IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 20, Issue 1. Ver. III (January. 2018), PP 01-08
www.iosrjournals.org

Impact of Leverage of a Company on Stock Market Liquidity in Indian Markets

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Abstract: *This paper examined the relationship between leverage and the stock market liquidity of Indian firms included in the S&P BSE 500 Index from 2009 to 2013. The fixed effects panel regression model has been invoked to analyze the relationship. The empirical results support the stock market liquidity implications of leverage, that is, lower level of debt results in higher stock market liquidity of the firm. The empirical results put forth that there is a negative relationship between stock market liquidity as measured by Amihud measure and firm leverage.*

Keywords: *Leverage, stock market liquidity, S&P BSE 500 Index.*

Date of Submission: 28-12-2017 Date of acceptance: 13-01-2018

I. Introduction

Expected cost of equity, stock returns and value of the firm are affected by liquidity thereby luring managers to alter their decisions regarding capital structure in order to enhance stock market liquidity (Amihud and Mendelson, 1986; Abedini and Razmi, 2014; Masereti, 2014; Mathanika et al., 2015). Liquidity of a stock is generally defined as the ability to trade large volumes with minimal price impact (transaction price), cost and delay (Attig, 2003; Pastor and Stambaugh, 2003; Liu, 2006; Krishnan and Mishra, 2013; Jackson, 2013). Capital structure of the firm reflects the proportion of debt and equity (Abhor, 2005; Nirajini & Priya, 2013). An increase in debt alleviates the financial burden of a firm, such as payment of interests, which ultimately increases the risk of the firm that leads to decrease in liquidity. Nirajini & Priya (2013) opines that this fixed interest costs should be kept to a minimum because of uncertainty of future. Equity shareholders have the residual claim in the firm. So, if a firm becomes highly levered relative to its equity size, then it poses serious threat to its equity shareholders (Ahmad et al., 2013). Foster and Viswanathan (1993) opined that trading by informed agents is encouraged due to increased equity volatility, thereby forcing market makers to widen spreads. Moreover, traditional accounting measures such as the current ratio, advocate that highly leveraged firms deters the liquidity of stock. Illiquidity caused by the leverage, further decreases the base of shareholders because liquidity traders will prefer stock with the lowest transaction costs (Huddart et al., 2002).

II. Review of literature

Huang and Chang (2015) found that as companies become highly leveraged, stock market liquidity goes down. Liquidity is a risk factor as it reveals about the attractiveness of the stock. For illiquid stocks investors demand certain level of premium as a compensation for bearing that risk, thereby affecting the investment decisions. Khediri and Daadaa (2011) posits that highly levered firms suffer from lower activity of stock trading with higher leverage have low stock trading activity. Eisfeld and Rampini (2006) analysed the relationship between the capital structure of firms and their stock liquidity and revealed that highly leveraged firms alleviates information asymmetry making trading of stock costly which ultimately reduces the stock market liquidity of the firm. Lipson and Mortal (2006) advocates that the stock market liquidity of a firm enhances with lower levels of leverage. Norvaisiene and Stankeviciene (2014) revealed that in Lithuanian companies higher level of debt had a negative impact on the stock liquidity that is the stock were less liquid of such firms. Andrade and Kaplan (1998) revealed that high level of leverage is the major cause of financial distress which ultimately leads to decrease in stock market liquidity. In the opinion of Gomez and Schmid (2010); Ngome (2016), firm opt for debt to have interest tax shields (especially when the cost of raising debt is low) if they have valuable investment opportunity at hand. This will enlarge the level of the risk of financial distress because debts need to be paid even if income levels goes down. Therefore, the use of debt can affect equity return because of the increased risk levels. Mitchell et al. (2002) revealed that high idiosyncratic risk as well as high costs of trading is associated with investing in financially distressed stocks. Economic conditions of a country affect the stock market liquidity of firms, but under the same economic conditions different firms exhibit different levels of stock market liquidity. Therefore, there are certain firm specific factors that affect

stock market liquidity. So, the present study explores the affect of firm level leverage on liquidity of its stock. Based on what precedes, the following hypothesis can be formulated:

H1: There is significant relationship between the financial leverage and stock market liquidity practices in a firm.

III. Need Of The Study

As can be inferred from the experiences of financial crises, severe economic conditions can vanish stock market liquidity from the market (Huang and Chung, 2015). There are few studies investigating the impact of financial leverage on stock market liquidity especially in emerging markets such as India. The present study on stock market liquidity will, thus, fill the research gap.

IV. Objective Of The Study

1. To examine the stock market liquidity in the sample companies
2. To analyze financial leverage for sample companies.
3. To study the relationship between financial leverage and stock market liquidity of the sample companies.

