007, Fama and French, 1993). This shows that investors in India are much more sensitive to the size and the book-to-market ratio of stocks as compared to investors of the US market.

Table 2.

These are the descriptive statistics of the explanatory variables in the time-series regressions for April1999 to March 2012. 'Rm-Rf' is the monthly market excess return, calculated as the difference between the return on the BSE 500 index and the 10 year government security rate of return. Following Fama and French (1993) SMB is the difference in the average returns of the two size based portfolios (small minus big), HML is the difference between the returns of two extreme book-to-market ratio based portfolios across the two size portfolios. LIQ is the liquidity factor represented by the difference between the returns of the least liquid 20 per cent and the most liquid 20 per cent of stocks.

Table 2

	RM_RF	SMB	HML	LIQ
Mean	0.0087	0.0179	0.0194	0.0311
Median	0.0145	0.0133	0.0157	0.0199
Maximum	0.3306	0.1643	0.2778	0.3175
Minimum	-0.2784	-0.0682	-0.0612	-0.1235
Std. Dev.	0.0846	0.0377	0.0488	0.0658
Skewness	-0.2257	0.7971	1.4649	1.1068
Kurtosis	4.5976	4.3522	7.6481	5.6436
No. of Obs	143	143	143	143

Table 3 presents the correlations between the various variables. The coefficients are in general low, the lowest being 0.09 between market risk (RM-RF) and the size factor (SMB). Comparatively the highest correlation is between size and the liquidity factor. However at 0.56 it is fairly low by itself. Overall, the correlations between the various explanatory variables are not high indicating that none of them are proxying for each other.

Table 3. Correlations between explanatory variables

Rm-Rf is the market risk factor, SMB and HML are the size and book-to-market ratio based risk factors calculated in accordance with the Fama-French (1993) methodology. LIQ is the liquidity factor formed from the difference of the least and most liquid 20 per cent stocks, sorted on the trading volume of the stock.

Table 3

	RM_RF	SMB	HML	LIQ
RM_RF	1			
SMB	0.09	1		
HML	0.21	0.25	1	
LIQ	-0.20	0.56	0.18	1

Returns of liquidity based decile portfolios

Table 4 contains average returns of the 10 portfolios sorted on trading volume for the entire period. P1 is the most illiquid portfolio and P10 is the most liquid one. In addition, returns of the portfolios in two sub-periods (April 2000-March 2006 and April 2006 to March 2012) have also been reported. As a first confirmatory indication of liquidity being a significant factor affecting stocks, the deciles show a decreasing trend in returns, from the most illiquid portfolio (P1) having a return of 4.05 per cent to the most liquid (P10) earning a return of 0.11 per cent a month. The premium earned by the most illiquid stocks over the most liquid ones is therefore 3.95 per cent a month. These results are in consonance with other such studies. For example, Acharya and Pederson (2005) find illiquid stocks traded on the NYSE earning a premium of 0.62 per cent a month over liquid stocks. The magnitude of their premium is much less as compared to ours likely due to the US being a much more efficient market as compared to India in terms of trading mechanisms and transparency. Another such study is by Amihud et al (2015) which finds the premium earned by illiquid stocks in India to be 2.56 per cent a month. This value is expectedly much closer to the one obtained in our study. The returns in the two sub-periods follow the same pattern of results as obtained for the total period. Returns in both the sub-periods are highest for the most illiquid portfolio (7.09 per cent and 2.01 per cent for sub-periods one and two respectively) and lowest for the most liquid portfolio (0.98 per cent and 0.19 per cent for the two sub-periods resp). The illiquid stocks are thus earning a premium over the liquid stocks in both the sub-periods. The high t-values indicate these premia to be significant.

Table 4. Returns on decile liquidity portfolios

The table presents the raw returns of the liquidity sorted portfolios (P1 to P10). Liquidity is proxied by and trading volume (TV). P1-P10 is the hedge portfolio representing the difference between the least and most liquid portfolios. Column two contains average returns for the full sample period. Columns three and four contain returns for the two sub-periods namely SP1 from April 2000-March 2006,and SP2 from April 2006-March 2012. T-statistics are in parentheses. *p < .01,**p < .05, ***p < .10

Table 4

Portfolios	Returns		
	Full sample period	SP1	SP2
P1	4.05	7.09	2.01
	(4.27)*	(5.08)*	(1.68)
P2	2.90	5.35	1.61
	(3.45)*	(4.25)*	(1.52)
P3	2.44	4.28	1.61
	(2.78)*	(3.91)*	(1.20)
P4	2.43	4.36	1.43
	(2.73)*	(3.79)*	(1.08)
P5	2.02	3.98	1.07
	(2.18)**	(3.68)*	(0.72)
P6	1.98	3.53	0.13
	(2.29)**	(3.35)*	(1.02)
P7	1.30	2.78	0.85
	(1.51)	(2.67)*	(0.63)
P8	1.72	3.24	1.26
	(1.78)***	(2.53)*	(0.89)
P9	0.91	2.25	0.55
	(1.06)	(2.33)*	(0.39)
P10	0.11	0.98	0.19
	(0.12)	(0.91)	(1.12)
P1-P10	3.95	6.10	1.82
	(5.14)*	(5.06)*	(2.09)*

Time-series regressions

After the preliminary analysis we proceed to adjust for the well-known risk factors affecting returns of stocks. This is done in context of four models of asset pricing – the CAPM, a 'market risk and liquidity' model, the Fama-French three-factor model and a four-factor liquidity augmented model.

