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Stock Illiquidity and Firm Characteristics

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Main objective of the study is to analyze firm characteristics which affect stock illiquidity. The paper aims to give suggestions and policy implications to corporates and investors while dealing with investments in illiquid stocks. ANOVA, chi-square tests, correlation analysis, univariate and multiple regression models are employed on Amihud (2002) (Amihud, Y., (2002). Illiquidity and Stock Returns: Cross-Section and Time-Series Effects, *Journal of Financial Markets* 5, 31–56) illiquidity measure and various firm characteristics. Findings of this paper suggest that firms with illiquid stocks can be characterized with low promoter's stakes, high leverage, poor financial health, small size and low/negative profitability. The findings of the paper will be of relevance to retail investors who are at the mercy of informed investors. The results portray basic characteristics that an investor should look into before investing in any stock. The study is of value to the investors who are grieved because of the adverse selections and information asymmetry. Moreover, the basic nature of illiquid firms has never been studied.

Keywords: Illiquidity; leverage; ownership structure; financial distress.

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1. Introduction

Marketability, tradability and liquidity are important characteristics of assets as they affect investor's required rate of return which ultimately affect the asset prices (Amihud and Mendelson, 1988, 1991). Investor's expected rate of return in capital market is governed by market risk, volatility, firm characteristics, liquidity of stocks in the market and various other factors (Loderer and Roth, 2005). As the liquidity of assets affect required rate of return, it also affects the cost of raising capital for companies (Amihud and Mendelson, 1988; Lipson and Mortal, 2009). Since companies with high liquidity can raise capital at a cheaper rate than companies which have low liquidity, it becomes an important concern for companies to keep a check on the liquidity of their stocks. Liquidity comes out as an important characteristic which attracts investors towards a company.

Numerous studies have discussed about illiquidity and its premium which investor expects from a company. A study by Amihud *et al.* (2015) suggests that illiquidity is priced and investors demand more illiquidity premium in emerging markets than in developed markets. Marcelo and Quirós (2006), Liu (2006), and Miralles-Quirós *et al.* (2017) show that illiquidity premium factor plays a significant role in asset pricing.

Citing the importance of liquidity as a characteristic of stocks and its implications for investors and corporates, we aim to calculate stock illiquidity of Indian companies and identify companies with illiquid stocks. Our main objective is to study firm characteristics of select companies having illiquid stocks. The study attempts to analyze firm characteristics which affect stock illiquidity. The study revolves around that questions such as, does illiquidity affect the ability of a firm to get equity funding which forces companies to resort debt and does illiquidity in stocks result in financial distress of firms in future?

Motivation to study illiquid stocks come from the fact that they cause disturbance in financial markets by impacting investor's faith and confidence. Stocks with high illiquidity are always excluded from majority of studies as they are outliers and considered to be non-representative of the market. Identifying the basic nature of illiquid companies is not just important from the perspective of investors but also from the perspective of stock exchanges and market regulators. This study also analyzes common factors that are prevalent in companies with illiquid stocks, which can help investors to avoid insecurity and identify when and how their good investments can turn illiquid.

In this paper, Amihud (2002) illiquidity measure is calculated for all firms listed on NSE for the year 2017 and 98 illiquid stocks were identified. These

illiquid stocks were taken as sample and firms were studied for characteristics such as ownership structure, size, capital structure, fundamentals and financial ratios. It was found that 13 out of these 98 illiquid companies were known as blue-chip firms prior to 2017 and one of the companies with illiquid stock entered the list of blue-chip firms in June'2018. The varied nature of these illiquid stocks arouse our interest in understanding the costs or losses incurred by investors in Indian stock markets especially when they invest in stocks, considering them as good performing stocks but with the passage of time, possession of good stocks turn out to be illiquid. This paper studies future of illiquid companies in terms of their ability to survive as a listed firm and their financial distress. In addition, detailed analysis of four selected companies from the sample illiquid companies has been done to give a broader picture of the characteristics of illiquid companies.

Rest of the paper is organized as follows. Section 2 talks about the related literature, Sec. 3 develops hypothesis for study, Sec. 4 explains the nature of selected Indian case studies, Sec. 5 briefs methodology, Sec. 6 provides analysis and interpretation, Sec. 7 gives discussion and conclusion, and Sec. 8 provides implications for policy makers and investors.

2. Related Literature

2.1. *Measures of illiquidity*

Illiquidity is the cost which an investor incurs in the form of exogenous costs (such as brokerage fees, order processing costs, taxes, etc.), information risk, inventory risk and/or search frictions (Amihud *et al.*, 2006). Spread and depth measures of illiquidity are widely used in literature. Although, spread is a good measure for measuring illiquidity in standard size transactions, it requires intra-day data to compute. While depth measures such as volume and turnover are ambiguous liquidity measures and can lead to false interpretation of liquidity in times of excess demand due to information asymmetries in the market.

Glosten and Milgrom (1985) commented that order flows have an impact on stock prices due to adverse selection costs and inventory risks. Kyle (1985) further commented that order flows cannot be distinguished in terms of informed and uninformed order flows, but price movements can be attributed to imbalances in order flows and developed a measure of illiquidity known as Kyle's lambda (λ) assuming a positive relationship between order flows and price movements. Brennan and Subrahmanyam (1996) measure illiquidity as

a combination of Kyle (1985) lambda (λ) and fixed component of bid-ask spread. Easley *et al.* (2002) calculate illiquidity using structural market microstructure model and developed a measure called, probability of information (PIN) trading which accounts for adverse selection and information asymmetry.

The illiquidity measures mentioned above are theoretically strong and refined, but they require market microstructure data of transactions which is difficult to access. Amihud (2002) gave an illiquidity measure which can be calculated using daily data and proved that the measure strongly relate to the market microstructure estimates of illiquidity. Amihud (2002) proposed to calculate illiquidity of stocks as a ratio of daily absolute returns and value of stocks traded in a day. This study uses Amihud (2002) measure of illiquidity based on its robustness and availability of data. Moreover, studies such as Goyenko *et al.* (2009) and Fong *et al.* (2017) have found Amihud (2002) illiquidity measure as the best low frequency measure and suggested that low frequency measures are very close substitutes of high frequency measures. They also commented that low frequency measures can be used even if data for high frequency measures are available. Amihud (2002) illiquidity measure takes into account long term illiquidity of stocks with an inherent capacity to capture illiquidity featured in intraday high frequency measures of illiquidity.

