

**LIQUIDITY, STOCK RETURNS AND OWNERSHIP STRUCTURE  
AN EMPIRICAL STUDY OF THE BOMBAY STOCK EXCHANGE**

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## 1. Introduction

In recent years, globalization of capital flows has led to the growing relevance of "Emerging Capital Markets". In particular, India is one of the countries with an expanding stock market that has started attracting foreign funds. The Indian capital market has grown phenomenally due to the recently initiated liberalization process. For instance, between 1985 and 1992 the number of listed companies on the Bombay Stock Exchange (B.S.E.) increased from 4,344 to 6,480. Over the corresponding period, the market value of capital of the listed companies went up from Rs.253 billion to Rs.3,541 billion (approximately \$ 110 billion). As a percentage of the G.N.P., the market capitalization of the listed companies increased from 9.7% in 1985-86 to 57% in 1991-92. However, the stock markets in India are plagued by severe illiquidity with the trading being very infrequent and concentrated in only a few stocks.

Around 85% of the trading volume on the B.S.E. is from the Group 'A' securities (about 88 companies). In fact, 32% of the volume is due to only the 10 most active issues. In contrast, as Gupta (1992) points out, about 25% of the listed companies do not trade even once a year. In this paper, we examine this issue by empirically looking at the characteristics of the firms leading to the differential levels of trading frequency on the B.S.E.

Illiquidity as measured by the absence of continuous trading basically implies that there is an extreme mis-match between the available buyers and sellers at a given point in time. As early as in 1968, Demsetz notes the possibility that the available pool of liquidity motivated traders (who demand immediacy) may not arrive at the same time. The consequent order imbalance can be cleared only if there exist traders or dealers who are willing to absorb the excess demand or supply at a price concession, of course. In other words, the traders who want to buy immediately can do so at a higher price and, similarly traders desiring immediate sale

have to accept a lower price. In India the liquidity traders do not have this facility at this time, since there are no pre-arranged dealers for the stocks. Therefore, at a given time, if there are no liquidity-motivated traders on one side of the transaction, then one would expect no trade to occur.

For the New York Stock Exchange, Demsetz (1968) has shown that the probability of the arrival of a trader - the transaction rate - depends on the number of shareholders. Since then, other authors such as Benston and Hagerman (1974) and, Glosten and Harris (1988) have used it as a proxy for the extent of liquidity traders for a particular stock. Recently, Bhidé (1993) argues that liquidity of the stock can be enhanced by having a more diffused ownership but at the cost of good internal monitoring. Also, Holmstrom and Tirole (1993), make a distinction between long-term investors and the short-term liquidity traders. The basic idea is that the ownership structure affects the level of liquidity of the stock. This is something that has not been directly tested empirically even in the U.S. Of course, several authors have used variables such as insider concentration as a proxy for the adverse-selection component of the bid-ask spreads.

In this paper we attempt to shed light on the issue of what are the factors causing differential levels of trading frequency on the B.S.E. Given the benefit of the knowledge of the research that has been conducted on the U.S. markets we focus our attention on factors such as, number of shareholders, number of shares outstanding, the ownership structure etc. Also, we investigate the effect of this lack of liquidity on the expected returns of the stocks. Amihud and Mendelson (1986) in a theoretical model predict a liquidity premium.<sup>1</sup> We believe that the paper contributes to our better understanding of a hitherto relatively unresearched Emerging Market.

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<sup>1</sup>Eleswarapu and Reinganum (1993) raise some doubts about the robustness of the empirical validity of this model using N.Y.S.E. data).

Given the growing attention being given to India and its stock markets, the findings of this paper should be of interest to the non-Indian audience as well.

We conduct this study for a sample of about 250 companies over a five year period - 1989 to 1993. We find evidence in favour of a liquidity premium in the Indian market and that diffused stock ownership has a beneficial impact on the secondary market liquidity. Also, liquidity is adversely affected by larger insider holdings of government and financial institutions. The rest of the paper is organised as follows. In section 2 we discussed the implication of differential liquidity across stocks. The data and empirical results are discussed in section 3. We offer our concluding comments in section 4.

## **2. Implications of differential liquidity across stocks**

Prior literature has focussed on several definitions of liquidity. For instance, Lippman and McCall (1986) have defined liquidity in terms of the time that it takes to transact. Hasbrouck and Schwartz (1988) characterize a liquid market by its depth, breadth and resiliency. Depth refers to the existence of buy and sell orders near the current market price. Breadth is the existence of orders in substantial volume. Finally, resiliency is the responsiveness of new orders to price changes caused by short-term order flow imbalances. Other authors such as Amihud and Mendelson (1986) define liquidity as the observable bid-ask spread. Bernstein (1987) reviews the various measures of liquidity and points out the pitfalls of using any single measure of liquidity. The focus of this paper is on implications of differential liquidity on asset pricing and the effect of ownership structure on liquidity.