Panel A in table 5 has the results of the regression of the CAPM, panel B of the 'market and liquidity model', panel C of the Fama-French model and panel four of the liquidity-augmented four factor model. It is observed that the number of significant alphas declines from six for the CAPM to three for the market and liquidity model, turning finally to zero for the Fama-French and four factor models. With the exception of the last one, in all of them the intercepts show a generally decreasing trend, that is, they are higher for the more illiquid firms than the more liquid ones. The liquidity factor has therefore, successfully explained the difference in returns of the various portfolios. The average value of the intercept too is steadily decreasing across the models. The Rm-Rf (market risk) coefficient is significant and of a magnitude of almost one. However down the models it does tend to register lower values on an average. This is likely as other factors have taken up part of the explanation. Across portfolios it shows a slightly upward trend, being lower for the more illiquid portfolios and higher for the more liquid ones. The coefficient of the size factor is as usual, highly significant for all portfolios including the hedge, and for both the models which contain it. Its average value is however much higher in the four factor model than the Fama-French one. Across portfolios it has a very definitive declining trend. The only exceptions are portfolios nine and 10 of the four factor model where it makes a sudden upward jump. The book-to-market factor registers five and eight significant coefficients in the Fama-French and the four factor liquidity-augmented models respectively. Its average coefficient however has a small magnitude of the order of 0.25. There is a marginal decreasing trend in the HML values in the Fama-French model, while none exists at all in the four factor one.

The last factor is that of liquidity (LIQ). All the coefficients for this factor, including the one for the hedge portfolio, are significant in the four factor model, most of them at the one per cent level. It is positive for the most illiquid stocks and turns negative form P3 onwards for the most liquid ones. In terms of absolute magnitude this factor is highest for the liquid firms, registering coefficients of -0.46 and -0.52 for portfolios nine and 10 respectively. For portfolios one and two, these values are 0.27 and 0.14 respectively. For the hedge portfolio however LIQ registers the highest coefficient of all, 0.79. The average adjusted R squared values increase from 56 per cent for the CAPM through 65 per cent for the Fama-French model to 68 per cent for the four-factor model. A comparison of the average adjusted R squared values of the CAPM and the 'market and liquidity' models shows that the addition of the liquidity factor adds four percent to the explanatory power of the CAPM.

Table 5.Regression results of deciles sorted on trading volume of a stock

The table reports the coefficients from regressions run on the monthly returns of the 10 portfolios formed of BSE 500 stocks sorted on the basis of their liquidity (calculated by the trading volume), for the period April 1999 to March 2012. The models covered are – The CAPM : Rpt – Rft= Rf+ bpRM-Rf +εpt(Panel A), where Rm-Rf is the market risk factor; Market and Liquidity factors model: Rpt – Rft= ap+ bpRM-Rf+ ψPLIQt+ εpt (Panel B), where LIQ is the liquidity factor formed from a portfolio long on the 20 per cent most illiquid stocks and short on the 20 per cent most liquid stocks; the Fama-French model Rpt – Rft= ap+ bpRM-Rf+spSMBt+ hpHMLt+ εpt(Panel C), where SMB and HML are the size and book-to-market factors resp.; and the four-factor liquidity augmented model : Rpt – Rft= ap+ bpRM-Rf + spSMBt+ hpHMLt+ ψPLIQt+ εpt(Panel D).The last but one column contains the coefficients for hedge portfolio (P1-P10). The last column contains the average adjusted R squared values of portfolios one to ten, computed by averaging the adjusted R squared values of the 10 portfolios. T-statistics are in parentheses. *p<.01, **p< .05, ***P<.10