2.2. *Studies on firm characteristics and illiquidity*

Investors and market makers invest and provide liquidity in the markets by relying on the corporate information, as corporate financial and non-financial information are true indicators of stock liquidity. Liquidity of stocks is positively related to the quality of financial reports, firm-specific variables, market factors and microeconomic events (Kim *et al.*, 2006). Chordia *et al.* (2014) study liquidity dynamics across small and large firms and found that absolute stock returns, firm size, return volatility, institutional holdings and volume are significantly related to liquidity of stocks. Norvaišienė and Stankevičienė (2014) studied Baltic markets for the effect of internal factors of companies on market liquidity of stocks. They investigated stock liquidity and company level factors such as size, financial leverage, return on assets (ROA), liquidity of assets, market to book value ratio, and the fact of profit or loss. They found that Estonian companies were influenced by financial leverage, liquidity of assets and firm's profitability while Latvian companies were influenced by size of company and Lithuanian companies were influenced by size, ROA and financial leverage of companies. Jovanović *et al.*

(2017) developed a model of financial indicator for predicting illiquidity of stocks. They found that capital turnover, inventory turnover, fixed asset turnover, real asset coverage, net profit, return on total assets, return on equity, and effectiveness of main business activity ratios as significant financial indicators in predicting stock illiquidity. Thus, the literature provides evidence that company level factors have an influence on the market liquidity of stocks and can predict the liquidity in stocks. Stock liquidity is strongly related to the internal factors and financials of the company.

2.3. *Firm characteristics affecting illiquidity*

Extensive literature review suggest that many variables affect illiquidity of stocks in the market. This paper discusses literature on some firm characteristics which may impact liquidity in stocks.

2.3.1. *Ownership structure*

Nekounam *et al.* (2012) study ownership structure as a proxy of ownership type and ownership concentration. Ownership concentration is an important variables while studying ownership structures (Heflin and Shaw, 2000a; Bronson *et al.*, 2006; Nekounam *et al.*, 2012). Agency costs reduce with employee stock options (ESOPs) (Gamble, 2000; Gamble *et al.*, 2002). In this study ownership structure has been taken in terms of promoter's stake, free-float capital, ownership concentration and agency costs.

2.3.2. *Size*

Researchers proxy firm size as total market capitalization of firm (Chordia *et al.*, 2004; Kim *et al.*, 2006), market value of equity (Heflin *et al.*, 2000), asset size, sales value (Buzby, 1975; Lipson and Mortal, 2009; Eriotis *et al.*, 2007; Bronson *et al.*, 2006) and book value of total assets (Khediri and Daadaa, 2011). For the purpose of this study market capitalization and net worth are used as proxies for firm size. Net worth is a firm characteristic which shows the excess of assets over liabilities.

2.3.3. *Financial distress*

Models for predicting financial distress can be broadly classified as univariate analysis, multiple discriminant analysis, logit and probit analysis, recursive partitioning algorithm and neural network models (Siddiqui, 2012). Muller *et al.* (2009) did a comparative study on predicting financial distress of companies listed on South Africa JSE and found that multiple discriminant analysis and recursive partitioning algorithm models were able to predict

financial distress of companies with most accuracy. Altman (1968) proposed a multiple discriminant analysis model for predicting distress of a company using financial ratios. Altman (1968) z_score has the highest predictive power when compared to other distress models (Diakomihalis, 2012; Karamzadeh, 2013). Altman (1968) z_score can predict distress in modern economy (Siddiqui, 2012). In this paper, Altman z_score is used for measuring financial distress in firms as it has been proved to be a good model for predicting financial distress in a company accurately.

2.3.4. *Leverage*

Capital structure and stock liquidity are inversely related, as high liquidity leads to low leverage in the company (Lipson and Mortal, 2009; Dang *et al.*, 2019). Studies on capital structure use different measures of leverage including both short-term and long-term solvency measures. Eriotis *et al.* (2007) measure leverage as interest coverage ratio and debt ratio. Book leverage and market leverage are proxies of firm leverage (Khediri and Daadaa, 2011; Lipson and Mortal, 2009). In this paper, leverage has been calculated by book leverage and market leverage as per Lipson and Mortal (2009). Other measures of leverage used in this paper are interest coverage ratio, debt-equity ratio and debt to asset ratio.

2.3.5. *Profitability*

Profit after taxes and earnings per share are widely used as measures of profitability *et al.*, 2014). Khediri and Daadaa (2011) measure profitability as ROA while Greer and Liao (1986) measure profitability as return on net worth. In this study, profitability has been measured as profit after taxes reported by the firms, return on total assets, earnings per share, price to earnings ratio and return on net worth.

2.3.6. *Volatility*

Volatility is measured as variance or standard deviation of daily returns or daily prices (Frieder and Martell, 2006; Heflin *et al.*, 2000). In this study, volatility has been calculated as annual standard deviation of daily stock returns.

2.3.7. *Change in face value of shares*

Copeland (1979) and Conroy *et al.* (1990) study the effects of stock splits on liquidity. While, Han (1995) study the effects of reverse splits or consolidation on the stock liquidity. In this study, both splits and reverse splits have been taken into consideration under the head of change in face value of shares.

2.3.8. *Age*

Firm age is used as an important variable in understanding various aspects of firms (Evans, 1987; Hansen, 1992). This paper uses age of the company since its incorporation.

3. Hypothesis Development

3.1. *Ownership structure*

The distribution of shareholdings, free-float shares and agency costs affect the liquidity of stocks. Nekounam *et al.* (2012) study the effect of ownership structure on liquidity of stocks in Tehran stock market and found that corporative ownership has a positive relation with stock liquidity. While, institutional ownership, managerial ownership and ownership concentration have a negative relationship with stock liquidity. There is inverse relationship between controlled ownership and stock liquidity (Iskandrani, 2017). Attig *et al.* (2006) suggest that a large difference in ownership stakes and control stakes lead to high information asymmetry and wide bid-ask spreads. Higher concentration of ownership stakes in the hands of few results in selfish acts which are reflected in poor disclosures. Firms with low agency costs do not have incentives to publicly disclose the quality financial information (Bronson *et al.*, 2006). Iskandrani (2017) investigated the effect of ownership composition on stock's liquidity for Jordanian companies for the period 2006–2014. They found that companies in which government and foreign investors have more stake are more liquid, although the complex pyramid ownership structure leads to less transparency and low liquidity. They also found a positive relationship between free float capital and stock's liquidity.

H1: *Illiquid firm have high promoter's stake and more ownership concentration.*

3.2. *Size*

Firm size is an important characteristic and many studies have found a positive relation between firm size and liquidity. Firm size is an important firm characteristic which is used by almost all the studies in stock returns. Literature on liquidity premium factor also controls for size as there is a belief that small stocks are more illiquid than large stocks. Norvaišienė and Stankevičienė (2014) study the impact of company level factors such as leverage ratio, size, fact of profit or loss, market to book ratio, current solvency ratio and ROA on the stock's liquidity in Baltic markets and found that only size is

a significant factor in influencing stock's liquidity. On daily basis, liquidity of small size firms vary more than liquidity for large size firms (Chordia *et al.*, 2004). Stock liquidity is positively related with firm specific characteristics such as size (Kim *et al.*, 2006).

