

A Newsletter of **Finance Lab**

January, 2013

Volume 1, Issue 6

a₹tha



Indian Institute of Management Calcutta

Editorial

Chief Editor



Prof. Ashok Banerjee

Editorial Team



Prof. Partha Ray



Dr. Golaka C. Nath

We are approaching the budget session of the Parliament. People are keenly waiting for the economic survey report and any further policy announcements before budget. It is expected that order will prevail during the budget session and we can see passage of some major bills affecting banking and insurance sector. The recent discussion on whether corporate should be given banking license raises concerns on 'conflict of interest'. While the Ministry of Finance, Government of India, is favourably disposed with this idea, the central bank (RBI) has not yet decided its mind. One should not bother too much for the capital market reactions as of now. It is believed that if the policy makers can take some bold decisions affecting the real sector (e.g., power, mining, telecom etc.), the capital market will respond.

Prof. Paul Embrechts of Swiss Federal Institute of Technology, Zurich visited the Finance Lab on 17 January 2013 and delivered a lecture on "Risk, Regulation and Statistics". Paul is known for his work on extreme value theory which deals with modeling the tail events. Paul regularly advises the Basel Committee of banking supervision.

The present issue contains three articles. The first piece looks at two important features of high frequency trade- *market microstructure* and *liquidity*. Using high frequency data of a few Indian companies, the article shows that market liquidity remains very low during mid-day and hence traders should avoid any trade around that time. The second article warns that the major challenge that the Indian banking sector will face in the near future is going to be infusion of additional capital to the tune of INR 5 trillion (about USD 90 billion). The third article evaluates market borrowing by states at a high spread. The major factor driving the spread for the State Government bonds is illiquidity. The author suggests some measures to improve liquidity.

I hope you'll enjoy reading the newsletter. Please offer suggestions for further improvement to ashok@iimcal.ac.in

Editor

TABLE OF CONTENTS

MARKET MICROSTRUCTURE AND LIQUIDITY..... 4-12

Prof. Ashok Banerjee

BANK CAPITAL IN INDIA: IS IT AN ELEPHANT IN THE ROOM? 13-15

Prof. Partha Ray

MARKET BORROWINGS BY STATES..... 16-18

Dr. Golaka C. Nath

Market Microstructure and Liquidity

Prof. Ashok Banerjee



Ashok Banerjee, Ph.D., is Professor, Finance and Control, Indian Institute of Management Calcutta (IIM-C). He is also the faculty in-charge of the Financial Research and Trading Lab at IIM-C. His primary research interests are in areas of Financial Time Series, News Analytics and Mergers & Acquisitions.

Market Microstructure

A financial market is a place where traders assemble to trade financial instruments. Such trades take place between willing buyers and willing sellers. The market place may be a physical market or an electronic trading platform or even a telephone market. The trading rules and trading systems used by a market define its market structure. Every market has procedures for matching buyers to sellers for trades to happen. In quote-driven markets dealers participate in every trade. On the other hand, in order-driven markets, buyers and sellers trade with each other without the intermediation of dealers. Garman (1976) coined the expression “market microstructure” to study about market making and inventory costs. Market microstructure deals with operational details of trade- the process of placement and handling of orders in the market place and their translation into trades and transaction prices. One of the most critical questions in market microstructure concerns the process by which prices come to impound new information. In a dealer-driven market, market makers, who stand willing to buy or sell securities on demand, provide liquidity to the market by quoting bid and ask prices. In a quote-driven market, limit orders provide liquidity. While the primary function of the market maker remains that of a supplier of immediacy, the market maker also takes an active role in price-setting, primarily with the objective of achieving a rapid inventory turnover and not accumulating significant positions on one side of the market. The implication of this model is that price may depart from expectations of value if the dealer is long or short relative to desired (target) inventory, giving rise to transitory price movements during the day and possibly over longer periods (Madhavan, 2000).

Market microstructure is concerned with how various frictions and departures from symmetric information affect the trading process (Madhavan, 2000). Microstructure challenges the relevance and validity of random walk model.

