

STOCK MARKET LIQUIDITY: MEASUREMENT AND IMPLICATIONS

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ABSTRACT: - Stock prices are, generally, treated as lead indicator of future economic activity. This is true, provided current prices represent discounted value of expected dividend growth and that, to the extent such assets are traded in deep and well-informed markets, expectation about future growth tend to be rational. Stock market liquidity could, therefore, be an important perspective to assess the stock market developments.

KEY WORDS: - Elasticity, Price discovery, Impact cost, Spreads, Bear-run.

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1.1 INTRODUCTION

Over the last two decades, Indian stock markets have witnessed significant changes in terms of trading environment particularly the introduction of screen-based trading, regulatory framework and higher competition among market intermediaries. In addition, there has been significant increase in the diverse range of instruments offered and informed market players have been playing a larger role. Stock trading is widespread and deep as signified by higher volumes, the beneficial impact of well-functioning capital market would remain limited to a few scrips where trading is frequent and deep. This would also result in dual equity markets wherein a small number of scrips attract large trading interest while large number of scrips show low and infrequent trading volumes.

1.2 CONCEPTS OF LIQUIDITY

One could think of two distinct though related concepts of liquidity. First, monetary liquidity which would depend on availability of cash and near cash in relation to general demand for goods/assets. The trends in monetary liquidity would generally get reflected in short-term interest rates. The low short-term rates signify easy liquidity. This concept of liquidity is commonly talked about and commented upon.

In the context of specific markets, viz. commodities or equities, depth of market is generally related to volume of transactions or frequency of trading. In popular stock market parlance, volumes of trading are routinely indicated to signify ease/frequency of trading. However, to talk about liquidity without reference to price is hardly meaningful.

Market liquidity is considered as capacity of financial markets to absorb temporary fluctuations in demand and supply without undue dislocations in prices. These two concepts of liquidity are linked, as an increase in monetary liquidity may lead to higher demand for securities and would reflect in higher security prices. An increase in monetary liquidity would lead to lower interest rates. It is through the increase in security prices the yield would be brought in alignment with interest rates.

However, market liquidity should be considered an important indicator of the state of market. A good measure of liquidity across different markets would help in comparative analysis of different markets/market segments (Reddy, 1996).

The financial literature provides no universal definition of liquidity. Liquidity of an asset can be narrowly defined as "... the ability of individuals to trade quickly at prices that are reasonable in light of underlying demand/supply conditions" (Schwartz, 1991). Darst (1975) further corroborated that liquidity or marketability of a security is made up of two elements – the volume of securities which can be bought or sold at one time without significantly affecting its price and the amount of time needed to complete a desired transaction.

These simple definitions of asset liquidity reflect two dimensions of a desired transaction, namely, speed (transaction time) and price (transaction cost). Baker (1996) reinforced this by relating liquidity to the costs of executing a transaction in the capital markets. A cost where trading costs like direct transaction cost, bid-ask spread, market impact cost, delay and search cost are attributable to liquidity (Amihud and Mendelson, 1991).

1.3 SIGNIFICANCE OF LIQUIDITY

Liquidity plays a crucial role in financial markets. The improvement and stability of market liquidity is important for market participants and serves as a way to enhance financial market credibility. In the absence of liquidity, financial markets cannot provide accurate price signals to investors and corporations, which are crucial for efficient risk sharing and accurate investment decisions. Without the availability of counter offers, financial markets would cease to exist, and would be replaced by individualized bilateral contracts.

Thus, some liquidity is necessary for the very existence of a financial market. Therefore, higher liquidity increases the expected level of satisfaction (utility) of market participants. Further, there is growing evidence of a positive relationship between asset returns and liquidity. Hence, liquidity directly

affects a firm’s cost of capital and hence its willingness to undertake real investment.