Table 5

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av. Adj R
Panel A. CAPM												
C	0.0333*	0.0217*	0.0161*	0.0158*	0.0113***	0.0113**	0.0045	0.0088	0.0005	-0.0077	0.0410*	
	(4.4225)	(3.5988)	(2.8139)	(2.7678)	(1.9239)	(2.1359)	(0.8679)	(1.2771)	(0.0973)	(-1.3148)	(5.36)	
RM_RF	0.8296*	0.8374*	0.9453*	0.9667*	1.022*	0.9706*	0.9778*	0.9583*	0.9845*	1.0017*	-0.1721***	
	(9.3364)	(11.7768)	(13.9851)	(14.3268)	(14.7506)	(15.5792)	(16.1126)	(11.7796)	(16.2847)	(14.5297)	(-1.9081)	
Adjusted R-squared	0.3777	0.4923	0.5781	0.5899	0.604	0.6299	0.6455	0.4924	0.6504	0.5967	0.0183	0.5657
Panel B. Market + LIQ												
C	0.0101	0.0071	0.0104***	0.0128*	0.0102	0.0112***	0.0062	0.0089	0.008	0.0022	0.008	
	(1.4863)	(1.1992)	(1.6826)	(2.0442)	(1.5721)	(1.9257)	(1.0904)	(1.1711)	(1.4717)	(0.354)	(1.5797)	
RM_RF	0.9519*	0.9143*	0.9752*	0.9826*	1.028*	0.971*	0.9688*	0.9578*	0.9449*	0.9497*	0.0021	
	(12.7463)	(14.0503)	(14.3347)	(14.2885)	(14.498)	(15.2199)	(15.6195)	(11.4975)	(15.8599)	(14.1636)	(0.0382)	

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av. Adj R
LIQ	0.6901*	0.4338*	0.1691**	0.0895	0.0337	0.0022	-0.0508	-0.0028	-0.2233*	-0.2932*	0.9834*	
	(8.2355)	(5.941)	(2.2148)	(1.1599)	(0.4231)	(0.0302)	(-0.7294)	(-0.0297)	(-3.3397)	(-3.8965)	(15.8649)	
Adjusted R-squared	0.5778	0.5916	0.5895	0.5909	0.6017	0.6273	0.6444	0.4888	0.6739	0.6336	0.6466	0.6019
Panel C. Fama-French model												
C	-0.0002	-0.0001	-0.0012	-0.0005	-0.0033	-0.0002	-0.0067	-0.0043	-0.005	-0.011	0.0109	
	(-0.0277)	(-0.0235)	(-0.2058)	(-0.0765)	(-0.5286)	(-0.0394)	(-1.1976)	(-0.5991)	(-0.8653)	(-1.6514)	(1.6214)	
RM_RF	0.7269*	0.7716*	0.8955*	0.909*	0.9765*	0.9297*	0.9395*	0.8721*	0.9616*	0.9863*	-0.2594*	
	(11.3551)	(12.9849)	(14.796)	(14.5679)	(14.8895)	(15.3782)	(15.9458)	(11.3896)	(15.6415)	(13.9289)	(-3.6524)	
SMB	1.5461*	1.0226*	0.8412*	0.6531*	0.6622*	0.4601*	0.4588*	0.0227*	0.1787*	0.0885*	1.4576*	
	(10.6518)	(7.5896)	(6.1292)	(4.616)	(4.453)	(3.3564)	(3.4346)	(0.1305)	(1.2818)	(0.5512)	(9.0503)	
HML	0.3414*	0.2084***	0.1357	0.2611**	0.1588	0.1859***	0.1659	0.6957*	0.1294	0.0974	0.244***	
	(2.992)	(1.9672)	(1.2576)	(2.3477)	(1.3585)	(1.7245)	(1.5799)	(5.0962)	(1.1804)	(0.772)	(1.927)	
Adjusted R-squared	0.6920	0.6619	0.6774	0.6656	0.6617	0.6677	0.6815	0.5712	0.6553	0.5943	0.4198	0.6528
Panel D. Four-factor liquidity augmented model												
C	-0.0032	-0.0018	0.0006	0.0021	0.0000	0.0026	-0.0030	-0.0023	0.0001	-0.0053	0.0021	
	(-0.5347)	(-0.315)	(0.1079)	(0.3553)	(-0.001)	(0.4655)	(-0.5592)	(-0.32)	(0.0189)	(-0.8656)	(0.4166)	
RM_RF	0.7922*	0.8073*	0.8566*	0.8541*	0.9056*	0.8681*	0.8593*	0.8286*	0.8503*	0.8608*	-0.0686	
	(12.0987)	(12.9834)	(13.548)	(13.2612)	(13.5585)	(14.0363)	(14.6705)	(10.3286)	(14.6899)	(12.8416)	(-1.2422)	

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av. Adj R
SMB	1.2431*	0.857*	1.022*	0.9076*	0.9914*	0.7458*	0.8306*	0.2245*	0.6947*	0.6706*	0.5725*	
	(7.2800)	(5.2851)	(6.1986)	(5.4035)	(5.6918)	(4.6243)	(5.4381)	(1.0729)	(4.6018)	(3.8361)	(3.9752)	
HML	0.2985*	0.1849***	0.1613	0.2972*	0.2054***	0.2263**	0.2186**	0.7242*	0.2024**	0.1799	0.1186	
	(2.6773)	(1.7465)	(1.4982)	(2.7097)	(1.8064)	(2.1490)	(2.1916)	(5.3014)	(2.0537)	(1.5759)	(1.2615)	
LIQ	0.2717*	0.1485***	-0.1621***	-0.2282*	-0.2951*	-0.2562*	-0.3333*	-0.1809***	-0.4626*	-0.5218*	0.7935*	
	(3.1346)	(1.8044)	(-1.9369)	(-2.6762)	(-3.3378)	(-3.1289)	(-4.2994)	(-1.7037)	(-6.0374)	(-5.8813)	(10.855)	
Adjusted R-squared	0.7104	0.6673	0.6837	0.6798	0.6847	0.6875	0.717	0.5769	0.7253	0.6733	0.6848	0.6806