The study in market microstructure started about four decades ago and it attracted further attention in the past decade with the advent of computer-driven trading and availability of all trade and quote data in electronic form, leading to a new field of research called high frequency finance. Research in high frequency finance demonstrates that properties that define the behaviour of a financial market using low frequency data fail to explain the market behaviour observed in high frequency. Three events are cited (Francioni et al, 2008) as general triggers for interest in microstructure:

- (a) the U.S. Securities and Exchange Commission’s Institutional Investor Report in 1971;
- (b) the passage by the U.S. Congress of the Securities Acts Amendment of 1975; and
- (c) the stock market crash in 1987

Market microstructure research typically examines the ways in which the working process of a market affects trading costs, prices, volume and trading behaviour. Madhavan (2000) classified research on microstructure into four broad categories:

- (i) price formation and price discovery;
- (ii) market structure and design issues;
- (iii) market transparency; and
- (iv) informational issues arising from the interface of market microstructure

The effect of market frictions (called microstructure noise) is generally studied by decomposing transaction price of a security into fundamental component and noise component. Ait-Sahalia and Yu (2009) related the two components to different observable measures of stock liquidity and observed that more liquid stocks have lower (microstructure) noise. We turn next to market liquidity.

Market Liquidity

Liquidity is an important stylized fact of financial markets. A market is termed liquid when traders can trade without significant adverse effect on price (Harris, 2005). Liquidity refers to the ability to convert stock into cash (or the reverse) at the lowest possible transaction cost. Transaction costs include both explicit (e.g., brokerage, taxes) and implicit costs (e.g., bid-ask spreads, market impact costs). More specifically Black (1971) pointed out presence of several necessary conditions for a stock market to be liquid:

- (a) there are always bid-and-ask prices for the investor who wants to buy or sell small amounts of stock immediately;
- (b) the difference between the bid and ask prices (the spread) is always small;
- (c) an investor who is buying or selling a large amount of stock, in the absence of special information, can expect to do so over a long period of time, at a price not very different, on average, from the current market price; and
- (d) An investor can buy or sell a large block of stock immediately, but at a premium or discount that depends on the size of the block- the larger the block, the larger the premium or discount.

Liquidity is easy to define but very difficult to measure. The various liquidity measures fall into two broad categories: trade-based measures and order-based measures (Aitken and Carole, 2003). Trade-based measures include trading value, trading volume, trading frequency, and the turnover ratio. These measures are mostly ex post measures. Order-driven measures are *tightness/width* (bid-ask spread), *depth* (ability of the market to process volumes of trade without affecting current market price), and *resiliency* (how long the market will take to return to its “normal” level after absorbing a large order). A commonly used measure of market depth is called Kyle’s Lambda (Kyle, 1985):

$$\lambda = \frac{r_t}{NOF_t}$$

Where r_t is the asset return and NOF_t is the net order flow over time. The parameter λ can be obtained by regressing asset return on net order flow. Exhibit 1 shows computed value of λ using intraday data for six Indian companies. The figures are drawn on the basis of order book and trade book positions on a particular day in 2010. The figures demonstrate that Indian market, as any other market, are less liquid during mid-day. Hence, it is unwise to trade at that time. There was hardly any interest in the leasing company stock (Sriram Transport Finance).

Another measure of market depth is Hui-Heubel (HH) liquidity ratio (Hui and Heubel, 1984). This model was used to study asset liquidity on several major U.S equity market, and relates trading volume to the change of asset price. Given the market activities observed over N unit time window, the maximum price P_{Max} , minimum price P_{Min} , average unit closing price P , total dollar trading volume V , and total number of outstanding quotes Q , the Hui-Heubel LHH liquidity ratio is given as follows:

$$L_{HH} = \frac{(P_{max} - P_{min})/P_{min}}{V/Q * \bar{P}}$$

A higher HH ratio indicates higher price to volume sensitivity.