V. Research Design

Sample Selection and Data Sources

Table 1 depicts the sample selection criterion of a subset of the S&P BSE-500 Index taken from PROWESS. Firstly, all the public sector companies were kept out of the sample because of their different governance mechanisms; influential policies because of social obligations and government (Singhania, 2007); and their poor financial performance may distort the results of the study. Secondly, all banking and financial sector companies were excluded because they are governed by different regulations viz. Reserve Bank of India Act, 1934 and the Banking Regulation Act, 1949. Thirdly, companies with first trading date falling within sample period were excluded. Fourthly, those companies which were incorporated on or after April1, 2008 have been excluded. Fifthly, companies suspended by BSE through the financial year April 1, 2008 to March 31, 2013 were excluded. Sixthly, for consistency in data, those companies which had financial year other than the fiscal year (i.e., April 1-March 31) were eliminated as they made comparison difficult. Lastly, the sample got further narrowed down as the annual data is not available for few companies. After applying sample selection criterion, a panel dataset of 187 companies with 935 company year observations has been used for the analysis.

Table: 1 Summary of Sample Selection Criterion

Sample Selection Criterion	**Number of Companies**
Initial Sample of BSE-500 index companies	500
Less:	
Government-owned companies will be deleted	(39)
Financial services sector companies will be deleted	(85)
Companies with first trading date falling within sample period	(37)
Companies which were incorporated on or after April1, 2008	(06)
Companies suspended by BSE during the sample period	(09)
Companies which had financial year other than the fiscal year (i.e., April 1-March 31)	(60)
Companies with missing financial database for any of the years under study	(56)
Companies with missing data from corporate governance reports of any of the years under study	(21)
Final Sample (187*5)= 935 observations	**187**

Source: Researcher's own compilation

Variable Selection and Description

The variables used to investigate financial leverage and stock market liquidity relationship have been presented in the following Table 2.

Table 2: Summary Variable Definitions

S. No.	Symbol	Variable	Definition	Prior Literature
1.	*LEV*	Leverage	Total debt divided by total debt plus equity	Jain and Rezaee, 2006; Chen et al., 2007; Garg, 2007; Balasubramanian et al., 2010; Foo and Zain, 2010; Li et al., 2012; Fang, 2012; Chan et al., 2013; Prommin et al., 2014; Huang et al., 2015
2.	*AIR*	Amihud Illiquiidty Ratio	It measures the average absolute change in share price per dollar of volume traded and computed as follows: $ILLIQ_{iy} = 1/D_{iy} \sum_{t=1}^{D_{iy}} \lvert R_{iyd} \rvert / VOLD_{iyd}$	Prasanna and Menon, 2012; Chan et al., 2013; Lim, 2013; Arouri et al., 2013; Back et al. 2013; Edmans et al., 2013; Liu, 2013; Xiong et al., 2013; Arazpoura and Fadaeinejadb, 2014; Jiang et al., 2014; Prommin et, al., 2014; Hung et al., 2015; Karmani et al., 2015; Liu, 2015; Sharif et al., 2015; Asem et al., 2016
3.	*AGE*	Age of the Company	Natural logarithm of the number of years for which the company has been in existence since incorporation	Sarin et al., 2000; Garg, 2007; Wu and Liu, 2009; Chung et al., 2010; Loukil and Yousfi, 2010; Jiang et al., 2011; Dass et al., 2011; Liu, 2013; Prommin et al., 2014
4.	*SIZ*	Company Size	Natural logarithm of firm's total sales	Sharma, 2005; Garg, 2007; Chen et al., 2007; Kanagaretnam et al., 2007; Wu and Liu, 2009; Loukil and Yousfi, 2010; Mihhejev and Obertas, 2012; Chan et al., 2013
5.	*CPR*	Closing Price	Log scaled daily closing stock price averaged over an annual trading period	Sarin et al., 2000; Attig, 2003; Ascioglu et al., 2005; Chung et al., 2010; Loukil and Yousfi, 2010; Boujelbene et al., 2011; Mihhejev and Obertas, 2012; Jackson, 2013; Charoenwong et al., 2014; Karmani et al., 2015; Asem et al., 2016
6.	*RVOL*	Standard Deviation of Stock Returns	Annualized standard deviation of daily stock returns over an annual trading period for each stock	Sarin et al., 2000; Attig, 2003; Ascioglu et al., 2005; Cheng et al., 2006; Chen et al., 2007; Jain et al., 2008; Agarwal, 2009; Uddin, 2009; Chung et al., 2010; Loukil and Yousfi, 2010; Amador et al., 2011; Jackson, 2013; Liu, 2013; Charoenwong et al., 2014; Jiang et al., 2014; Prommin et al., 2014; Huang et al., 2015; Karmani et al., 2015; Asem et al., 2016