Robustness tests

We subject the data to two different robustness tests, one of seasonality and the other of a sub-period analysis. The two best performing models, the Fama-French three factor model and the liquidity-augmented four-factor model have not only had no significant intercepts, they have also had the highest adjusted R squared values among all the models. Consequently, it is these two models that we subject to further tests of robustness in the following sections.

Sub-period tests

Table 6 shows the results of the sub-period regression run on the trading volume sorted portfolios. None of the intercepts are significant for either model in either sub-period. The coefficients are sporadically negative and a clear trend is absent. The market risk factor is again uniformly significant at the one per cent level for both the models and across the sub-periods. The coefficients however register higher values for the second sub-period (SP2) than the first (SP1). In the first sub-period the Rm-Rf values for the first and last portfolios of the four factor model are 0.53 and 0.56 respectively. In the second sub-period the same values rise to 0.85 and 1.30 respectively. As noticeable, while the market factor curve across portfolios is relatively flat in SP1, it clearly acquires an ascending character in SP2. This increase in the market factor values from the first to the second sub-period is consistent in both the models. Combined with the presence of a trend, this indicates some phenomenon present in the second sub-period that consistently made the market risk factor more important here than in the first sub-period. The size factor SMB too is uniformly significant at the one per cent level in both the periods and for both the models. In the first sub-period it is highest for the most illiquid firms in the four factor model (1.40 for P1) and lowest for the most liquid ones (0.59 for

P10). This trend though attenuated, persists in the second sub-period where SMB has a value of 0.60 for P1 and 0.40 for P10, both values for the four-factor model. The Fama-French model has a similar trend across portfolios. HML registers four and three significant coefficients for the Fama-French and four-factor models in the first sub-period and none at all in the second sub-period for the four factor model. The lack of consistency in the HML factor is in line with results of studies such as Hu (1997) who had found the book-to-market ratio an unreliable predictor across sub-periods in the Japanese market. The liquidity factor 'LIQ' has three and five significant coefficients in the two sub-periods including for the hedge portfolio. The trend is the same as for the total sample period, it is positive for the illiquid firms (0.23 for P1, SP1) and negative for the liquid firms (-0.35 for P10, SP1). In the second period too it has positive values for the illiquid firms and negative values for the liquid ones. The average adjusted R squared values increase from the Fama-French to the four-factor model in both the sub periods. However the values are much higher in the second sub period than in the first, being 37 per cent and 40 per cent for the two models respectively in SP1 and 90 per cent and 92 per cent respectively in SP2. The results in the two sub-periods are therefore in line with those for the total sample period.

Table 6. Regression results for the sub-period robustness of liquidity sorted portfolios.

The table reports the coefficients from sub-period regressions run on the monthly returns of the 10 portfolios (P1 to P10), formed of BSE 500 stocks sorted on the basis of their liquidity (calculated by trading volume). Panel A has results for the first sub-period (April 2000 to March 2006) and Panel B has results of the second sub-period (April 2006 to March 2012). The models covered are – a) The Fama-French model Rpt – Rft= ap+ bpRM-Rf+spSMBt+ hpHMLt+ εpt, where RM-Rfis the market risk factor and SMB and HML represent size and book-to-market ratio resp.; b) The four-factor Liquidity augmented model: Rpt – Rft= ap+ bpRM-Rf + spSMBt+ hpHMLt+ ψPLIQt+ εpt where LIQ is the liquidity factor calculated as the return on a portfolio long on 20 per cent of the most illiquid stocks and short on 20 per cent of the most liquid stocks. The last but one column contains the coefficients for hedge portfolio (P1-P10). The last column has the average adjusted R squared value of the model, calculated by averaging the adjusted R squared values of all the 10 portfolios of a given model. T-statistics are in parentheses. *p<.01, **p< .05, ***P<.10