Resiliency refers to the speed at which the price fluctuations resulting from trades are dissipated. Market-Efficient coefficient (MEC) (Hasbrouck and Schwartz, 1988) uses the second moment of price movement to explain the effect of information impact on the market. If an asset is resilient, the asset price should have a more continuous movement and thus low volatility caused by trading. Market efficient coefficient compares the short term volatility with its long term counterpart. Formally:

$$MEC = \frac{Var(R_{long})}{T \cdot Var(R_{short})}$$

where T is the number of short periods in each long period. A resilient asset should have MEC ratio will tend to close to 1.

Literature also has precedence for another aspect of liquidity- *immediacy*- the speed at which trade can be arranged at a given cost. Illiquidity can be measured by the cost of immediate execution (Amihud and Mendelson, 1986). Thus, a natural measure of illiquidity is the spread between the bid and the ask prices. Later, Amihud (2002) modified the definition of illiquidity. The now-famous illiquidity measure is the daily ratio of absolute stock return to its dollar volume averaged over some period.

$$ILLIQ_{iy} = 1/D_{iy} \sum_{t=1}^{D_{iy}} |R_{iyd}|/VOLD_{iyd},$$

R_{iyd} is the return on stock i on day d of year y and $VOLD_{iyd}$ is the respective daily volume in dollars. D_{iy} is the number of days for which data are available for stock i in year y.

Both MEC and Amihud's illiquidity indicators show (Exhibits 2 and 3) that Sriram Transport Finance stock was the most illiquid one. In fact, there was some allegation of corporate governance issues with this leasing company in 2010 and that has led to lack of interest in such stock. As a result, the trading cost was very high.

The most popular indicator of liquidity is the bid-ask spread. Liquid stocks would have low bid-ask spread. The observed (traded) price of a stock (P_t) can be expressed as below:

$$P_t = P_t^* + \varepsilon_t$$

Where P_t^* is the true (unobserved) price of the stock. The popular way to estimate the true price is to take the mid-point of the bid-ask spread (called, mid-quote). The bid-ask spread denotes one of the important costs of trading. It is the cost of immediacy. Exhibit 4 shows inverse relationships between bid-ask spread and traded volume. Amihud's illiquidity measure (Exhibit 3) showed that Reliance Industries Ltd. (RIL), the largest private sector company in India, was the most liquid stock. The options market for RIL stocks was also equally liquid (Exhibit 4). Another interesting feature in RIL stock is that even during mid-day the stock was highly liquid with minimum bid-ask spread.

The vast literature on liquidity studies the relationships of liquidity and cost of liquidity with various stock performance measures, trading mechanisms, order-trader types and asset pricing. Acharya and Pederson (2005) present a simple theoretical model (liquidity-adjusted capital asset pricing model- LCAPM) that helps explain how liquidity risk and commonality in liquidity affects asset prices. The concept of commonality of liquidity was highlighted by Chordia et al (2000) when the authors stated that liquidity is not just a stock-specific attribute given the evidence that the individual liquidity measures, like quoted spreads, quoted depth and effective spreads, co-move with each other. Later Hasbrouck and Seppi (2001) examined the extent and role of cross-firm common factors in returns, order flows, and market liquidity, using the analysis for the 30 Dow stocks.

Asset prices are also affected by the activities and interactions of informed traders and noise traders. Informed traders make trading decisions based on exogenous information and true value of the asset. Noise traders do not rely on fundamental information to make any trade decision. Their trade decisions are purely based on market movements. Thus, noise traders are called trend followers.

Reference:

