COMMONALITY IN LIQUIDITY: EVIDENCE FROM INDIAN EQUITY MARKET

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Chapter 1. Introduction

Background

Market microstructure is the study of the processes and outcomes of exchanging assets, under explicit trading rules. Madhavan (2000) describes market microstructure as the study of process by which investors' latent demands are ultimately translated into prices and volumes. Market microstructure literature tries to explain why interaction between the mechanics of the trading process and its realized characterizations - like price, volatility and volumes - matter for asset pricing. Easley & O'Hara (1995) observe that this focus allows market microstructure scholars to ask applied questions regarding efficacy of specific market structures. Thus, understanding the specifics of discovery of an asset's price and evolution of its liquidity is the cornerstone of much of market microstructure research.

While several scholars have made the theoretical microstructural modeling of asset markets an impressive body of knowledge, it is the large majority of empirical evidence in microstructure, partly fueled by ever increasing high quality data sets and sophisticated computing environments to analyze extremely large samples, which accounts for much of the allure and attraction towards the field.

Market microstructure has traditionally focused its attention on issues involving (a) inventory optimization of market makers, dealers and traders, (b) various facets of information

asymmetry between market makers and traders, (c) evolution and dynamics of liquidity, costs of liquidity and transaction costs, as well as (d) market design and regulation.

Need

The liquidity crisis of 2007-09 engulfed not just certain iconic firms & billions of dollars of market capitalization, but also several long cherished ideas about investment and finance. It was perfectly fine to hold diversified portfolios comprising the blue-chip large-cap companies without concerning oneself about the dynamics of its liquidity, as existence of liquidity for these top names was a 'given'- an assumed positive externality. That changed. A sudden exogenous shock to liquidity of any of the large firms could cause panic across the market and the liquidity, which was assumed to be given, would rapidly evaporate creating even bigger panic. This has brought renewed spotlight on studying liquidity of financial assets in a more 'systemic' perspective, to better understand how various assets are related to each other through the liquidity channel, which is, as yet, manifested through co-movements in various measures of liquidity.

Theorists in financial economics have investigated theoretical relationships between liquidity (and costs of liquidity) and asset pricing [Amihud & Mendelson (1986), Huang (2001), Constantinides (1986) and Lo, Mamayski & Wang (2001)]. The extant literature has now widely accepted that liquidity of securities moves over time and varies widely across cross-section of stocks. Chordia, Roll & Subrahmanyam (2000) point out that central micro-structural issues like transaction cost and liquidity has been studied, largely, pertaining to trading in a market of individual security. Studies of aggregate liquidity of financial markets

have been conducted in the context of market microstructure [Stoll (1978), Ho & Stoll (1981, 1983), Kyle (1985), Glosten & Milgrom (1985), Grossman & Miller (1988)] as well as limits to arbitrage [Shleifer, & Vishny (1997)].

Literature on time variations in liquidity of financial assets exhibiting significant common factors – referred to as 'commonality in liquidity', 'systemic liquidity', 'co-movement in liquidity' or 'pervasive liquidity' [Chordia, Roll & Subrahmanyam (2000), Hasbrouck & Seppi (2001), Amihud (2002), Korajczyk & Sadka (2008), Kamara, Lou & Sadka (2008), Coughenour & Saad (2004), Domowitz, Hansch, Wang (2005)] have gained currency. These studies have argued for order imbalances, order flows, inventory costs, common market makers/specialists, institutional ownership and trading, basket/indexed trading, as some of the factors which explain commonality in liquidity. Theoretical models addressing liquidity issues have started incorporating commonality in liquidity as a stylized fact demanding explicit attention [Brunnermeier & Pedersen (2009), Acharya & Pedersen (2002), Eckbo & Norli (2002)].

Studies of commonality in liquidity have raised certain interesting and important issues. Brunnermeier & Pedersen (2009) introduces funding liquidity of trader/ease (unease) of borrowing capital against securities' collaterals as one of the drivers of co-movements in market liquidity. Acharya & Pedersen (2002) incorporate commonality of liquidity in solving for liquidity-adjusted capital asset pricing model. Eckbo & Norli (2002) provide evidence of pervasive liquidity risk being priced using diverse set of assets in the USA over the period 1963 to 2000.