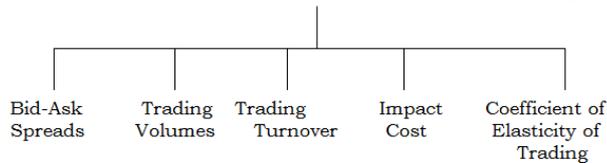
The debate regarding the impact of foreign listing on the liquidity of the domestic underlying shares is increasingly gaining the attention of academicians and finance researchers. Apart from the scientific merit, the issue is of direct importance to investors developing trading strategies and exchange officials attempting to identify conditions likely to disturb trading activity (Datar, 2000).

1.4 MEASUREMENT OF STOCK MARKET LIQUIDITY

The various methods for measurement of stock market liquidity are depicted in Figure 1.1. In a broader sense, market liquidity refers to market’s ability to provide immediate execution for an incoming market order [often called immediacy] and the ability to execute small market orders without large changes in the market price [often called market depth or resiliency] (Massimb and Phelps, 1994).

Figure 1.1

Methods for Measurement of Stock Market Liquidity



It is consistent with the three attributes of a market-depth, breadth, and resiliency of a liquid market defined by Schwartz (1991). These three attributes can lead to conflicting assessments of market liquidity. For example, a market may be deep but lack breadth. Therefore, Schwartz (1991) concludes there is no “unambiguous, operational definition of liquidity.” Dubofsky and Groth (1984) as well as Bernstein (1987), echoed Schwartz saying that there is no single, unambiguous, theoretically correct measure of liquidity. Despite the difficulties of precisely defining and measuring market liquidity, most researchers prefer some quantitative liquidity measure. Common liquidity proxies include bid-ask spreads, trading volume, and trading turnovers. These have been discussed as under:

- **Bid-ask Spreads**

One common measure of immediacy is the bid-ask spread, either absolutely or relative to some base price. It is the price that market makers impose for liquidity services. The bid-ask price can be a proxy for liquidity since the trader, unsure of the true price of an illiquid stock, is required to have a high margin for error. Also, an illiquid stock is difficult to locate and deliver. In both cases, a high bid-ask price indicates a relatively illiquid stock.

However, the traders are likely to use larger spreads in volatile periods, since, in such periods, uncertainty about illiquid stock’s price is larger (Roll, 1984; and McCulloch, 1987). However, the bid-ask spread is more directly a

measure of transaction costs than liquidity and suffers from several shortcomings as a liquidity measure.

Firstly, spread alone does not capture the ability of the market mechanism to absorb a dollar volume of trading without disturbing price. Posted quotes are often valid only for small amounts of the stock. Secondly, the spread does not reflect the price change that is necessary for large block of shares to trade. That is, it does not reflect the impact that market orders may have on prices. Thirdly, the bid-ask spread fails to account for trades occurring outside and inside the quoted spread. For example, large trades often transact outside the posted quotes and negotiated trades occur inside the posted quotes.

- **Trading Volume and Turnovers**

Another broad measure of liquidity is dollars trading volume where higher trading volume represents higher liquidity (Fisher, 1959; and Garbade, 1976). Some researches have also used the liquidity ratio (defined as annualized trading volume per unit market capitalization) as a metric of liquidity.

In some of the recent studies, researchers have used stock-trading turnover as a proxy for liquidity (Kamara, 1994; and Wolfe et al., 1992). It is expressed in the fraction form of the actual stocks traded daily with the stocks outstanding, and like trading volume, higher turnover means higher liquidity. These two measures have been criticized for the reason that the reported volume may involve some double counting. Moreover, the reliance of data largely depends on the market development.

Attempts have been made to measure market liquidity in terms of volume/frequency of trading, volume of turnover and impact costs.

One simple measure of market liquidity is to measure through frequency of trading. More frequent trading would certainly mean improved liquidity but with such an indicator it is not possible to measure extent of liquidity among frequently traded shares. Volume of trading, i.e., number of shares traded could also be considered as a measure of liquidity.

Gupta (1992) has used this measure to detect excessive or speculative trading. However, it would be difficult to assess liquidity only with reference to absolute volume of shares traded. A relative measure could be the ratio of traded volume to total number of shares issued. It enables comparison across different scrips.