1. Garman, Mark. 1976. Market Microstructure. *Journal of Financial Economics*, 3, 257-275.
2. Madhavan, A. 2000. Market Microstructure: A Survey. *Journal of Financial Markets*, 3, 205-258.
3. Francioni, R., Hazarika, S., Reck, m. And Schwartz, Robert, A. 2008. Equity Market Microstructure: Taking Stock of What We Know. *Journal of Portfolio Management*
4. Ait-Sahala, Y., and Yu, J. 2009. High Frequency Market Microstructure Noise Estimates and Liquidity Measures. *The Annals of Applied Statistics*, 3(1) 422-457.
5. Harris, L. 2005. *Trading & Strategies*. Oxford University Press.
6. Black, F. 1971. Towards a fully automated exchange, part i. *Financial Analysts Journal*, 27: 29-34.
7. Aitken, M. and Carole Comerton-Forde. 2003. How should liquidity be measured? *Pacific-Basin Finance Journal*, 11: 45-59.
8. Kyle, A. 1985. Continuous auction and insider trading. *Econometrica*, 53: 1315-35.
9. Hui, B. and Heubel, B. 1984. Comparative liquidity advantages among major u.s. stock markets. *Technical Report*, DRI Financial Information Group Study Series No. 84081.
10. Hasbrouck, J. and Schwartz, Robert, A. 1988. Liquidity and execution cost in equity markets. *The Journal of Portfolio Management*, 14: 10-16.
11. Amihud, Y. and Mendelson, H. 1986. Asset Pricing and the Bid-Ask Spread. *Journal of Financial Econometrics*, 17: 223-249.
12. Amihud, Y. 2002. Illiquidity and Stock returns: cross-section and time-series effects. *Journal of Financial Markets*, 5: 31-56.
13. Acharya, V.V. and Pedersen, L.H. 2005. Asset pricing with liquidity risk. *Journal of Financial Economics*, 77(2), 375-410.
14. Chordia, T. Roll, R., and Subrahmanyam, A. 2000. Commonality in liquidity. *Journal of Financial Economics*, 56(1) 3-28.
15. Hasbrouck, J. and Seppi, D.J. 2001. Common factors in prices, order flows, and liquidity. *Journal of Financial Economics*, 59(3) 383-411.