Karolyi, Lee & Dijk (working paper 2009) find a number of common determinants of commonality in returns, liquidity, and turnover using monthly time-series measures of commonality on 21,328 stocks in 40 developed and emerging countries, over the period 1995- 2004. They find evidence for several demand-side explanations - commonality being greater for *countries* with (a) weaker investor protections, (b) opaque information environments, and during *times* with (c) heightened presence of international and institutional investors, and (d) when investor sentiment is positive; as well as supply-side explanations of funding liquidity of financial intermediaries – commonality being higher during (e) times of high market volatility and (f) large market declines. They suggest that demand-side explanations are more consistent with stylized empirical facts about commonality in returns & liquidity, more so for emerging market equities. Thus, it is clear that in emerging markets, the role of institutions is significant not just for transaction costs (Lesmond, 2005), but also for levels of commonality of liquidity (Karolyi, Lee & Dijk 2009).

Significance and scope

Given the yet unexplored prospect of studying commonality in liquidity in an emerging market context, this thesis examines the issue of commonality of liquidity for Indian equities market, using monthly (a) Amihud's illiquidity measure and (b) Turnover measure as proxies for measuring liquidity, computed from daily data, over time period 2003-2010. I provide evidence of existence of a large, significant market wide and industry wide commonality. Given the relative illiquidity of stocks outside of the well-known large capitalization stocks, I find that degree of commonality in liquidity deferring between the large and the small capitalization stocks.

Extant literature of commonality in liquidity has been largely focused on sources of market wide commonality, akin to systematic risk-return, and on its relationships with returns, volatility and such other variables which normally characterize study of financial markets. Little attention is paid to the study of liquidity commonality of specific cross-section of firms. Since ownership structure characterizes the firms' holding of shares and its governance, it has significant importance in understanding how certain ownership structures create effects, which while largely idiosyncratic, also hold interesting insights for the entire market, especially when such firms are dominant or considered "too big to fail" – like the ones which created significantly large negative externalities (sudden illiquidity of a large firm's securities adversely impacting the liquidity of other firms' securities in the market, with little or no 'real' relationships between the firms). Given that liquidity of unrelated firms' securities may get affected due to an exogenous shock to liquidity of a large/dominant firm's securities, existence of networks of firms – with or without significant direct/indirect explicit/implicit relationships – which may face significant liquidity risks due to a liquidity shock to any of the firms in the network.

I would like to bring attention to this aspect of study of liquidity. Business groups, though difficult to define in one single definition, play significant roles, albeit structurally different, in developed western economies like Italy, Austria, France, Germany, they are dominant characteristics of emerging economies around the world - from *grupos* in Latin America, family-owned business houses in India, *chaebol* in South Korea, and others elsewhere – are ubiquitous in such economies (Khanna, Rivkin, 2006). Such business networks or groups have been studied in emerging economies such as China (Keister, 1998, 2000), India (Ghemawat and Khanna, 1998; Khanna and Palepu, 1997), Korea (Amsden, 1989; Chang

and Choi, 1988), and Central America (Strachan, 1976). The empirical evidence in emerging markets have suggested a largely positive role for affiliation of a firm's to a business group (Keister, 1998; Khanna and Palepu, 2000a,b; Khanna and Rivkin, 2001). It is clear that due to existence of institutional voids & market imperfections, business groups solve these challenges through coordination between various affiliated firms, resource sharing (internal capital & labor markets), risk sharing, easier exchange of technology and better its subsequent absorption as well as a broader business scan. There are various ways in which such ties are characterized & realized – through interlocking equity stakes, interlocking directorates or other social ties. Khanna & Thomas (2009) argue that stock price synchronicity due to interlocking directorates are associated either lower transparency or increased correlation in firm characteristics, possibly due to joint determination of resource allocation decisions in Chilean business groups to document.