## 2.1 Liquidity and Asset pricing

Schwartz (1988) states that liquidity differs between assets traded within a market center. Trading frictions have an impact on the price behavior of a security. Other things being equal, thinly traded stocks are found to have wider bid-ask spreads, greater short period price volatility and market model beta coefficients are biased downwards. The issue of whether liquidity differences between assets traded within a market center have a substantial effect on asset prices is an important one and needs to be addressed. Amihud and Mendelson (1986) in a seminal paper present evidence demonstrating the impact of liquidity on asset pricing. They measure illiquidity by the bid-ask spread which is the cost of immediate execution. Their theoretical model posits, and their empirical results corroborate, that assets with wider percentage spreads yield higher returns on average and that investors with longer holding periods should select assets with wider spreads.<sup>2</sup> Amihud and Mendelson (1988) examine the costs and benefits of increasing liquidity. By increasing liquidity, firms reduce their cost of capital and increase the value of the firm. They analyze the role of a number of financial management policies and institutional mechanisms for enhancing the secondary market liquidity of firms. The implication of these findings is that we need to move from the two-dimensional risk/return framework to a three-dimensional risk/return/liquidity framework.

There are several reasons why it is useful to study the relationship between liquidity and asset pricing. First, prior studies have largely focused on the more advanced western capital markets. The association of liquidity with stock returns has not been tested in emerging capital

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<sup>2</sup> Krishnamurti and Park (1990) present evidence from the NASDAQ market to show that illiquid firms earn higher returns as compared to liquid firms other things being equal. They use trading volume as their measure of liquidity.

markets. There are very important differences between the trading practices of the Bombay Stock Exchange and an advanced stock market such as the New York Stock Exchange. N.Y.S.E. is a continuous market (except at the beginning of each day) with specialists providing liquidity. Trades are consummated at the quoted prices of the specialist with negligible time delay. In B.S.E. there are no mandatory market makers. Investors seeking liquidity are subjected to uncertainty regarding the transaction price as well as the time of completion of trade. Furthermore, the differences in liquidity across stocks are exacerbated by the B.S.E. practice of categorizing stocks into two groups. Transactions of stocks in group A are not always followed by delivery. At the end of each settlement, traders have the option of carrying forward their long or short positions. In contrast, transactions in Group B stocks involve delivery. It is therefore interesting to study whether in spite of the differences in the market microstructure there exists a liquidity premium in the Indian stock market. Second, the study of liquidity in the Indian stock market, which is plagued by severe illiquidity problems, is likely to be useful to investors in making their investment decisions. Since 1993, Foreign Institutional Investors (FII) have been allowed to invest directly in the Indian stock markets. FIIs find it useful to invest in Indian stocks due to two reasons - expectation of higher returns and better diversification of their portfolios.<sup>3</sup> FIIs include only the most liquid stocks in their opportunity set. If the study finds evidence in favor of a substantial liquidity premium in the Indian stock market, FIIs might benefit from including the relatively illiquid stocks in their portfolio if their investment horizon

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<sup>3</sup> Their expectation of higher returns is due to the higher GNP growth in India as compared to advanced industrialized countries. The returns in the Indian stock market has a correlation of -0.17 with the U.S. market (S&P 500). Investing in the Indian market provides western investors with a classic opportunity for risk reduction.

is sufficiently long.

## **2.2 Ownership Structure and Liquidity**

Demsetz(1968) states that one of the important determinants of secondary market liquidity is the number shareholders. As the number of persons currently holding a particular share increases, the number of market participants interested in trading the asset increases in direct proportion. Therefore, the number of transactions per unit time also increases. The number of transactions and the volume traded are observed to be highly correlated in Demsetz's study. Another consequence of an increase in the number of shareholders is the reduction in bid-ask spreads.

Benston and Hagerman (1974) observe a direct relationship between a proxy for insider holdings and bid-ask spread. There are two reasons for the deleterious effect of 'insiders' ownership on liquidity. First, market makers in order to reduce their potential losses on account of trading with insiders widen their bid-ask spreads. As a direct consequence, trading volume reduces. The second factor is that insiders possess shares for the purpose of controlling the firm and have priveleged access to price-sensitive non-public information. In the U.S., they are precluded from short-term trading utilizing this informational advantage under section 16 of the Securities Exchange Act. Therefore, large block-holding by insiders adversely affects the trading volume of stocks in the secondary market.