However, number of shares actually available for trading are different from number of shares issued because of promoter/strategic or government holding etc. which normally are not traded. As a result, floating stock will be lower than the total issued shares. Adjustment would, therefore, be necessary to account for this factor while accurately measuring liquidity of different shares.

Such adjustments would be company specific and it would be difficult to do such adjustments (for arriving at floating stock) at the aggregate level.

In fact, liquidity has often been analysed in terms of turnover data. At the aggregate level, trends in annual

turnover (i.e. number of shares traded/price) become a measure of market liquidity. At times, total turnover in relation to market capitalization (market price of listed shares) is considered as a relative measure which can be used for comparison across different markets or over time. Table 1.1 presents the trends in turnover and turnover ratio in BSE trading since 1990-91. The turnover ratio displays wide fluctuations. This ratio suffers somewhat from dimensional distortion because while the market capitalization is a stock measure i.e. at a point of time, the turnover is a flow variable i.e. over a period of time. In the case of individual scrip, the turnover could be compared to market capitalization of that scrip to get a measure of liquidity which then can be used across different scrips. However, the floating stock could be very different for different securities. Several analysts take this factor into account while assessing liquidity in individual scrip. Recently, global stock indices are being recalculated after adjusting market capitalization of a scrip for proportion of free float.

It may be noticed from Table 1.1 that liquidity as measured by turnover (column 2) and turnover ratio (column 4) displays different trends. During 1991-92, the absolute level of turnover increased but the turnover ratio came down. On the contrary, during 1992-93, the absolute level of turnover fell significantly but the turnover ratio improved due to steep fall in market capitalization resulting from fall in stock prices. Even in 1993-94, while turnover improved, turnover ratio fell. During 1994-95 and 1995-96, both turnover and turnover ratio moved in the same downward direction.

After 1996-97, both turnover and turnover ratio have moved in the upward direction. The decline in turnover ratio over the years 1993-96 seems to rise as volumes failed to keep pace with increase in market capitalization. It is significant that when liquidity is measured in terms of turnover, distinction between volume of shares traded and value of shares traded is lost. Over short periods of time, it may not be material to maintain such distinction but over longer periods it may be useful to do so.

Table 1.1
Liquidity in Bombay Stock Exchange Trading
(Rs. in crore)

Year	Turnover	Market Capitalization	Turnover / Market Cap.(%)
1990-91	36,012	90,386	39.84
1991-92	71,777	3,23,363	22.19
1992-93	46,966	1,88,146	24.28
1993-94	84,536	3,68,071	22.96
1994-95	67,749	4,35,481	15.55
1995-96	50,063	5,26,476	09.51
1996-97	1,24,280	4,63,915	26.79
1997-98	2,07,640	5,60,325	37.06
1999-00	6,85,020	9,12,842	75.04
2000-01	10,00,160	13,01,718	76.93
2001-02	3,09,310	5,08,018	60.88
2002-03	3,16,550	4,80,220	65.91

2003-04	5,14,670	6,95,430	74.00
2004-05	6,02,800	7,15,480	84.25
2005-06	6,61,220	7,80,238	84.74

Source: RBI : Handbook of Statistics of Indian Economy and Annual Report, 2005-06.

• **Impact Cost**

Concept of impact cost as a measure of liquidity was introduced in Indian markets recently (Shah, 1996; Thomas Susan, 1998). It represents improvement over traditional measures like volume/frequency of trading. Basically, this measure takes into account institutional features of the screen-based trading environment wherein structure of order book would represent liquidity. At any time, order book would have different unmatched sale/purchase orders. From this data, average price to be paid to purchase shares worth (say) Rs. 1million can be computed. This is compared with ideal price which should be the average of bid and ask price (i.e., Bid price + Ask price/2).