H2: *Illiquid firms are small in size.*

3.3. *Financial distress*

Stock liquidity in the context of financial distress is less studied. Financial distress in a company is positively related to the proportion of number of its shares trading in the market i.e., a company is in financial distress if less number of shares are being traded in the market (Deng and Wang, 2006). Da and Gao (2010) study the abnormal returns on financially distressed companies as a result of short-term return reversals due to liquidity shocks in markets and comment that these return reversals occur because of change in clienteles.

H3: *Illiquid firms are financially distressed.*

3.4. *Leverage*

Investors expect higher rate of returns from illiquid companies which leads to increased cost of equity. Thus, illiquid firms prefer more debt than equity to reduce the overall cost of capital. Empirical literature supports this theory. Frieder and Martell (2006) examined the bi-directional relationship between capital structure and liquidity of NYSE stocks. They conclude that (i) increase in leverage increases the stock's liquidity and (ii) increase in illiquidity of stocks leads to more debt financing. Leverage is negatively related to trading volumes (Khediri and Daadaa, 2011). Firms can reduce the overall cost of capital by increasing its stock liquidity (Butler *et al.*, 2005). Lipson and Mortal (2009) found that companies which had more market liquidity for stocks, tend to raise capital from equity and preferred less leverage.

H4: *Illiquid firms are highly leveraged.*

3.5. *Profitability*

High ROA and return on equity reduces the chance of the asset being illiquid (Jovanović *et al.*, 2017). Liquidity of firms are positively affected by asset returns. Although there are few numbers of studies which consider profitability as a main characteristic which influences liquidity. Profitability is a

major indicator of financial health which in turn act as a good estimator of stock liquidity of a company.

H5: *Illiquid firms have low or negative profits.*

4. Indian Case Studies

We discuss four illiquid companies in detail, highlighting their basic characteristics, finances and future prospects.

4.1. *Proseed India Ltd.*

Proseed India Ltd. was incorporated as Garden Style Pvt. Ltd. in the year 1991 and registered itself as Green Fire Agri Commodities Ltd. in the year 2002. The company got public in the year 2006 and changed the name to Proseed India Ltd. on 20th Jan 2016. Proseed India Ltd. is an AgriBio-Tech company headquartered in Hyderabad, Telangana. Nature of business of Proseed India Ltd. is agri-commodities trading and production of seeds for trading. The net worth of the company as on March 2018 stood at Rs. $(-)$ 233.6 million and losses of Rs. 44.3 million are reported. The Altman z_score of the company is $(-)$ 2.72058, which is very low and calls for alert as a company having Altman z_score below 1.81 are financially distressed. Moreover, the company is in the list of shares trading below par value and incurring continuous losses for the past eight quarters reported by National Stock Exchange (NSE) on 30th November 2017. With all the negatives happening in the company, we also found that the stake of promoter's reduced to 35.66% as on March 2017 from 48.21% in March 2016. Lately, NSE has observed significant price movements in Proseed India Ltd.

4.2. *Noesis Industries Ltd.*

Noesis Industries Ltd. was incorporated in 1986 and registered itself in Delhi. Noesis Industries Ltd. works in the sector of consumer goods and electronics. Lately, it is trading at a price as low as Rs. 0.05. The company is in the list of NSE for incurring continuous losses for previous eight quarters. Out of all the companies in our sample, Noesis Industries Ltd. have the least Altman z_score standing at -41.2092 indicating that the company is highly distressed. The annual reports of the company say that the company is not able to beat the competition in the market and are facing tough time due to rapid technological changes in the industry. The indebtedness reported by the company as on March 2016 stands at Rs. 253,674,644. Currently business is not generating any

profits from operations and is in huge losses. The company sought for Corporate Insolvency Resolution process under Section 21 of Insolvency and Bankruptcy Code (2016) of Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015. The company also called a meeting of committee of creditors on 26th November 2018.

4.3. *KIOCL Ltd.*

KIOCL (Kudremukh Iron Ore Ltd.) is a public sector undertaking with a Mini Ratna status. The company is controlled by Ministry of Steel, Government of India and was registered on 1976 in Bengaluru. 99% of shareholdings of the company are owned by central/state government. The company deals in iron ore and pellets. The company reported huge losses in 2015–2016 due to decline in domestic and international markets for iron ore and pellets. Company is financially strong with very low debt as the market leverage of the company stands at 0.1912 and high Altman z_score 4.226. KIOCL Ltd. came up with its follow-on offer (FPO) as government approved to shed off some stakes from the company on 28th December 2018 and open new avenues for the company. Moreover, the company has climbed the ladder and entered Nifty 500 Index as on 29th June 2018.

4.4. *NBI Industrial Finance Ltd.*

NBI Industrial Finance Ltd. was incorporated in 1936 and worked as a bank. It stopped its business as a bank and started working as a non-banking finance company after the nationalization of banks in India in 1980. The company got listed on NSE in 2016. The company data show weird patterns. The share price of the company has risen from Rs. 270 on 7th December 2016 to Rs. 3,250 on 13th October 2017, an increase of 1104% in a year. High fluctuations are observed in sales data also. In 2017, sales rose from Rs. 3.83 cr. in 2016 to Rs. 100.89 cr. Sales slip in 2018 to Rs. 5.73 cr. Company have low market leverage and debt to asset value but a very high short solvency ratio as the current ratio stands at 62.4. The Altman z_score is good enough at a level of 2.323, slightly low from the benchmark z_score value of 2.99. It is doubted that this company is practicing stock value manipulation activities.

To summarize, the select four illiquid companies discussed above belong to different industries and show different characteristics. The companies are incurring losses and have problems in operations. They are generally found to be high on leverage and distressed, the only exception being KIOCL which is a PSU (Public Sector Unit). In fact, KIOCL has performed the best and reached in Nifty 500 list of companies.

5. Methodology of the Study

5.1. *Objectives of the study*

The study attempts to answer many research questions related to nature of illiquid companies; these are: What are the reasons of illiquidity in companies i.e. what firm characteristics affect level of illiquidity in stocks? What are the prominent firm characteristics in terms of size, profitability, leverage, age, volatility, shares outstanding etc. of highly illiquid firms? Do illiquid firms have high promoters' stake? Do high illiquid stocks have to raise capital from debt and are more levered? Is illiquidity an indicator of poor financial health (financial distress) of a firm?

To answer the questions following research objectives were framed:

- To calculate illiquidity of Indian companies
- To study firm characteristics of select companies having illiquid stocks
- To analyze firm characteristics which affect stock illiquidity
- To give suggestions and policy implications to corporates and investors while dealing with investments in illiquid stocks.