Table 6

Panel A. SUB-PERIOD 1

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av adj R^2
Fama-French model												
C	0.002	-0.0027	0.0017	0.0049	0.0055	0.0068	-0.0035	-0.0011	0.0027	-0.0075	0.0043	
	(0.1662)	(-0.2365)	(0.157)	(0.4224)	(0.4889)	(0.6293)	(-0.328)	(-0.0794)	(0.2583)	(-0.6043)	(0.3654)	
RM_RF	0.5858*	0.682*	0.6173*	0.6412*	0.6172*	0.6506*	0.6434*	0.4544*	0.5765*	0.538*	0.0528	
	(4.8672)	(5.886)	(5.631)	(5.3688)	(5.3557)	(5.8919)	(5.8989)	(3.2302)	(5.3395)	(4.2277)	(0.4381)	
SMB	1.6963*	1.1945*	0.8632*	0.6117*	0.6037*	0.3518	0.4956**	-0.1607	0.155	0.1709	1.5288*	
	(7.4701)	(5.4645)	(4.1734)	(2.7149)	(2.7767)	(1.6891)	(2.4083)	(-0.6054)	(0.761)	(0.7118)	(6.7276)	
HML	0.4225**	0.3324**	0.1941	0.348**	0.1965	0.2299	0.1687	0.8837*	0.1263	0.0537	0.3666**	
	(2.5652)	(2.0964)	(1.2938)	(2.1293)	(1.2464)	(1.5214)	(1.1305)	(4.5911)	(0.8548)	(0.3086)	(2.2241)	
Adjusted R-squared	0.5741	0.5155	0.4301	0.3817	0.3558	0.3673	0.3772	0.3145	0.2901	0.1881	0.4297	0.37944

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av adj R^2
Liquidity-augmented four-factor model												
C	-0.0004	-0.0039	0.0029	0.0072	0.0077	0.0087	-0.0009	-0.0004	0.0062	-0.004	0.0036	
	(-0.0311)	(-0.3388)	(0.266)	(0.6187)	(0.6918)	(0.8118)	(-0.0887)	(-0.027)	(0.6173)	(-0.3327)	(0.3589)	
RM_RF	0.5764*	0.6772*	0.6222*	0.6504*	0.6263*	0.6585*	0.654*	0.4573*	0.5906*	0.5524*	0.024	
	(4.8569)	(5.8311)	(5.667)	(5.5164)	(5.5118)	(6.0238)	(6.1526)	(3.2283)	(5.7923)	(4.5153)	(0.2324)	
SMB	1.4071*	1.0463*	1.0114*	0.8908*	0.8803*	0.5925**	0.8162*	-0.0713	0.5866**	0.6094	0.7976*	
	(5.063)	(3.8473)	(3.9335)	(3.2264)	(3.3081)	(2.3145)	(3.2791)	(-0.2149)	(2.4564)	(2.1271)	(3.3025)	
HML	0.3608**	0.3007	0.2257	0.4076**	0.2556	0.2812	0.2372	0.9027*	0.2184	0.1474	0.2134	
	(2.1733)	(1.8514)	(1.4699)	(2.4714)	(1.6082)	(1.8394)	(1.5953)	(4.5562)	(1.5314)	(0.8612)	(1.4791)	
LIQ	0.2365	0.1212	-0.1212	-0.2283	-0.2262	-0.1968	-0.2622**	-0.0731	-0.3529*	-0.3586**	0.5952*	
	(1.753)	(0.9179)	(-0.9711)	(-1.7028)	(-1.751)	(-1.5835)	(-2.1699)	(-0.4539)	(-3.0445)	(-2.5785)	(5.0758)	