Holmstrom and Tirole (1993) study the role of stock market as a monitor of managerial performance. The information content of stock prices improves with the liquidity of the secondary market. In a liquid market, speculators will devote more resources on monitoring since they will realise more of the potential gains. Concentrated ownership reduces liquidity and hence the benefits of market monitoring will accrue to all shareholders. Thus stock market liquidity is

shown to have both a private and social value.

Bhide (1993) argues that increased stock market liquidity due to diffused stock holding in the U.S markets has been achieved at the cost of good internal monitoring by block-holders. Currently block-holders owning 10% or more of a firm's stock are considered to be insiders and section 16(b) of the Securities Exchange Act., places restrictions on their short term trading. Corporate and pension fund managers do not wish to compromise on the fiduciary responsibilities to their constituents in terms of protecting the liquidity of their investments. Therefore, they try to restrict their holdings to less than 10% to avoid triggering the provisions of Section 16(b). With smaller holdings, block-holders have no incentives to provide internal monitoring. Bhide (1993) considers this loss of internal monitoring as the cost of providing liquidity.

In the Indian context, the governmental regulatory agencies have historically favoured policies that diffuse stock ownership. New issues of capital were to be made on a non-discretionary basis and investors who apply for a smaller number of shares were favoured. Also, listed companies paid taxes at lower rates than non-listed companies. Thus the Indian government followed policies that promoted stock market liquidity.

However, ownership in stocks was also concentrated in the hands of insiders, government and financial institutions. Typically about 40% of shares were held by insiders and about 15%-20% by financial institutions and government. At the extreme, public sector companies were wholly owned by the government of India and were absolutely illiquid. Even in the larger private sector companies, it was not unusual to find governmental nominees sitting on the board of directors. The effect of ownership concentration on stock market liquidity in the Indian context, has not been empirically studied. We plan to remedy this lacuna by addressing this issue.

Recently, the regulatory agency, Securities Exchange Board of India (SEBI: The



counterpart of SEC in India) has started permitting private placement of stocks, increased the minimum amount of investment in public issues, and allowed companies to raise capital from Euro-Issues. These measures undermine the secondary market liquidity of stocks. An ostensible reason for these measures is to allow companies to raise capital at lower issue costs. But adequate attention has not been given to the adverse impact of these measures on the liquidity of stocks. Therefore, we consider it relevant and timely to study the effect of stock ownership patterns on the liquidity particularly in the Indian market which is plagued by extreme illiquidity.

### **3.0 Data and empirical results**

Data on stock prices were obtained from the database of Dateline and Research Technologies Limited (DART). The DART database covers nearly 2,000 companies out of a total of nearly 6,000 listed companies on the Bombay Stock Exchange. The data are available in computer readable form and covers the period July 1988 to June 1993. The data on shareholding pattern were obtained from DART and the Bombay Stock Exchange directory. The shareholding data contains the following variables: Percentages held by insiders, public, and governmental financial institutions, total number of shares outstanding, and number of shareholders.

### **3.1 Sample**

We selected 254 companies randomly from the DART database. Companies belonging to both Group A and Group B were selected to make our sample representative of the universe as far as possible. The companies left out in the DART database are most likely to be infrequently traded stocks especially of small companies. Therefore, our sample systematically

excludes the most illiquid stocks. All the currently available Indian databases (in computer readable form) suffer from the same bias. Hand collection of data for the severely illiquid stocks is extremely prohibitive in terms of time required and cost. In order to reduce the data processing costs we used a random sample instead of the entire set of 2,000 companies.

### 3.2 Methodology

For each company included in the sample, we compute the monthly returns for the period July 1989 to June 1993. Owing to the severity of the non-trading problem, we did not compute daily or weekly returns. We measure the liquidity of a stock by its trading frequency. Traditional liquidity measures such as bid-ask spread and trading volume are not available for Indian stocks.<sup>4</sup> We measure trading frequency as the ratio of the number of days the particular stock traded to the total number of days on which the stock exchange operated during each year.<sup>5</sup>

We conduct regressions to determine the effect of liquidity on stock returns and to understand the impact of ownership structure on liquidity. We also create quintiles based on trading frequency. The portfolios are rebalanced every year.<sup>6</sup> We compute descriptive statistics on trading frequency, and shareholding pattern for each of the quintiles.

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<sup>4</sup> Volume data is available for Group A stocks but not for Group B stocks. Our sample is mainly composed of Group B stocks. The Indian stock markets at present do not have mandatory market makers. Therefore, bid-ask spreads are not available.