5.2. *Data*

Data for all listed companies is collected from Prowess IQ CMIE database and reports from NSE official website were extracted for the purpose of this study. We collect daily data for returns, adjusted closing prices and number of shares traded in order to compute Amihud (2002) illiquidity ratio. Amihud (2002) illiquidity measure is calculated as

$$\text{Illiq}_{iy} = \frac{1}{D_{iy}} \sum \frac{|r_{iy}|}{\text{RsVol}},$$

where Illiq_{iy} is the illiquidity of stock i for year y, D_{iy} is the number of days stock i is traded in year y, $|r_{iy}|$ is absolute returns and RsVol is adjusted closing price $\times$ number of shares traded. Data for company specific variables such as ownership structure, profitability, leverage, fundamentals and financial ratios were collected on annual basis.

5.3. *Sample construction*

Illiquidity ratio for all the listed companies on NSE for the year 2017 were computed. The population of 1,775 companies gave varied levels of illiquidity. It was found that 98 companies out of the total 1,775 companies have very high illiquidity as the illiquidity ratios were beyond 1. While rest of the companies had ratios less than 0.75. Table 1 gives brief statistics on the level

Table 1. Statistics for sample construction.

	No. of Companies		
	Sample	Not Included in Sample	Total
	98	1677	1775
Minimum	1.044292	2.34305E−07	2.34E−07
Maximum	896.2281	0.75248593	896.2281
Mean	69.13675	0.013023096	3.804357

of illiquidity and it can be concluded from the table that for 98 highly illiquid companies the illiquidity ratio ranges from 1.044 to 896.22. The mean illiquidity of the population is 3.8 and the mean illiquidity ratio of 98 companies is as high as 69.136 when compared to 0.0130 for rest of the 1,677 companies. Thus, 98 companies out of 1,775 listed companies were marked as illiquid companies and are studied in this paper.

It was found that out of these 98 illiquid companies, 16 companies got compulsorily delisted while 1 company got voluntarily delisted and 1 company got delisted with liquidation in the year 2018. We eliminate all the 18 delisted companies from our sample along with outlier companies. Our final sample comprises of a set of 79 illiquid companies listed on NSE.

5.4. *Variable description*

The variable definitions for all the variables used in the study are given in Table 2. The illiquidity measure of market impact by Amihud (2002) is based on the theoretical linear model of Kyle (1985), but market impact has a concave relationship function with size of bets. Thus, non-linear market models are more analytical and allow for simple arbitrage strategies. Based on the empirical regulatory observations of Loeb (1983), Torre and Barra (1997) proposed a square root model of market impact. Square root model is dimensionally consistent and lays down a practical way to measure market impact for asset managers (Kyle and Obizhaeva, 2018). Based on the square root impact law as confirmed by Donier and Bonart (2015), this paper uses a modified version of Amihud (2002) illiquidity ration for the purpose of analysis. Modified illiquidity ratio for Amihud (2002) is shown as

$$\text{Illiq}_{iy} = \frac{1}{D_{iy}} \sum \frac{|r_{iy}|}{\sqrt{\text{RsVol}}}.$$

The paper employs multiple discriminant analysis model given by Altman (1968) for predicting financial distress. Altman (1968) z_score is calculated as

$$z\_\text{score} = (1.2 \times a) + (1.4 \times b) + (3.3 \times c) + (0.6 \times d) + (1.0 \times e),$$

Table 2. Variable description.

Variables	Description
Illiq	Amihud (2002) illiquidity for the year (illiquidity measure used for sample construction)
sqrt_illiq	Square-root model of illiquidity (illiquidity measure used for data analysis and results)
Size	
mkt_cap	Market capitalization of company
net_worth	Net worth of company in millions
Financial distress	
*z*_score	Altman *z*_score measure for financial distress
Ownership characteristics	
prom%	Percentage of shareholdings with promoters
esop	Presence of employee stock options or agency cost
own_conc	Categorical variable for promoter's stake
ffc	Free-float capital
Leverage	
int_cov	Interest coverage ratio
book_lev	Book leverage ratio
mkt_lev	Market leverage ratio
d/e	Debt to equity ratio
d/a	Debt to asset ratio
Profitability	
PAT	Profit after taxes as reported by company in millions
RoNW	Return on net worth
RoA	Return on assets
EPS	Earnings per share
P/E	Price to earnings ratio
Age	Age of company
dFV	Change in value of equity due to splits or reverse splits
sh_o/s	Number of shares outstanding
Volatility	Return volatility calculated as standard deviation of daily returns

where a = working capital/total assets, b = retained earnings/total assets, c = earnings before interest and tax/total assets, d = market value of equity/total liabilities and e = sales/total assets.

*z*_scores are categorized further, companies which have *z*_score more than 2.99 are considered to be in "Safe" zone, a *z*_score of more than 1.81 and less than 2.99 are categorized as companies in "Grey" zone and companies which have *z*_score of less than 1.81 are put in "Distress" zone.

Lipson and Mortal (2009) measure of market leverage and book leverage are used as a proxy for capital structure. Book leverage is the ratio of total debt and total debt plus book value of equity. Where, book value of equity is

total assets minus preference stock plus deferred taxes and debt. Market leverage is the ratio of total debt and total debt plus market value of equity. Where, market value of equity is the multiple of number of shares outstanding and market price.

As per the literature review, measures of firm characteristics were identified and given in Table 2 including ownership characteristics, leverage, size, profitability, financial distress, age, change in face value due to splits and volatility.

5.5. *Correlation*

The Pearson's correlation between all the variables are shown in Table 3. It is found that illiq has significant positive correlation with int_cov, sh_o/s and ffc as the correlation coefficients are 0.78, 0.283 and 0.234, respectively. While z_score and prom% have a significant negative correlation with illiq at 0.315 and 0.470 respectively, which means that a company high on illiquidity is distressed and have low promoter's stake. Thus, the correlation table shows that with high (low) illiq of stock, the company has high (low) int_cov, more (less) sh_o/s, more (less) ffc, low (high) z_score and less (more) prom%. Net_worth of a company is positively correlated with sh_o/s (0.437), mkt_cap (0.774), P/E (0.851), book_lev (0.225), EPS (0.266), volatility (0.224) and prom% (0.272) and negatively correlated with mkt_lev (−0.312). Int_cov have a very high significant positive correlation with sh_o/s (0.973) and ffc (0.995). P/E has high positive correlation with mkt_cap as the correlation coefficient stands at 0.854. *dfv* has significant positive correlation with sh_o/s at 0.481. Prom% have a significant negative relation with int_cov (−0.640) and d/a (−0.248), and a significant positive relation with mkt_cap (0.328), P/E (0.508), volatility (0.250) and own_conc (0.805). The variables were studied through correlation analysis as given in Table 3 and only selected variables were used for further analysis to avoid problem of autocorrelation of variables in regression model.