Adjusted R-squared	0.5869	0.5143	0.4296	0.3987	0.3751	0.3812	0.4099	0.3063	0.3681	0.2512	0.6064	0.40213
Panel B. SUB-PERIOD 2												
Fama-French model												
C	-0.0016	0.0011	-0.0009	-0.0021	-0.0062	-0.0024	-0.0062	-0.0026	-0.0068	-0.0093**	0.0022	
	(-0.3328)	(0.2845)	(-0.2023)	(-0.5556)	(-1.2394)	(-0.5288)	(-1.5559)	(-0.6762)	(-1.6555)	(-2.3083)	(0.3499)	
RM_RF	0.8746*	0.8922*	1.1289*	1.1445*	1.2651*	1.1555*	1.1667*	1.2439*	1.2549*	1.3125*	-0.4325*	
	(16.0101)	(21.2695)	(21.569)	(27.2306)	(22.7468)	(23.0082)	(26.1194)	(28.7192)	(27.3366)	(29.2942)	(-6.1939)	
SMB	1.2629*	0.7664*	0.8076*	0.741*	0.7246*	0.6456*	0.3598*	0.4906*	0.1566	-0.1315	1.4049*	
	(8.0165)	(6.3356)	(5.3512)	(6.1142)	(4.5181)	(4.4581)	(2.7932)	(3.9282)	(1.1832)	(-1.0182)	(6.9768)	
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P1-P10**	**Av adj R^2**
HML	0.0153	-0.1979***	-0.1333	-0.1395	-0.1266	-0.0888	0.0839	-0.0393	-0.0031	0.1569	-0.1498	
	(0.1036)	(-1.7489)	(-0.9439)	(-1.2307)	(-0.8437)	(-0.6554)	(0.6966)	(-0.3361)	(-0.0248)	(1.2983)	(-0.7954)	
Adjusted R-squared	0.8524	0.8888	0.8909	0.9276	0.8984	0.9008	0.9212	0.9329	0.9241	0.9341	0.541	0.9071
Four-factor liquidity augmented model												
C	-0.0071	-0.001	-0.0014	-0.0021	-0.0053	-0.0013	-0.004	-0.0033	-0.0031	-0.0048	-0.0023	
	(-1.8015)	(-0.2766)	(-0.2816)	(-0.5332)	(-1.0338)	(-0.293)	(-1.0273)	(-0.8317)	(-0.8367)	(-1.4745)	(-0.7917)	
RM_RF	1.1542*	0.9987*	1.1498*	1.1434*	1.2197*	1.1029*	1.0551*	1.279*	1.0637*	1.0839*	0.0703	
	(18.9945)	(17.6048)	(15.4678)	(19.1306)	(15.4986)	(15.5706)	(17.4368)	(20.8667)	(18.906)	(21.7072)	(1.5535)	
SMB	0.6013*	0.5143*	0.758*	0.7437*	0.8321*	0.77*	0.6238*	0.4077	0.6092*	0.4094*	0.1919	
	(3.7502)	(3.4361)	(3.8646)	(4.7157)	(4.0071)	(4.1201)	(3.9072)	(2.5208)	(4.104)	(3.1073)	(1.6066)	
HML	0.124	-0.1565	-0.1251	-0.14	-0.1442	-0.1092	0.0405	-0.0256	-0.0774	0.068	0.056	
	(1.0568)	(-1.4287)	(-0.8718)	(-1.213)	(-0.9493)	(-0.7988)	(0.347)	(-0.2166)	(-0.713)	(0.7056)	(0.6403)	
LIQ	0.6914*	0.2634*	0.0518	-0.0028	-0.1123	-0.13	-0.2759**	0.0867	-0.473*	-0.5653*	1.2567*	
	(6.5194)	(2.6603)	(0.3995)	(-0.0266)	(-0.8177)	(-1.0519)	(-2.6131)	(0.8104)	(-4.8173)	(-6.4872)	(15.9074)	
Adjusted R-squared	0.9083	0.8979	0.8895	0.9266	0.8979	0.901	0.9274	0.9326	0.9428	0.9589	0.903	0.91829

Tests during varied market conditions

In the second test of robustness we divide the sample period based on the two states of the market namely market upswing (market excess returns being positive) and market downswing (negative excess market returns). Consistency in pattern with previous tests will imply that the results are sound.

Table 7 contains results of this test. In the case of market upswing three intercepts are significant for the FF (Fama-French model), which number is reduced to two for the 4F (four-factor liquidity-augmented model). In the case of down market conditions none of the intercepts are significant for either model. This trend of significant intercepts though not observed for the total period and the sub-period check, has been found in other studies such as Lam and Tam (2011) and was not found to affect the significance of the liquidity factor. As before, the intercepts are predominantly negative and the trend across portfolios (most illiquid to most liquid) is a very shaky downward one.

The market risk factor keeps up its previous record of positive, highly significant coefficients for all portfolios for both models and across both market conditions. An upward trend exists for both the models in the first case, that is, illiquid firms have a slightly lower market factor coefficient than the liquid ones when the market is having a good run. In the case of a market downturn this trend disappears. Average values tend to be higher in the case of the up phase than in the downward one (1.14 and 0.78 resp. in the two phases for the four-factor model; FF model values are similar). The SMB factor like the market factor has positive, highly significant coefficients for both the models under both conditions of the market. Though a clear trend is again absent in the SMB values across portfolios, the factor has higher values for the illiquid firms than the liquid ones. For example, for the four factor model, it has a coefficient of 1.20 and 0.84 for the least and most liquid firms during market upswing and values of 1.33 and 0.66 for the same portfolios during market downswings. The book-to-market factor HML has no significant coefficients in the upward phase of the market,

for either model. In the second phase however it registers three and four significant coefficients for the Fama-French and four factor models. A downward, albeit shaky, trend is observable for this factor in both models in the market upswing phase. None such is observable in the downswing phase for either model. This indicates that the state of the market has an effect on the behavior of the book-to-market factor. The last factor, liquidity, has ten significant coefficients (including for the hedge portfolio), in the up phase of the market. These are reduced to five in the downward phase. Previous patterns are maintained where LIQ is positive for the most illiquid firms and negative and larger for the most liquid ones (0.42 and -0.61 for portfolios one and ten of the four factor model in upswing and 0.14 and -0.42 for the same portfolios in downswing). The average adjusted R squared values, as before, increase from the Fama-French to the four-factor model, irrespective of the phase through which the market is passing. They are 53 per cent and 59 per cent for FF and 4F models resp. during upswings and 39 per cent and 41 per cent for the two models resp. during market downswings.