Exhibit 1: Kyle’s Lambda

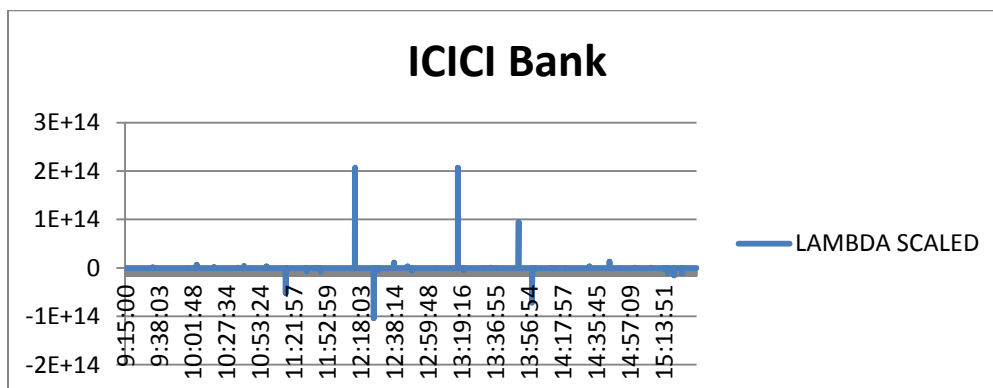
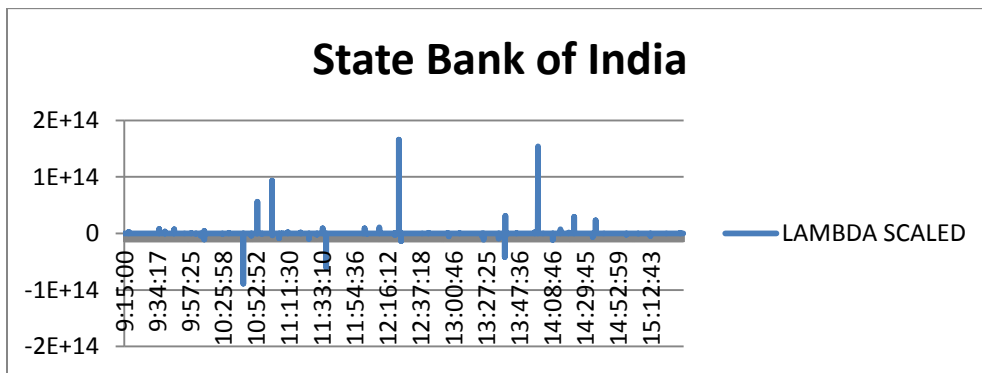
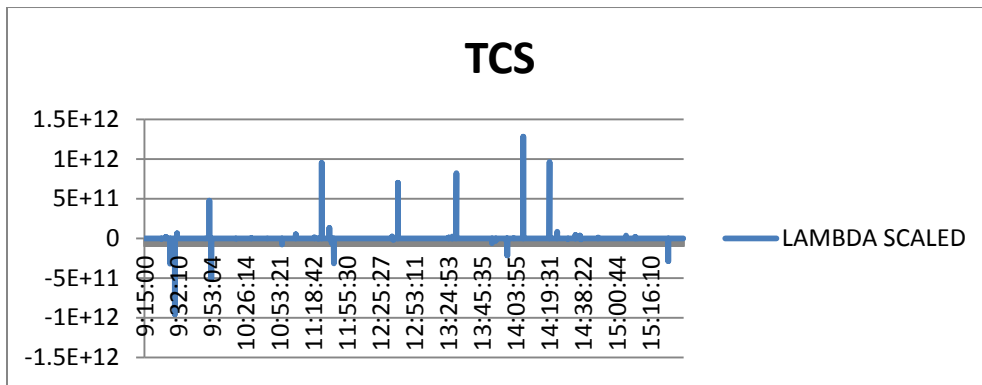
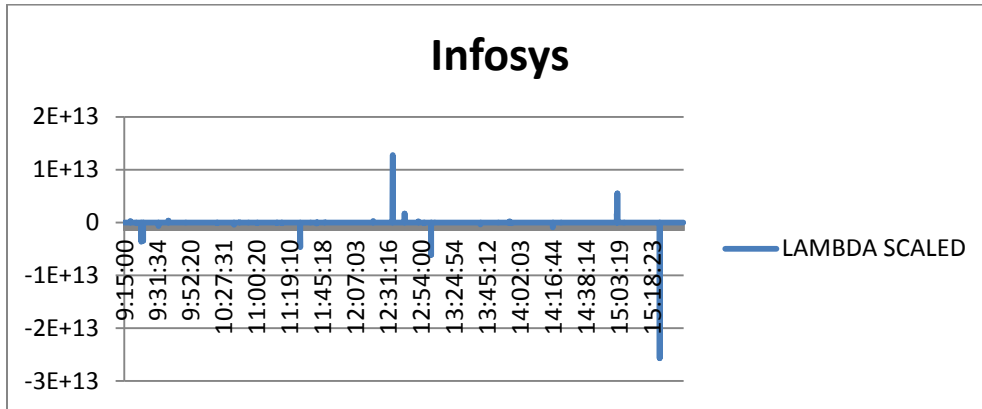