We study illiq as a function of all the above-mentioned dependent variables. The basic equation of our study is,

$$\begin{aligned}\text{illiq} = {} & \beta_0 + \beta_1 \times \text{OWN} + \beta_2 \times \text{LEV} + \beta_3 \times \text{FIN\_DISTRESS} \\ & + \beta_4 \times P + \beta_5 \times \text{SIZE} + \varepsilon,\end{aligned}$$

where OWN is ownership structure, LEV represents company leverage or capital structure, FIN_DISTRESS is measured as Altman z_score, P is profitability, SIZE is firm size and ε is the error term.

Table 3. Correlation analysis.

	illiq	esop	dvf	net worth	z_score	RoNW	RoA	d/e	int_cov	d/a	book_lev	mkt_lev	sh_o/s	mkt_cap	EPS	P/E	volatility	age	own_conc	prom%	ffc
illiq	1																				
esop	0.145	1																			
dvf	0.138	−0.146	1																		
net worth	−0.069	0.013	0.188	1																	
z_score	**−0.315****	−0.069	−0.131	0.211	1																
RoNW	−0.119	**−0.613****	0.128	0.096	0.273	1															
RoA	−0.109	0.001	0.123	0.184	0.172	**0.575****	1														
d/e	0.294	**0.619****	−0.121	−0.122	−0.28	**−0.753****	−0.281	1													
int_cov	**0.780****	−0.069	0.391	−0.064	−0.133	0.113	0.403	−0.189	1												
d/a	0.081	−0.035	−0.096	−0.027	−0.142	0.003	**− 0.783****	0.227	−0.335	1											
book_lev	−0.018	0.047	0.022	**0.225***	0.027	**−0.479****	0.045	**0.693****	−0.397	−0.019	1										
mkt_lev	0.105	**−0.298****	0.212	**−0.312****	−0.086	−0.108	0.188	0.291	0.108	**−0.263***	−0.079	1									
sh_o/s	**0.283***	0.146	**0.481****	**0.437****	0.039	0.052	0.003	−0.069	**0.973****	−0.024	−0.082	0.013	1								
mkt_cap	−0.012	−0.041	0.168	**0.774****	0.112	0.053	0.06	−0.088	−0.085	−0.021	0.016	−0.212	**0.567****	1							
EPS	−0.014	−0.012	0.19	**0.266***	0.067	0.092	0.129	−0.113	0.023	−0.007	**0.436****	**−0.226***	−0.015	0.021	1						
P/E	−0.089	0	0.135	**0.851****	**0.447***	−0.288	0.032	−0.136	−0.281	−0.133	0.022	**−0.536***	**0.669****	**0.854****	−0.123	1					
volatility	0.097	0.093	0.107	**0.224***	0.183	0.256	0.214	0.035	−0.351	−0.08	−0.093	−0.109	**0.326****	**0.328****	**0.253***	**0.456***	1				
age	−0.146	0.031	−0.021	0.112	0.061	0.037	0.128	−0.159	−0.125	−0.173	0.014	−0.134	−0.052	0.064	0.004	“eqno					
own_conc	−0.208	−0.07	−0.188	0.165	0.221	0.239	0.095	**−0.309***	−0.251	−0.14	0.106	−0.177	0.069	**0.247***	0.004	0.342	0.245*	0.066	1		
prom%	**−0.470****	0.203	−0.046	**0.272***	0.195	0.114	0.147	−0.229	**−0.640****	**−0.248***	0.071	−0.047	0.057	**0.328****	0.046	0.508*	0.250*	0.097	**0.805****	1	
ffc	**0.234***	−0.042	0.206	−0.04	0.013	0.058	0.037	−0.049	**0.995****	0.008	−0.08	0.084	**0.340****	−0.037	−0.008	−0.128	−0.107	−0.047	−0.19	**−0.323****	1

“rm” 0.045 1 0.011

Notes: **Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

6. Analysis and Interpretation

6.1. *Descriptive statistics*

Table 4 presents summary statistics. It can be observed that the value of the sqrt_illiq varies over a range where minimum value is 0.01015 and maximum value is 0.34449. The average sqrt_illiq of our sample is 0.081495. Mean net_worth of illiquid companies is −170.203 reflecting that on average illiquid companies are running on high liabilities, but the data has very high standard deviation revealing huge differences in net_worth of companies. On average, the z_score of the companies is negative and low (−0.5938) with negative skewness of −6.837 which reflects that maximum companies in the sample have negative z_scores. The mkt_cap of the illiquid companies also vary to a great extent as some companies are very small with market capitalization of just Rs. 1.92 million and some as high as Rs. 237,688.9 million. Mean EPS and P/E ratio of illiquid companies is −1.16 and 52.60, respectively, which shows that companies are in losses while investors expect higher returns. Thus, the sample illiquid stocks are overvalued.

Table 4. Summary statistics.

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
sqrt_illiq	0.01015	0.34449	0.081495	0.0775772	1.966	3.668
esop	0	1	0.1	0.304	2.695	5.398
dfv	0	1	0.33	0.473	0.741	−1.489
net_worth	−8462.1	21456.3	−170.203	3208.0284	3.424	27.187
z_score	−41.2092	5.525394	−0.5938	5.064641625	−6.837	54.382
RoNW	−207.18	27.37	−9.928	35.47839	−4.358	22.755
RoA	−158.82	11	−9.3488	22.21704	−4.596	27.739
d/e	0	9.25	1.0868	1.97792	2.811	8.02
int_cov	0.22	116	8.6094	26.90719	4.188	17.664
d/a	0	51.36842	1.084029	5.847243743	8.392	72.647
book_lev	−39.3697	22.15491	−0.23023	6.168655396	−3.701	25.62
mkt_lev	0	0.997511	0.711655	0.282985919	−1.281	0.646
sh_o/s	2456806	6.35E+08	65184164	113850265.1	3.183	11.124
mkt_cap	1.92	237688.9	3341.582	26716.33617	8.876	78.85
EPS	−259.99	331.98	−1.16	48.27768	2.286	39.72
P/E	0.41	421.43	52.6023	96.42292	3.126	10.623
volatility	0	1.245803	0.313725	0.319647923	0.914	0.409
age	7	93	30.61	17.74	1.753	3.417
own_conc	1	3	1.63	0.644	0.519	−0.634
prom%	0.17	99	48.1025	19.10257	−0.514	0.439
ffc	−9979657	8.73E+08	23497793	100254902	8.057	68.314

Table 5. Ownership structure: Univariate regression analysis.

Dependent: sqrt_illiq			Sig.	R Sq.	Adj. R Sq.
	α	β			
prom%	0.165	−0.002	0	0.221	0.209
own_conc	0.122	−0.025	0.066	0.043	0.031
ffc	0.077	1.809E−10	0.038	0.055	0.042

6.2. *Ownership structure*

Stock liquidity is influenced by ownership structure of company (Nekounam *et al.*, 2012; Attig *et al.*, 2006). We study ownership structure in terms of promoter's stake, agency costs, ownership concentration and free-float capital. Univariate regression results for ownership structure are reported in Table 5. It is found that prom% (−0.002) and own_conc (−0.025) are inversely related to sqrt_illiq while ffc (1.809E−10) is positively related to sqrt_illiq. The best univariate regression model for ownership structure is explained by prom% with adjusted R square of 0.209 and negative beta coefficient of 0.002. The negative beta coefficient of prom% means that companies with high promoter's stake have low sqrt_illiq, suggesting the fact that high illiquid companies tend to have low promoter's stake.