Source: Researcher's own compilation

VI. Data Analyses

The software packages, SPSS (version 20) and STATA (version 12) were utilized to carry out the data analysis in the present study. Hsiao (1986) advocates that in order to capture the dynamics of liquidity, panel data is more effective than a cross-section or time series data. The present study invoked panel data fixed effects regression model to test the proposed relationship between leverage and stock market liquidity:

$$AIR_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 AGE_{it} + \beta_3 SIZ_{it} + \beta_4 CPR_{it} + \beta_5 RVOL_{it} + \varepsilon_{it} \quad (1)$$

Where,

AIR = Stock Market Liquidity is denoted by Amihud illiquidity ratio (*AIR)* for company *i* for year *t*
LEV = Total debt divided by total debt plus equity
AGE = Natural logarithm of the number of years for which the company has been in existence since incorporation
SIZ = Natural logarithm of firm's total sales
CPR = Log scaled daily closing stock price averaged over an annual trading period
RVOL = Annualized standard deviation of daily stock returns over an annual trading period for each stock
Ɛ = Error term

VII. Emrirical results and discussion

Descriptive Statistics

The analysis begins by examining the characteristics of all the variables used in the present study by employing descriptive statistics (mean, standard deviation, minimum, median and maximum) for the financial years 2009-2013 using the full sample of 935 company-year observations. Panel A of Table 3 shows the descriptive statistics for the independent variable, that is, ***LEV*** used in the regression model. ***LEV*** ranges from 0 to 1 with mean (median) as 0.804 (0.91). Panel B shows the descriptive statistics for proxy of stock market liquidity used in the study. ***AIR*** measure illiquidity, i.e. higher estimates corresponds to lower liquidity. Illiquidity as measured

by the absence of continuous trading implies that there is an extreme mismatch between the available buyers and sellers at a given point in time (Eleswarapu and Krishnamurti, 1994; Amihud et al., 2005). The mean (median) value of ***AIR*** is 8.234 (8.201). Further investigations reveals that ***AIR*** covers a wide range suggesting that sample covers companies having low as well as high stock market liquidity. Panel C reports the statistics of control variables employed in the present study. As can be inferred from the table the average company in the sample is nearly 3 years old, suggesting that the sample companies are relatively young. Average ***SIZ*** of sample companies as measured by the natural logarithm of firm's sales is 10.278 with maximum and minimum values of 14.974 and 6.623 respectively suggesting that the sample for the present study covers small as well as large size companies. In terms of average ***CPR***, the average company has a mean value of 5.321, with maximum and minimum values of 8.294 and 1.648 respectively, covering a wide range. ***RVOL*** covers a narrow range from 0.008 to 0.058 with a mean (median) of 0.020 (0.019).

Table: 3 Descriptive Statistics

Panel A: Leverage(Independent Variable)							
Continuous Variables	**Symbol used**	**Observations**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Leverage	LEV	935	0.804	0.256	0	0.91	1
Panel B: Proxy for Stock Market Liquidity (Dependent Variable)							
Continuous Variables	**Symbol Used**	**Observations**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Amihud Illiquidity Ratio	AIR	935	8.234	2.226	2.405	8.201	16.744
Panel C: Control Variables							
Continuous Variables	**Symbol Used**	**Observations**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Age of the company	AGE	935	3.451	0.819	1.099	3.332	7.607
Company Size	SIZ	935	10.278	1.338	6.623	10.120	14.974
Closing Price	CPR	935	5.321	1.078	1.648	5.353	8.294
Standard Deviation	RVOL	935	0.020	0.007	0.008	0.019	0.058

Note: Results are obtained using SPSS 16.0

Panel Data Regression

The significant *p* value of Hausman test strongly rejects the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as those estimated by the consistent fixed effects estimator. The test therefore supports the use of a fixed effects model. Table 4 reports the panel data regression (fixed effects) analysis results on the panel dataset of 935 observations. The intercept is found to be significant at one percent level. Further, the results show that ***LEV*** have positive and significant coefficient (0.917) at one percent level. The positive sign of the coefficient of leverage ***(LEV)*** is consistent with the expectation that the use of debt hinders stock market liquidity. For ***AIR***, ***AGE*** is positive and insignificant (β= 0.431, p> 0.05). Further, ***SIZ*** has a negative and significant coefficient (β= -1.558, p< 0.01) at one percent level, that is, larger companies have high stock market liquidity. Large companies faced more pressure to enhance stock market liquidity to meet or beat investors and analyst's expectations. ***CPR*** has found to have negative and significant relationship with ***AIR***, indicating that higher the average closing price of the stock, higher would be its liquidity. ***RVOL*** has a positive and insignificant relationship with ***AIR***. The overall R^2 is 0.49 and the Wald statistics for the regression model is significant at one percent level of significance, indicating the model fitness.