Exhibit 1 (contd.): Kyle's Lambda

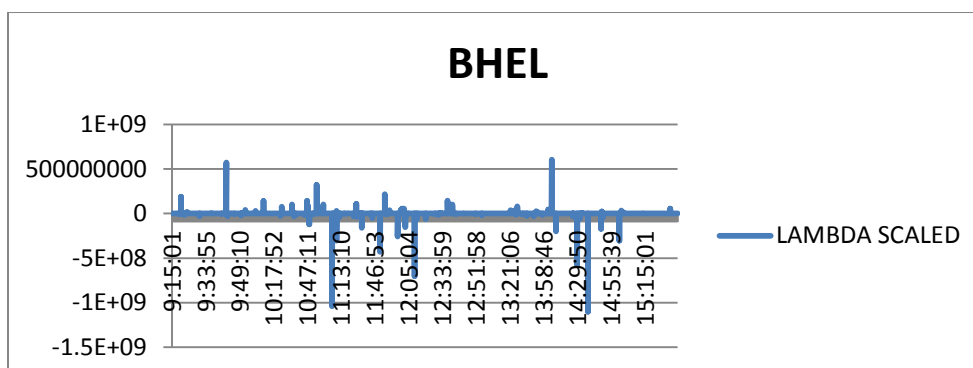
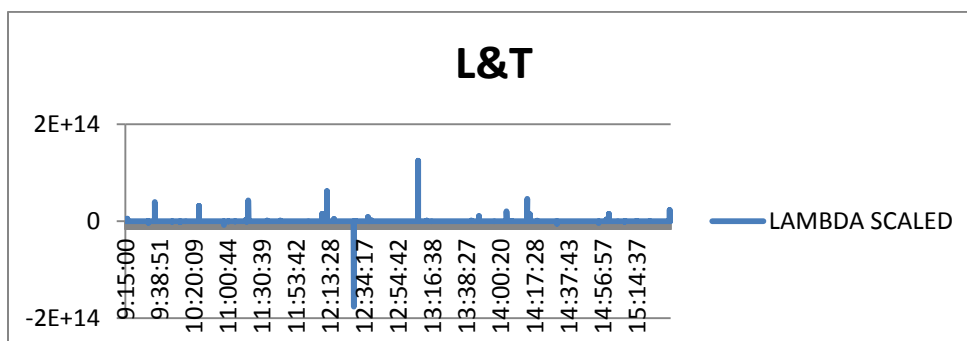
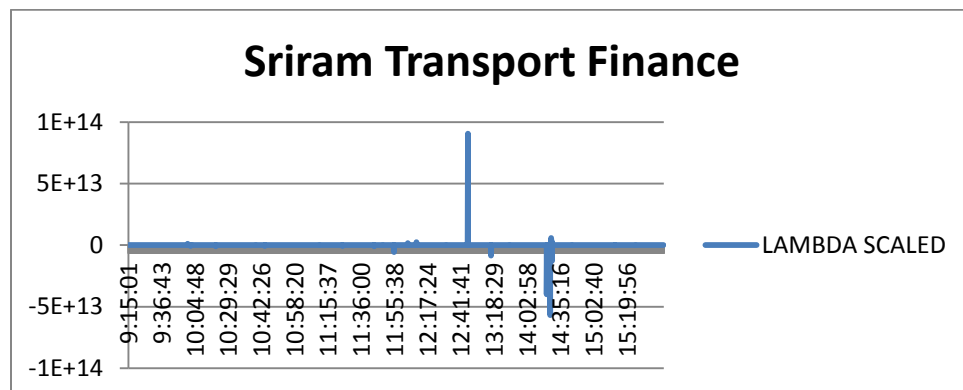