6.3. *Financial distress*

The association of financial distress with stock illiquidity was studied using univariate regression analysis. The result of univariate regression between z_score and sqrt_illiq are reported in Table 6. z_score comes out to be highly significant when regressed alone on illiquidity. The z_score have negative effect on illiquidity with its β coefficient equal to −0.005. The negative relation between z_score and sqrt_illiq means that a company with low z_score will lead to high stock illiquidity. Thus, z_scores are good predictors of illiquidity in stocks. Looking at the univariate regression results it can be inferred that financially distressed companies will have high market illiquidity.

Table 6. Financial distress: Univariate regression analysis.

Dependent: sqrt_illiq			Sig.	R Sq.	Adj. R Sq.
	α	β			
z_score	0.079	−0.005	0.005	0.099	0.087

Table 7. Leverage: Univariate regression analysis.

Dependent: sqrt_illiq			Sig.	R Sq.	Adj. R Sq.
	α	β			
int_cov	0.04	0.001	0	0.609	0.585
d/e	0.055	0.011	0.053	0.086	0.064

6.4. *Leverage*

Leverage of a company has been measured in terms of debt to equity ratio, debt to asset ratio, interest coverage ratio, book leverage and market leverage. Univariate regression results for leverage are reported in Table 7. Out of all the leverage measures, it is found that int_cov and d/e have significant positive impact on stock sqrt_illiq with β coefficient of 0.001 and 0.011, respectively. The univariate regression model for int_cov have a high value of adjusted R square of 0.585, suggesting it to be best amongst all univariate regression models for leverage measures. The positive relationship between the leverage measures and sqrt_illiq show that the companies with high illiquidity are high on leverage.

6.5. *Profitability*

In this study profitability has been measured as return on net worth, ROA, earnings per share and price to earnings ratio. The results of univariate regression for the profitability measures on stock illiquidity shows that none of the profitability measures significantly affect illiquidity. Thus, it is inferred that profitability of a company does not affect stock illiquidity. Regression results for univariate analysis are tabulated in Table 8.

6.6. *Size*

Size (mkt_cap) terciles have been formed to create three size categories namely, small size, mid-size and large size. ANOVA along with *post hoc*

Table 8. Profitability: Univariate regression analysis.

Dependent: sqrt_illiq			Sig.	R Sq.	Adj. R Sq.
	α	β			
RoNW	0.064	0	0.44	0.014	−0.009
RoA	0.077	0	0.351	0.012	−0.002
EPS	0.081	−2.22E−05	0.904	0	−0.013
P/E	0.056	−4.70E−05	0.692	0.008	−0.042

Table 9. ANOVA results for size categories.

	Sum of Sq.	Df	Mean Sq.	F	Sig.
Between Groups	436302.806	2	218151.403	9.558	0.000
Within Groups	1734632.421	76	22824.111		
Total	2170935.227	78			
Tukey HSD					
(I) Size Categories	(J) Size Categories		Mean Difference ($I - J$)		Sig.
Small size	mid-size		128.609993*		0.008
	large size		175.8877466*		0.000
Mid-size	small size		−128.609993*		0.008
	large size		47.27775332		0.493
Large size	small size		−175.8877466*		0.000
	mid-size		−47.27775332		0.493

Tukey test have been employed. Results for ANOVA and Tukey came out to be highly significant and reflect differences in sqrt_illiq across and within size categories. Table 9 reports the ANOVA and Tukey results for size categories. The analysis of variance across size categories give F-value of 9.558 which is highly significant. Tukey results show that sqrt_illiq in small size firms differ significantly from both mid-size and large size firms. While, there is no significant difference in sqrt_illiq between mid-size and large size groups.

6.7. *Liquidity portfolios*

We construct portfolios in two ways. First, we make illiquidity quintiles by ranking illiquidity of stocks from lowest to highest. Second, the portfolios are constructed by controlling for size, wherein illiquidity quintiles are formed within each size tercile creating 15 size × sqrt_illiq portfolios. Illiquidity quintiles are denoted as Q1, Q2, Q3, Q4 and Q5. Where, Q1 is least illiquid quintile and Q5 is most illiquid quintile. The size × illiq portfolios range from S1Q1 (small size × least sqrt_illiq) to S3Q5 (large size × most sqrt_illiq) where S1 is small size, S2 is mid-size and S3 is large size.

Cross-tabulation of illiquidity quintiles with own_conc categories, z_score categories, profit/loss and size categories along with chi-square results are presented in Table 10. It is seen that z_score and size of companies differ significantly across illiquidity quintiles with significant chi-square values of 16.858 and 43.246, respectively. Cross tab results for z_score show that out of 79 illiquid companies, 70 companies are financially distressed, 3 companies are in safe zone and 6 companies are in grey zone of financial distress. All the

Table 10. Cross-tabulation and chi-square results for sqrt_illiq quintiles across characteristic categories.

own_conc		sqrt_illiq quintiles					
		Q1 (least sqrt_illiq)	Q2	Q3	Q4	Q5 (most sqrt_illiq)	Total
Less than 50% shares are owned by promoters	N	6	6	8	6	10	36
	%	37.50%	37.50%	50.00%	37.50%	66.70%	45.60%
50–70% shares are owned by promoters	N	9	7	7	8	5	36
	%	56.30%	43.80%	43.80%	50.00%	33.30%	45.60%
More than 70% shares are owned by promoters	N	1	3	1	2	0	7
	%	6.30%	18.80%	6.30%	12.50%	0.00%	8.90%
Total	N	16	16	16	16	15	79
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
				Pearson chi-square	6.786	Asymp. Sig. (2-sided)	0.56
z_score categories							
Safe zone	N	0	1	2	0	0	3
	%	0.00%	6.30%	12.50%	0.00%	0.00%	3.80%
Grey zone	N	4	0	2	0	0	6
	%	25.00%	0.00%	12.50%	0.00%	0.00%	7.60%
Distress zone	N	12	15	12	16	15	70
	%	75.00%	93.80%	75.00%	100.00%	100.00%	88.60%
Total	N	16	16	16	16	15	79
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
				Pearson chi-square	16.858	Asymp. Sig. (2-sided)	0.032
Size categories							
Small size	N	2	1	5	7	11	26
	%	12.50%	6.30%	31.30%	43.80%	73.30%	32.90%
Mid-size	N	3	3	7	9	4	26
	%	18.80%	18.80%	43.80%	56.30%	26.70%	32.90%