Table 4: Regression Results of Leverage on Stock Market Liquidity

Explanatory Variables	**Model 4 (AIR)**
Intercept	**25.953*** (0.000)**
LEV	**0.917*** (0.002)**
AGE	0.431 (0.483)
SIZ	**-1.558*** (0.000)**
CPR	**-0.756*** (0.000)**
RVOL	4.466 (0.542)
No. of Observations	935

Overall R^2	0.49%
Wald Statistics (F)	57.50
Prob>chi square	0.000

Note: Results are obtained using EViews 9

Dependent variable is stock market liquidity as captured by Amihud illiquidity ratio
The p-values are shown in parentheses.
*** indicates level of significance at 1 percent. The test of significance is two tailed.
** indicates level of significance at 5 percent. The test of significance is two tailed.
* indicates level of significance at 10 percent. The test of significance is two tailed
.

Test for Multicollinearity

Correlation among three or more independent variables is known as multicollinearity. It makes impossible to determine the separate effect of any particular independent variable on the dependent variable (Anderson et al., 2008). As a rule of thumb, VIF exceeding 10 and tolerance below 0.2 indicates a potential problem (Myers, 1990; Bowerman and O'Conell, 1990; Menard, 2002; Gujarati, 2003; Field, 2005). As can be inferred from the Table 5, multicollinearity was not a serious problem in the present study.

Table 5: Variance Inflation Factors (VIF)

Variable	VIF	Tolerance
LEV	1.14	0.877
AGE	1.07	0.931
SIZ	1.17	0.854
CPR	1.16	0.861
RVOL	1.12	0.896

Heteroskedasticity

The heteroskedasticity is more common with cross-sectional data and leads to inefficient estimates of the coefficients. The insignificant *p*-value reported in Table 6, indicates presence of heteroskedasticity in the present study.

Table 6: Breusch-Pagan Test for Heteroskedasticity

Dependent Variable	Chi-square value	*p*-value
AMI	90.57	0.00

Where, *AMI*, proxy for stock market liquidity

Robust Check

In order to remove heteroskedasticity and for controlling the presence of outliers in the results of the study, robust regression has been used. Table 7 presents the results of robust standard error depicting that there is no problem of outliers in the data and results are as efficient as the results of linear regression.

Table 7: Robust Regression

Explanatory Variables	Model (AMI)
Intercept	**25.953*** (0.00)**
LEV	**0.917*** (0.01)**
AGE	0.431 (0.57)
SIZE	**-1.558*** (0.00)**
CPR	**-0.756*** (0.00)**
RVOL	4.466 (0.55)
No. of Observations	935
Overall R^2	0.49%
Wald Statistics (F)	31.73
Prob>chi square	0.000

Note: Results are obtained using STATA 12.0

VIII. Conclusion And Implications

This paper hypothesizes that financial leverage affect stock market liquidity. To provide supporting evidence, present study employed panel data regression model. Companies with low level of financial leverage

enhance stock market liquidity as it reduces financial burden of the firm and thereby posing less risk. Empirical results reveal that the use of debt hinders stock market liquidity. Further, the benefits to a company from having high stock market liquidity will likely depend upon the size of the company, that is, larger companies have high stock market liquidity. The results put forth that higher the average closing price of the stock, higher would be its liquidity.

Research findings shed light on the important role of capital structure in enhancing stock market liquidity of the company. It will help managers of the companies to realize the importance of capital structure who should put their best of efforts to maintain debt levels to enhance stock market liquidity. Results will help investors to become more vigilant in assessing management's capacity to enhance stock market liquidity and thereby improves their decision making.

IX. Limitations

Despite the valuable contribution and implications, the present study contains certain limitations.

Stock market liquidity is difficult to measure as it has several dimensions. The study employed Amihud illiquidity measure as a proxy to capture stock market liquidity. The results may suffer from potential measurement errors. Furthermore, varying conclusions may be obtained using other measures for stock market liquidity. Further, results have been controlled only for certain factors in the present study but stock liquidity could be affected by a number of factors other than the leverage. The sample of the present study consists of only BSE 500 index companies, pertaining to the period 2009-2013; however, a larger sample may yield better estimates.

X. Directions For Future Research

Future research can be conducted with large sample for better results. There could be comparative analysis of the companies, viz., small, medium and large companies as well as public and private companies. The future research could be replicated to examine the impact of financial leverage on stock market liquidity in financial sector and unlisted companies.

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IOSR Journal of Business and Management (IOSR-JBM) is UGC approved Journal with Sl. No. 4481, Journal no. 46879.

Dr. Manjit Kaur Sidhu"Impact of Leverage of a Company on Stock Market Liquidity in Indian Markets." IOSR Journal of Business and Management (IOSR-JBM) 20.1 (2018): 01-08.