I study the common factors in liquidity of business group affiliated firms using a unique dataset of Indian business group affiliated firms. These firms, majority of which are part of a large traditional family-controlled network of firms, dominate the landscape of India's economic landscape in traditional as well as modern sectors like technology or telecommunications. Most of them today are managed by well-qualified professional managers, but group level control still exists with one or more dominant members of the founding family, which are in charge of all the major decisions pertaining to the firms. Some of the business groups like Tata group, A V Birla group have large profitable international operations, but a typical business group, on an average is more focused on its leadership in domestic markets. Literature has evidence of social ties, economic ties or in some cases weaker ties relating the firm and the larger business groups. Pyramidcal structures whereby a

holding company controls large stakes in large firms which in turn controls a network of firms are seen sparingly in India, with major exception of Tata group, which conducts its business largely through it's unlisted holding company Tata Sons Ltd. The firms affiliated to business groups coordinate their activities like investment decisions of capital-raising to minimize transaction costs. One of the interesting characteristics of Indian business groups is the existence of one or more dominant firms in the business group enjoying significant reputation in capital markets being used for raising resources for the various activities of business group affiliated firms, including starting new ventures. These practices have attracted scrutiny by scholars providing evidence for tunneling (Bertrand, Mehta, Mullainathan (2002), Bae, Kang, Kim (2002)).

Further, using dataset of NSE listed firms, which are affiliated to one of the top 50 business groups, I study the dynamics of liquidity of business group affiliated firms. While many of the business group affiliated firms are relatively large, some of them are of moderate size. Thus the sample of top 50 business groups in many ways is representative of the business group as a whole, nevertheless due caution is warranted before generalizations across the board. I extend Chordia, Roll & Subrahmanyam (2000) framework to test whether the individual firm's liquidity co-moves with liquidity of the business group to which it belongs. I find that after controlling for market wide and industry wide co-movements, along with their lead and lag factors, there is significant co-movement of individual stock liquidity with that of the business group.

Thus, these findings are unique and, to the best of my knowledge, first evidence on business group affiliation as a significant factor explaining individual stock specific liquidity. For

Indian equities market, this is one of the earliest studies documenting market wide and industry wide commonality in liquidity of listed firms. Given the relatively scarce literature on dynamics of liquidity in emerging markets, this thesis contributes to better understanding of emerging market liquidity commonality and given the clear evidence creates future directions for study of commonality in liquidity with more than one asset classes. Business group affiliated firms' stock market liquidity dynamics have not received any attention in the extant literature. As continuing dominance of business landscape by business groups in emerging market countries like India, this thesis is an attempt to address an issue which would be of interest not just in the context of emerging market liquidity, but also in understanding liquidity dynamics of firms which are connected to each other to through various ties, formal or otherwise.

For investors in emerging market firms, who routinely come across business group affiliated firms as investment option, given their relative dominance; this work suggests a word of caution. As business group affiliated firms' securities' liquidity exhibits co-movement with market level, industry level and business group level liquidity, investors face non-diversifiable, idiosyncratic liquidity risk – risk that an exogenous shock to liquidity of any group firm, may create co-movements in liquidity of other stocks in the group.

Policy makers and regulators in emerging economies, like India, may have some important implications from this analysis; given that they face unique set of challenges in managing stability of their financial markets in an increasingly globalizing capital flows. A sudden unexpected shock to systemic liquidity of financial assets may create market stress, which if not mitigated has the potential to snowball into a liquidity crisis, which any emerging

economy can ill-afford. This analysis finds that co-movement in liquidity of financial assets, like traded equity shares, is an important feature of dynamics of liquidity, which could possibly provide early symptoms of market stress. Specifically for emerging economies with large number of listed firms affiliated to dominant business groups, it may be further important to create mechanisms which address the issue of commonality in liquidity being an additional source of liquidity risk. That some of the listed firms affiliated to business groups in emerging markets are dominant with large market-capitalizations and large product market shares, may make some of these firms systemically important for these economies. Every sound financial market regulator or policy maker knows, now more than ever, the significance of systemically important firms and the potential systemic impact of a liquidity shock to any of these firms.