The percentage difference between the ideal price and required price is termed as impact cost. Lower the impact cost, higher would be the liquidity. There are certain advantages of impact cost as a measure of liquidity. It reflects up-to-date prices. It could be computed for individual scrip or an aggregate of scrips, say scrips included in Sensex or Nifty. The National Stock Exchange uses minimum impact cost as a criterion for inclusion of scrips in stock indices it compiles. It also publishes impact cost for different index scrips averaged over one year period (Datar, 2000).

Estimates suggest that impact cost during March-July 1997 was 0.29 per cent for Rs. 5 million worth purchase of index scrips while the same was 0.49 per cent for Rs. 20 milli transactions. Similarly, impact cost was 0.56 per cent in March 1997 while it reached 0.16 per cent in May 1997. The concept of impact cost is, no doubt, very helpful for index fund managers as it addresses their concerns when it is computed for sale/purchase of index scrips.

Impact cost measures marginal liquidity in a forward-looking manner as it computes liquidity of a potential standard size transaction from the order book of an automated order driven stock exchange. It is maintained that liquidity would indicate cost of trading and lower such costs higher would be the liquidity. The cost of trading would also depend on market structure of and competition in the market.

Moreover, it would be difficult to compute impact costs in traditional market which are not automated and order driven. It would, therefore, be difficult to use impact cost to compare liquidity in equity markets and markets for corporate bonds or even commodities which have not yet been automated in developing countries like India.

• **Elasticity of Trading**

The proposed new measure to monitor liquidity is similar to price elasticity measure. It is measured as price elasticity of trading volumes. It can be computed for individual stocks or groups thereof. It can be computed for any period of time (day or month). The main advantage is that it can be computed by anyone who has access to information on prices and volumes of trading data.

<p>Coefficient of Elasticity of Trading (CET) = % Change in Trading Volume / % Change in Price</p>

The range of CET is quite wide: from plus infinity to negative infinity. The coefficient would be positive when the direction of changes in volume and price is the same while it would be negative when the direction is different. High value of CET would indicate that price changes are accompanied by high volume of transaction when large sized transactions take place with little or no change in price, value of CET would approach infinity and indicate high liquidity. As a measure of elasticity, the sign of CET may not be very relevant, but with its sign, the information content will be enriched. The CET, together with price trends would convey a lot of information about state of the market; either for individual scrip or the whole market.

A schematic presentation of the range of potential information is shown in Exhibit 1.1. If the CET is above 1 and prices are increasing would indicate a situation where higher prices are drawing even higher volumes at higher prices should reflect real good news. If CET equals 1 and prices are increasing would mean volumes are increasing proportionately. Whereas, if CET is less than 1 prices are increasing would indicate a situation where prices are increasing on low volumes and the price increase could be speculative.

Exhibit 1.1: Range of CET

Value of CET \ Price Change	>1	=1	<1
Prices Increase	Price increases supported by more than proportionate change in volumes.	Price increases matched by proportionate change in volumes.	Bull Run (?)
Prices Decline	Price declines matched by more than proportionate	Price declines matched by proportionate change in	Bear hug(?)

	change in volumes.	volumes.	
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1.5 Conclusion:

Moreover, stock prices, anticipated or actual, are linked to demand for stocks and the extent of trading volumes. Hence, an ideal measure of liquidity should combine price and volume. One way to combine this is to consider turnover as a measure of liquidity (Barua, 1987).

The problem of combining volume and price is solved by computing impact cost for a standardized transaction. It is of course true that impact costs would vary with transaction and also over time.

Furthermore, computation of impact cost would be difficult unless one has access to complete order book. It is not easy to compute impact cost unlike say computation of turnover ratio. Therefore, unless the impact costs are computed and published regularly (say by stock exchanges) their use by individual market participants may remain limited, and therefore informational role of impact costs would remain incomplete (Bernstein, 1987).

It is interesting to consider whether CET, as a measure of liquidity, is different from other measures of liquidity such as turnover ratio and impact cost. The major difference is that it is computed on changes in prices and volumes in contrast to turnover ratio which is based on prices and volumes. The computations of impact cost are based on structure of order book and are generally computed for a transaction of standard size.

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