Overall the pattern of results continues to hold. The liquidity factor is found to be significant under both market conditions while the four-factor model is found to have the higher average adjusted R squared values in both cases.

The results of the two robustness tests provide further evidence that our liquidity is indeed a significant factor affecting the returns of Indian stocks.

Table 7.Results of regression run on liquidity sorted portfolios during market upswing and market downswing

The table reports the coefficients from regressions run on periods of market upswing (Panel A) and periods of market downswing (Panel B). The regressions are run on monthly returns of the 10 portfolios (P1 to P10), formed of BSE 500 stocks sorted on the basis of their liquidity (calculated by trading volume). The models covered are – A) The Fama-French model Rpt – Rft= ap+ bpRM-Rf+spSMBt+ hpHMLt+ εptwhere RM-Rf is the market risk factor and SMB and HML are the size and book-to-market factors. B) The four-factor Liquidity augmented model: Rpt – Rft= ap+ bpRM-Rf + spSMBt+ hpHMLt+ ψPLIQt+ εpt where LIQ is the liquidity factor formed of a portfolio long on 20 per cent of the most illiquid stocks and short on 20 per cent of the most liquid stocks (sorted on trading volume). The last but one column contains the coefficients for the hedge portfolio (P1-P10). The last column contains the average adjusted R squared values of portfolios one to ten. T-statistics are in parenthesis. *p< 0.01, **p< 0.05, ***p < 0.10

Table7

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av adj R^2
Fama-French three factor model												
C	-0.0131	-0.0091	-0.0193	-0.0094	-0.0295**	-0.0107	-0.0168	-0.023**	-0.0198***	-0.026**	0.0075	
	(-0.9658)	(-0.7861)	(-1.6004)	(-0.8407)	(-2.5772)	(-0.9071)	(-1.5759)	(-2.0402)	(-1.8683)	(-2.0763)	(0.4922)	
RM_RF	0.9061*	0.8962*	1.1271*	1.0385*	1.3527*	1.0637*	1.1016*	1.2156*	1.2049*	1.2777*	-0.3668*	
	(5.9984)	(6.9558)	(8.3804)	(8.3751)	(10.6265)	(8.1298)	(9.2567)	(9.6907)	(10.2355)	(9.1596)	(-2.1621)	
SMB	1.6613*	1.1069*	0.8630*	0.7222*	0.6423*	0.4148	0.4194*	0.2992***	0.1286	0.0373	1.6332*	
	(8.3104)	(6.4924)	(4.8486)	(4.401)	(3.8133)	(2.3955)	(2.6633)	(1.8027)	(0.8258)	(0.202)	(7.2757)	
HML	0.2145	0.1628	0.0668	0.1701	0.0963	0.2325	0.1669	0.1572	0.0421	-0.0335	0.2448	
	(1.1307)	(1.0065)	(0.3954)	(1.0923)	(0.6025)	(1.4148)	(1.1165)	(0.9979)	(0.285)	(-0.1914)	(1.1491)	
Adjusted R-squared	0.5715	0.5244	0.5175	0.5211	0.6022	0.4787	0.5352	0.5485	0.566	0.5081	0.4792	0.5373
Panel A. Market upswing												

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	Av adj R^2
Four-factor liquidity-augmented model												
C	-0.0174	-0.0102	-0.0167	-0.0074	-0.0259**	-0.0066	-0.0129	-0.0189	-0.0148	-0.0198***	0.0024	
	(-1.3448)	(-0.8758)	(-1.4063)	(-0.6673)	(-2.3735)	(-0.5971)	(-1.2984)	(-1.7969)	(-1.5971)	(-1.8396)	(0.2327)	
RM_RF	1.0217*	0.926*	1.0569*	0.9851*	1.2558*	0.9542*	0.9958*	1.1040*	1.0700*	1.1109*	-0.0892	
	(6.9151)	(6.9555)	(7.773)	(7.789)	(10.0792)	(7.5515)	(8.7528)	(9.2075)	(10.1324)	(9.0156)	(-0.7418)	
SMB	1.0996*	0.9619*	1.204*	0.9818*	1.1129*	0.947*	0.9334*	0.8415*	0.7840*	0.8478*	0.2518	
	(4.2319)	(4.1084)	(5.0353)	(4.4145)	(5.0795)	(4.2619)	(4.6653)	(3.9909)	(4.2215)	(3.9126)	(1.1909)	.
HML	0.1839	0.1549	0.0854	0.1842	0.122	0.2615***	0.1949	0.1867	0.0779	0.0107	0.1732	
	(1.0213)	(0.9551)	(0.5153)	(1.1956)	(0.8034)	(1.6984)	(1.4058)	(1.2783)	(0.6051)	(0.071)	(1.1825)	
LIQ	0.4261*	0.11	-0.2587**	-0.1969***	-0.357*	-0.4037*	-0.3899*	-0.4113*	-0.4971*	-0.6148*	1.0409*	
	(3.1584)	(0.9052)	(-2.084)	(-1.7055)	(-3.138)	(-3.4996)	(-3.7532)	(-3.7573)	(-5.1558)	(-5.4649)	(9.4828)	