<sup>5</sup> The number of days the Bombay stock exchange operated is less than the number of days the stock exchange remained open. Work stoppages due to brokers going on strike is a common occurrence in the Indian Stock exchanges. In addition, scheduled stoppages on BSE are quite frequent. BSE is closed for nearly two weeks on account of Christmas vacation!

<sup>6</sup> For the first year, namely 1989, we use data only for the six months, that is from July to December.

### 3.3 Empirical results

We first conduct a pooled time series and cross-section regression to estimate the impact of trading frequency on stock returns. Trading frequency is computed once a year, and returns are computed on a monthly basis. We then compute the average monthly returns for each year for each stock. We regress the average monthly returns of a particular stock on its trading frequency during the previous year. The results of regression I reported below, indicate the existence of a liquidity premium for the most illiquid stocks. The negative coefficient for the trading frequency variable (Tra\_Frq) is statistically significant at conventional levels ( $t = -2.71$ ,  $p\text{-value} = .007$ ). Our results are consistent with Krishnamurti and Park (1990), which documents a liquidity premium for the NASDAQ stocks. In this study we do not control for systematic risk and bid-ask spread. Due to infrequency of trading, we are unable to obtain the required number of data points for estimating the beta of the most illiquid stocks. Furthermore, the evidence of Fama and French (1992) indicates that control for size is more important than that of systematic risk.<sup>7</sup>

$$(I) \quad \text{Returns} = 3.30 - 2.80 \text{ Tra\_Frq}$$

(3.74)            (-2.71) (t-statistics in parenthesis)

It is common practice in studies of determinants of asset pricing to control for market capitalization. However, due to infrequent trading, we are unable to obtain year-end prices for the entire sample. Therefore, we use the number of shares outstanding as the proxy for size. By regressing average monthly returns on the trading frequency and number of shares outstanding (regression II), we find that the trading frequency variable remains significant but the number of

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<sup>7</sup> Fama & French (1992) present evidence that is consistent with a strong relationship between returns and size but are unable to find a reliable relation between returns and beta.

shares outstanding is not. The lack of significance of the number of shares outstanding may be due to multicollinearity. A high degree of correlation between trading frequency and the number of shares outstanding may be causing the multicollinearity.

**(II) Returns = 3.71 - 3.28 Tra\_Frq - 6.25 x 10<sup>-9</sup> Shares outstanding**

**(4.34) (-3.31) (.80)**

We then regress average monthly returns on the trading frequency and the number of shareholders. The number of shareholders is a proxy for the transaction rate according to Demsetz (1968). According to him there exists an approximate linear relationship between the number of transactions and the number of shareholders. We wish to test the relative importance of the liquidity proxies viz., trading frequency and number of shareholders. The results which are shown in regression III, indicate significance for the trading frequency variable but the number of shareholders variable is not statistically significant. Once again, multicollinearity seems to be affecting the significance of the number of shareholders variable.

**(III) Returns = 3.82 - 3.23 Tra\_Frq - 5.75 x 10<sup>-7</sup> No. of Shareholders**

**(4.10) (-3.00) (0.63)**

In order to better understand the relationship between the liquidity variables and the shareholding pattern variables, we provide the table of descriptives below. Average values of the variables are shown for each of the liquidity portfolios LQ1 through LQ5. The portfolios are sorted on the basis of the average trading frequency for each year and are rebalanced annually.

**Table 1**

**Descriptive statistics of liquidity and shareholding variables for the five portfolios based on trading frequency**

Portfolio Number	Average Trading Frequency	Number of Shares outstanding	Number of Shareholders	Percentage of shares held by insiders	Percentage of shares held by govt. / FI	Percentage of shares held by public
LQ1	0.41	4.119 million	11,007	43.13	15.94	40.92
LQ2	0.79	10.480 million	51,598	43.76	15.12	41.07
LQ3	0.90	7.720 million	33,335	42.98	15.92	41.16
LQ4	0.97	12.850 million	63,875	43.44	15.40	41.37
LQ5	1.00	24.023 million	149,594	42.85	20.30	36.82