Table 10. (*Continued*)

own_conc		sqrt_illiq quintiles					
		Q1 (least sqrt_illiq)	Q2	Q3	Q4	Q5 (most sqrt_illiq)	Total
Large-size	*N*	11	12	4	0	0	27
	%	68.80%	75.00%	25.00%	0.00%	0.00%	34.20%
Total	*N*	16	16	16	16	15	79
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
				Pearson chi-square	43.246	Asymp. Sig. (2-sided)	0.000
Profit/Loss							
Profit	*N*	6	4	8	5	2	25
	%	37.50%	25.00%	50.00%	31.30%	13.30%	31.60%
Loss	*N*	10	12	8	11	13	54
	%	62.50%	75.00%	50.00%	68.80%	86.70%	68.40%
Total	*N*	16	16	16	16	15	79
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
				Pearson chi-square	5.399	Asymp. Sig. (2-sided)	0.249

companies in high illiquidity quintiles i.e., Q4 and Q5 are financially distressed. Approximately, 44.285% of financially distressed companies appear in highly illiquid quintiles i.e., Q4 and Q5. This clearly indicates that poor financial health of a company has strong association with its market illiquidity as financially distressed companies tend to have illiquid stocks. The results of 3 size categories show that 65.38% of small size companies appear in highly illiquid portfolios i.e., Q4 and Q5. While 85.18% of large size companies appear in Q1 and Q2. All the companies in highly illiquid portfolios i.e., Q4 and Q5 are either small size or medium size. Thus, it can be inferred that companies which are very high on market illiquidity do not have high mkt_cap. It is observed that number of companies with small size increase with illiquidity, while the number of large size companies decrease to 0 with increase in illiquidity. Q1 and Q2 have highest number of large size companies i.e., 11 and 12 respectively. Cross tab results for own_conc show that out of a sample of 79 illiquid companies only 8.90% of companies have promoter's stake more than 70%. Number of companies with promoter's stake less than 50% increase in highly illiquid quintiles. While no company with promoter's stake more than 70% appear in Q5. Across the quintile portfolios it is observed that promoter's stake decrease with increase in illiquidity. Approximately, 91.14% of companies have promoter's stake less than 70%. It is found that 54 out of 79 illiquid companies are into losses and only 31.60% of illiquid companies are earning profit. Across all the portfolios the number of companies in losses are more than the number of companies in profit except for Q3 quintile where, number of companies in profit are equal to number of companies in losses. The results show that 86.70% of companies in Q5 are incurring losses. Thus, it can be said that negative profitability is a prominent factor of illiquid companies.

Table 11 reports chi-square results for own_conc categories, z_score categories and profit/loss across size × sqrt_illiq portfolios. Chi-square results are

Table 11. Chi-square result of size-sqrt_illiq portfolios across characteristic categories.

	S1Q1-S1Q5		S2Q1-S2Q5		S3Q1-S3Q5	
	Pearson chi-square	Asymp. Sig. (2-sided)	Pearson chi-square	Asymp. Sig. (2-sided)	Pearson chi-square	Asymp. Sig. (2-sided)
Own_conc categories	9.038	0.339	5.098	0.747	15.24	**0.055**
z_score categories	n/a	n/a	14.243	**0.076**	9.493	0.302
Profit/loss	0.925	0.921	7.738	**0.102**	1.65	0.8

insignificant across all three categories revealing that all three categories do not differ across size × sqrt_illiq portfolios, suggesting that after controlling for size, other characteristics become weak indicators of sqrt_illiq. While, own_conc differences occur across large size illiquidity portfolios and z_score differs in mid-size illiquidity portfolios at a significance level of 10%.

6.8. *Reasons of illiquidity: Multiple regression model*

The firm characteristics which have major impact on stock illiquidity are identified using regression analysis. The ordinary least square multiple regression models are run on overall set of illiquid companies and on each illiq quintile. The model of best fit is reached after applying backward regression and analyzing the exclusion and inclusion of variables in the regression model. The paper reports multiple regression results for least illiquid quintile (Q1), most illiquid quintile (Q5) and for all companies in our sample.

Panel A of Table 12 reports the results of multiple regression for Q1 quintile. The reasons for illiquidity or the firm characteristics that influence illiquidity of companies in Q1 quintile are z_score, d/a, mkt_cap, EPS, volatility, prom% and RoNW. The model of best fit has a significant F-value which is equal to 12.552. R square and adjusted R square of the model are also high at 0.956 and 0.88 respectively. Mkt_cap, EPS and volatility have a negative influence on illiquidity with β coefficients −1.454, −0.954 and −2.415 respectively. While z_score, d/a, prom% and RoNW positively affect illiquidity of companies with β coefficient equal to 1.854, 0.994, 1.307 and 0.851 respectively. Panel B of Table 12 gives multiple regression model for Q5 quintile. The multiple regression model gives only 3 firm characteristics which are significant and reports a high significant F-value of 158.813. The model's R square and adjusted R square are equal to 0.996 and 0.99 respectively. z_score have a negative impact on illiquidity with β coefficient equal to −0.755 while net_worth and d/e have a positive effect on illiquidity with β coefficient of 0.327 and 0.603 respectively. Panel C of Table 12 reports the results of multiple regression for the whole sample of illiquid companies. The model is highly significant with F-value at 17.246. The model is a good fit as R square and adjusted R square values are 0.961 and 0.905 respectively. Net_worth, d/e, d/a and volatility have a negative influence on illiquidity as their significant β coefficients are −0.871, −0.5, −0.328 and −0.635 respectively. While firm characteristics namely, *dfv*, z_score, int_cov and mkt_lev have a significant positive effect on illiquidity and their β coefficients are 0.201, 0.549, 0.393 and 1.002 respectively. The multiple regression results

Table 12. Multiple regression results.

Dependent Variable: sqrt_illiq	β	t	Sig.
Panel A: Q1 (least sqrt_illiq)			
z_score	1.854	6.55	0.003
d/a	0.994	5.855	0.004
mkt_cap	−1.454	−6.367	0.003
EPS	−0.954	−2.507	0.066
volatility	−2.415	−7.047	0.002
prom%	1.307	6.169	0.004
RoNW	0.851	2.686	0.055
R sq.	0.956	F	12.552
Adj. R sq.	0.88	Sig.	0.014
Panel B: Q5 (most sqrt_illiq)			
net_worth	0.327	4.526	0.046
z_score	−0.755	−9.693	0.01
d/e	0.603	11.446	0.008
R sq.	0.996	F	158.813
Adj. R sq.	0.99	Sig.	0.006
Panel C: Overall multiple regression model			
dfv	0.201	2.095	0.074
net_worth	−0.871	−7.127	0
z_score	0.549	2.98	0.021
d/e	−0.5	−2.425	0.046
int_cov	0.393	3.768	0.007
d/a	−0.328	−2.137	0.07
book_lev	0.448	1.87	0.104
mkt_lev	1.002	4.311	0.004
volatility	−0.635	−5.427	0.001
own_conc	0.125	1.234	0.257
R sq.	0.961	F	17.246
Adj. R sq.	0.905	Sig.	0.001

have shown that size, financial distress and leverage are important firm characteristics which have an influence on illiquidity of the company. It can be said that the major reasons for illiquidity in stocks lie in low market capitalization, poor financial health and high amount of debt in the capital structure of a company.