Adjusted R-squared	0.6152	0.5233	0.5371	0.5324	0.6422	0.5436	0.6012	0.6128	0.6722	0.6398	0.754	0.5920
Panel B. Market downswing												
Fama-French model												
C	-0.0027	-0.0081	0.0064	-0.0028	-0.0069	-0.0001	-0.0135	-0.0085	-0.0076	-0.0252	0.0173	
	(-0.2391)	(-0.6691)	(0.5553)	(-0.1959)	(-0.4886)	(-0.0105)	(-1.0412)	(-0.4678)	(-0.5551)	(-1.6387)	(1.4246)	
RM_RF	0.6525*	0.6386*	0.9428*	0.8531*	0.8691*	0.9057*	0.8339*	0.7728*	0.905*	0.7906*	-0.1323	
	(5.0287)	(4.6186)	(7.1321)	(5.3289)	(5.4062)	(6.423)	(5.6671)	(3.7338)	(5.7704)	(4.5167)	(-0.9585)	
SMB	1.4614*	0.8495*	1.0995*	0.6216**	0.9996*	0.6382**	0.6001**	-0.0416	0.523	0.3745	1.0866*	
	(5.834)	(3.1824)	(4.3082)	(2.0113)	(3.2206)	(2.3444)	(2.1124)	(-0.1042)	(1.7272)	(1.1082)	(4.0777)	
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P1-P10**	**Av adj R^2**
HML	0.4219*	0.2343	0.1768	0.3204***	0.2006	0.1523	0.1683	1.0658*	0.1955	0.2001	0.2186	
	(3.1141)	(1.6229)	(1.281)	(1.917)	(1.1951)	(1.0347)	(1.095)	(4.9315)	(1.1936)	(1.0948)	(1.5167)	
Adj R squared	0.5164	0.3287	0.5088	0.3622	0.3694	0.4212	0.3624	0.4136	0.3697	0.2575	0.2628	0.3909
Four-factor model												
C	-0.0047	-0.0106	0.0072	0.001	-0.0041	0.0014	-0.0097	-0.0083	-0.002	-0.0195	0.0148	
	(-0.4106)	(-0.8729)	(0.6129)	(0.0691)	(-0.2933)	(0.1121)	(-0.7711)	(-0.4494)	(-0.1587)	(-1.3383)	(1.5504)	
RM_RF	0.6867*	0.6812*	0.9292*	0.7885*	0.8211*	0.879*	0.7689*	0.7695*	0.8074*	0.6909*	-0.0041	
	(5.215)	(4.8812)	(6.8386)	(4.9543)	(5.0539)	(6.0975)	(5.295)	(3.6095)	(5.4636)	(4.1242)	(-0.0378)	.
SMB	1.3629*	0.727**	1.1386	0.8071**	1.1377*	0.7148	0.787*	-0.0323	0.8035*	0.6611	0.7017**	
	(5.2333)	(2.6341)	(4.237)	(2.564)	(3.5409)	(2.5072)	(2.7403)	(-0.0767)	(2.7494)	(1.9956)	(3.2338)	
HML	0.3928*	0.1981	0.1884	0.3753*	0.2415	0.175	0.2235	1.0685*	0.2785***	0.2849	0.1079	
	(2.8763)	(1.3687)	(1.337)	(2.2737)	(1.4332)	(1.1706)	(1.4843)	(4.8328)	(1.817)	(1.6398)	(0.9483)	
LIQ	0.1445	0.1797	-0.0574	-0.2722**	-0.2027	-0.1124	-0.2742**	-0.0136	-0.4117*	-0.4206*	0.5651*	
	(1.2912)	(1.5152)	(-0.4968)	(-2.012)	(-1.4681)	(-0.9178)	(-2.222)	(-0.0753)	(-3.278)	(-2.9545)	(6.0601)	
Adjusted R-squared	0.5221	0.3439	0.5021	0.3951	0.3822	0.4196	0.4043	0.403	0.4631	0.3475	0.5523	0.4182

Conclusions

In this study we have aimed to find the effect of liquidity on the returns of Indian stocks using trading volume of the stock as the liquidity proxy. We find that unadjusted for risk illiquid stocks earn a premium of 3.95 per cent a month over liquid ones. Furthermore, the effect of the liquidity factor is significant even in the presence of the well-known factors affecting stock returns namely market risk, market capitalization and the book-to-market value of the stock. The results persist during robustness checks where the sample is divided into two periods of equal length as well as during both bull and bear phases of the market. Apart from liquidity, market risk, company size and the book-to-market ratio in that order are also found to significantly affect the returns of Indian stocks. Overall it is found that the liquidity of a stock is an important factor that must be taken into account when pricing it.

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