We observe from table 1 that the average trading frequency of the least liquid stocks is only 0.41. This implies that these stocks do not trade for approximately 60% of the days. The average trading frequency increases to 0.79 for the second most illiquid portfolio (LQ2). The average trading frequencies of LQ3, LQ4, AND LQ5 are 0.90, 0.97, and 1.00 respectively. The average number of shares outstanding increases from 4.119 million to 24.023 million from LQ1 to LQ5. The increase is not strictly monotonic. The average number of shareholders shows an increasing pattern from 11,007 to 149,594 from LQ1 through LQ5. Once again the increase is not strictly monotonic. The descriptive statistics give us some idea about the effect of ownership structure on the observed liquidity. Liquid firms are characterized by a large number of shares outstanding, and are owned by a large number of shareholders. Diffused ownership seems to be associated with higher trading frequency. Our results are in conformity with Bhide (1993).<sup>8</sup> The shareholding pattern is as follows: approximately 40% is held by the public, government and financial institutions hold 15 - 20% and the rest is held by the corporate insiders.<sup>9</sup> There is not a great deal of variation from LQ1 through LQ5. It is not clear from the above statistics whether differences in shareholding pattern have an effect on the observed liquidity variables. Therefore, we use regression techniques to analyse the impact of shareholding pattern on trading frequency.

We regress trading frequency on number of shares outstanding and show the outcome in regression IV below. The number of shares outstanding has a positive effect on the trading

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<sup>8</sup> An extreme example is the case of DSP Financial Consultants which has less than 100 shareholders. The shares of the company are rarely traded. The last trade occurred in January 1992.

<sup>9</sup> We club governmental holdings with that of developmental financial institutions. The government either directly through shareholdings or indirectly through directives exercise a certain degree of control on the financial institutions. The government nominees serve on the board of directors of the FIs.

frequency and the relation is statistically significant.

$$(IV) \quad \text{Tra\_Frq} = 0.83 + 1.25 \times 10^{-9} \text{ Shares outstanding}$$

(103.06)                      (4.62)

We next regress trading frequency on number of shareholders and report the results in regression V. A strong statistically significant positive relationship exists between trading frequency and the number of shareholders. Our results are in conformity with Demsetz (1968) and Bhidé (1993).

$$(V) \quad \text{Tra\_Frq} = 0.83 + 1.04 \times 10^{-7} \text{ No. of shareholders}$$

(100.48)                      (3.20)

Regressions VI and VII test the effect on insiders' holdings and the holdings of government/Financial Institutions on trading frequency. As per our discussion in section 2.2, we expect an inverse relation between the holdings of insiders and the secondary market liquidity as measured by trading frequency.

$$(VI) \quad \text{Tra\_Frq} = 0.81 + 4.16 \times 10^{-9} \text{ Shares outstanding} - 1.74 \times 10^{-14} \text{ Shares held by insiders}$$

(87.30)                      (5.77)                      (-4.35)

Regression VI confirms that insiders' holdings have a deleterious effect on trading frequency even after controlling for the total number of shares outstanding. In regression VII, we use holdings by government and Financial Institutions in addition to total number of shares outstanding to explain the trading frequency. The government and Financial Institutions do not actively trade in their shares and hence their shareholding effectively reduces the number of shares available for trading in the secondary market. Our results confirm this conjecture. The governmental / Financial Institutional holding variable has a negative and statistically significant effect on trading frequency (p-value = .07) after controlling for the number of shares

outstanding.

**(VII)  $Tra\_Frq = 0.82 + 2.47 \times 10^{-9}$  Shares outstanding -  $3.61 \times 10^{-11}$  Shares held by govt. and Fin. Inst.**

**(100.14)**

**(3.39)**

**(-1.81)**

Our empirical results indicate the following. Trading frequency is inversely related to stock returns. The determinants of trading frequency are the number of shareholders and the number of shares outstanding (proxy for size). The proportion held by insiders has an inverse relationship with the trading frequency. Similarly an increase in the proportion held by government and financial institutions decreases the trading frequency in the stock market.

#### **4.0 Conclusion**

Our results indicate that there exists a liquidity premium for stocks traded in the Bombay Stock Exchange. Size and diffused ownership have a beneficial effect on the liquidity measure. Liquidity is adversely affected by increasing the holdings of insiders, government and financial institutions.

Our study has several implications. First, liquid firms face lower cost of capital and therefore have a higher market value. Liquidity enhancing measures are valuable in themselves. Increasing the number of shares (proxy for size) and the number of shareholders are two such measures. Diffused ownership has a beneficial impact on liquidity but comes with additional costs. The process of making public issues targeted at a very large number of investors is both time consuming and expensive. These costs must be weighed with the benefits that accrue from better liquidity. The dynamics of the costs and benefits of liquidity enhancing measures is a fertile area for further research.



The research also pinpoints the efforts of "control" shares, namely, insider holdings and holdings of financial institutions and government. Issue costs are lowered. When shares are sold to insiders and to government and financial institutions but at the cost of reduced liquidity. The ostensible argument for increasing the "control" shares is better monitoring. The measurement of the benefit of improved monitoring versus the cost of reduced liquidity is another fruitful area for future research.

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