7. Discussion and Conclusion

The paper analyzed the firm characteristics of companies with illiquid stocks and attempts to identify the nature of such illiquid companies. It is observed that firm characteristics such as size, financial distress, ownership structure, leverage, and profitability of a company are prominent. The importance of all

firm characteristics is studied using multiple ways to gauge their association with illiquidity in stocks. Illiquidity definitely have a negative association with promoter's stake in ownership structure and it is observed that only 8.90% of illiquid companies have high promoter's stake. The tests on ownership structure have consistently proved that the low promoter's stake indicate towards high illiquidity. It is also observed that the companies have high debt in their capital structure, as illiquidity in stocks make the cost of raising capital from equity high which forces illiquid companies to rely on debt financing. Thus, illiquid companies are highly levered. More debt in the capital structure means more fixed financial obligations of the company and failing to meet that the company can become financially distressed. The results show that 70 out of 79 illiquid companies are in distress zone. Results have consistently shown negative relation between z_score and illiquidity. Thus, poor financial health of the company and illiquidity in stocks have strong association.

Firm characteristics which effect illiquidity in stocks for the companies in Q1 quintile are financial distress, small size, high promoter's stake, low profitability and low volatility. While for Q5 quintile (companies with highest illiquidity), the firm characteristics which have shown a significant influence on stock illiquidity are high leverage and financial distress of the company. Overall, the results clearly reveal that small size, low promoter's stake, high debt, negative profitability and poor financial health are prominent characteristics of high illiquid companies in Indian stock markets. Moreover, low z_score, small size and high leverage are 3 major reasons of illiquidity in stocks.

8. Implications for Policy Makers and Investors

The reasons for stock illiquidity in firms can be attributed to their basic nature, so investors should be cautious and look for firm characteristic movements when they have to invest in stocks or long stocks. As the results show that illiquid companies have low promoter's stake and most of the illiquid firms are also financially distressed and appear in high illiquidity quintiles. This clearly indicates that promoter's must have realized the sickness of the firm and have left the company on its own fate. While the uninformed retail investors stay back to face illiquidity costs of these companies. Policy makers should ensure transparency in the market, so that there exists no information asymmetry in terms of company's financial health. Agencies or regulators should keep a track of the ownership stakes and

mischievous acts of promoters should be questioned. Stock exchanges should charge more for floating new shares of illiquid company. Thus, public floating of illiquid stocks should be made difficult until the company shows good financial health and improve stock liquidity in the market.

The companies which rely more on debt and are raising huge amounts of capital in the form of debt are surely the ones for whom raising capital from equity is difficult and expensive. Such companies are definitely going to become sick if they continue with the imbalances in their capital structure. Thus, investors should refrain from investing in companies which are moving towards high leverage. Companies should avoid inclining towards debt and should improve their stock liquidity by increasing transparency and proper dissemination of information. Regulators can keep a check on company's financial leverage by asking for reports annually and warn the company in case of default.

In general, companies with illiquid stocks are distressed as 88.60% of companies in the sample were reported as financially distressed. 18 out of 98 shortlisted illiquid companies got delisted from NSE in the year 2018. Table A.1 (in Appendix) gives the details of delisted companies. Finally, we conclude that illiquid companies are those which have basic characteristics of low promoter's stakes, small size, financially distressed, high leverage and low/negative profitability. We suggest investors to refrain from investing in such companies and should study these basic characteristics before going long in such stocks.

Appendix A

Table A.1. List of delisted companies.

S. No.	Name of Company	Date of Delisting	Mode of Delisting
1.	L C C Infotech Ltd.	8th August 2018	Compulsory delisting
2.	Agro Dutch Inds. Ltd.	30th May 2018	Compulsory delisting
3.	Suryajyoti Spinning Mills Ltd.	8th August 2018	Compulsory delisting
4.	Rei Six Ten Retail Ltd.	11th September 2018	Compulsory delisting
5.	Omnitech Infosolutions Ltd.	8th August 2018	Delisted and liquidated
6.	A I Champdany Inds. Ltd.	17th October 2018	Voluntarily delisting
7.	Shree Ganesh Jewelry House (India) Ltd.	8th August 2018	Compulsory delisting
8.	Lumax Automotive Systems Ltd.	30th May 2018	Compulsory delisting
9.	Net 4 India Ltd.	11th September 2018	Compulsory delisting
10.	N E P C India Ltd.	8th August 2018	Compulsory delisting
11.	V K S Projects Ltd.	11th September 2018	Compulsory delisting

Table A.1. (*Continued*)

S. No.	Name of Company	Date of Delisting	Mode of Delisting
12.	Kemrock Industries & Exports Ltd.	30th May 2018	Compulsory delisting
13.	Pan India Corpn. Ltd.	30th June 2018	Compulsory delisting
14.	G E I Industrial Systems Ltd.	8th August 2018	Compulsory delisting
15.	Sudar Industries Ltd.	11th September 2018	Compulsory delisting
16.	Shri Aster Silicates Ltd.	30th May 2018	Compulsory delisting
17.	Malwa Cotton Spg. Mills Ltd.	11th September 2018	Compulsory delisting
18.	Acropetal Technologies Ltd.	8th August 2018	Compulsory delisting

Table A.2. List of companies which existed in Nifty 500 in past.

S. No.	Name of Company	Whether Delisted	Nifty 500	
			Inclusion	Exclusion
1.	Gujarat Lease Financing Ltd.		1998	2001
2.	Samtel Color Ltd.		1998	2009
3.	Tamilnadu Telecommunications Ltd.		2002	2005
4.	Agro Dutch Inds. Ltd.	Delisted	2002	2009
5.	Today's Writing Instruments Ltd.		2003	2007
6.	Jain Studios Ltd.		2000	2007
7.	Creative Eye Ltd.		2002	2005
8.	K I O C L Ltd.		2018	—
9.	Melstar Information Technologies Ltd.		2002	2007
10.	Regency Ceramics Ltd.		2003	2006
11.	N E P C India Ltd.	Delisted	1998	2009
12.	Kemrock Industries & Exports Ltd.	Delisted	2011	2013
13.	Hind Syntex Ltd.		1998	2002
14.	Malwa Cotton Spg. Mills Ltd.	Delisted	1999	2002

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