Exhibit 2: Market-efficient Coefficient

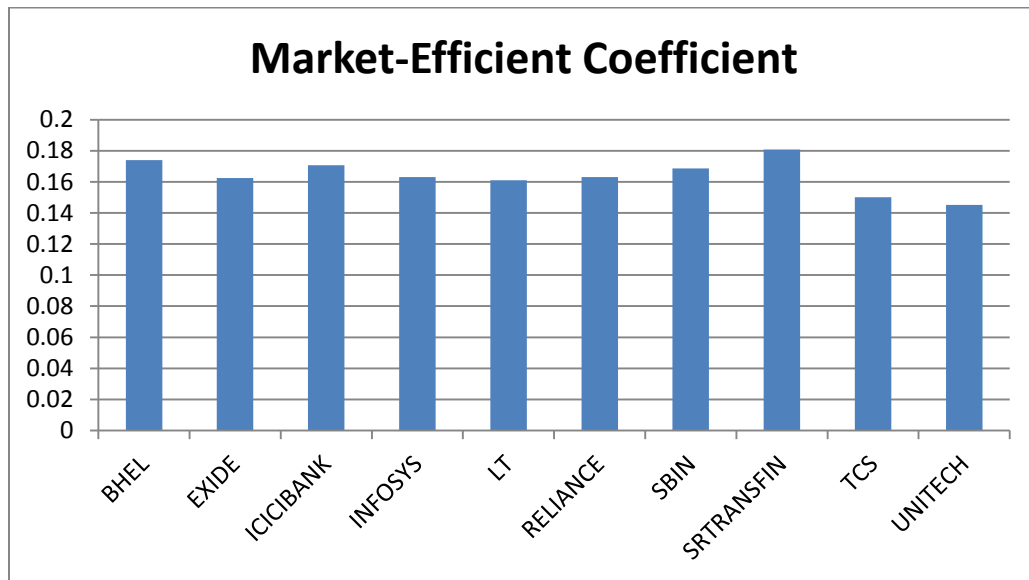


Exhibit 3: Amihud's Illiquidity

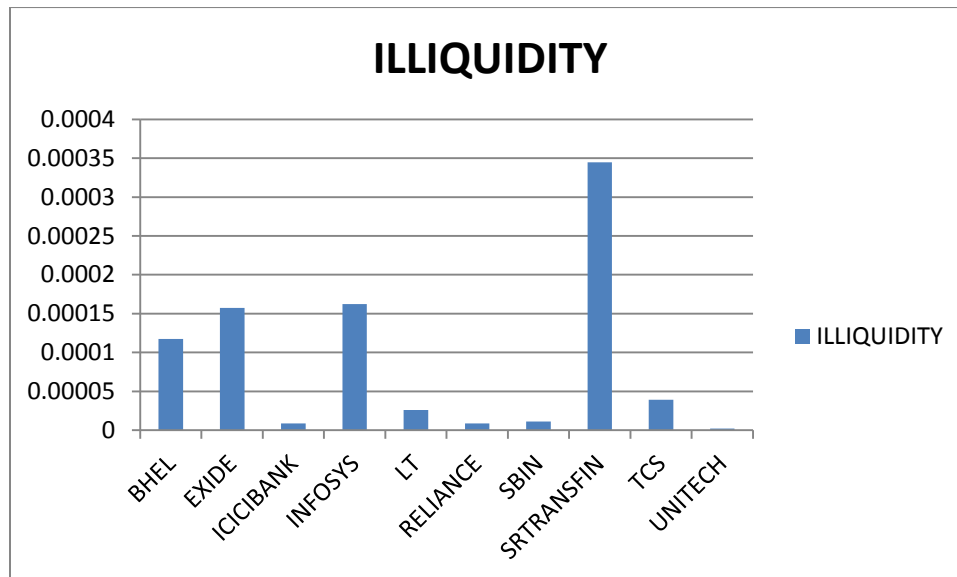
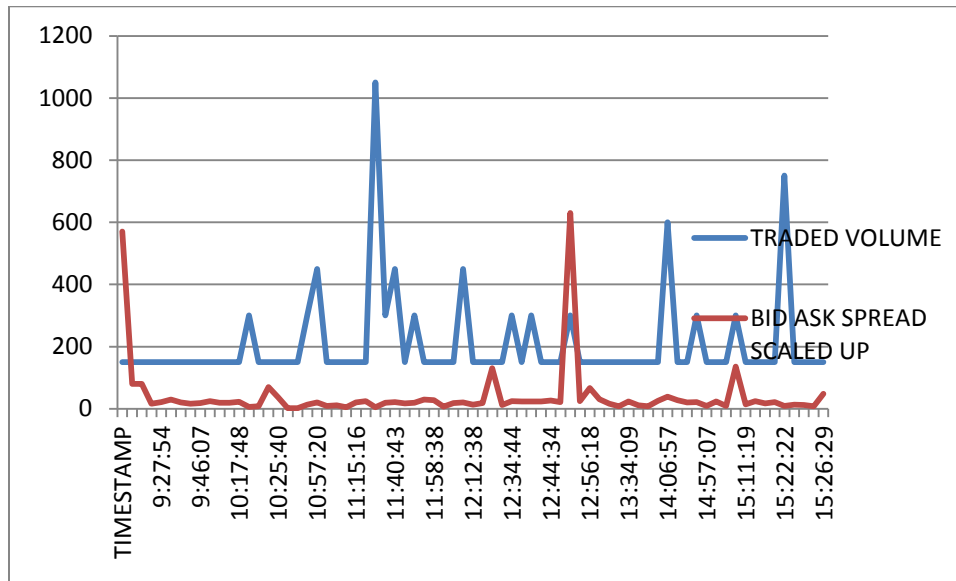
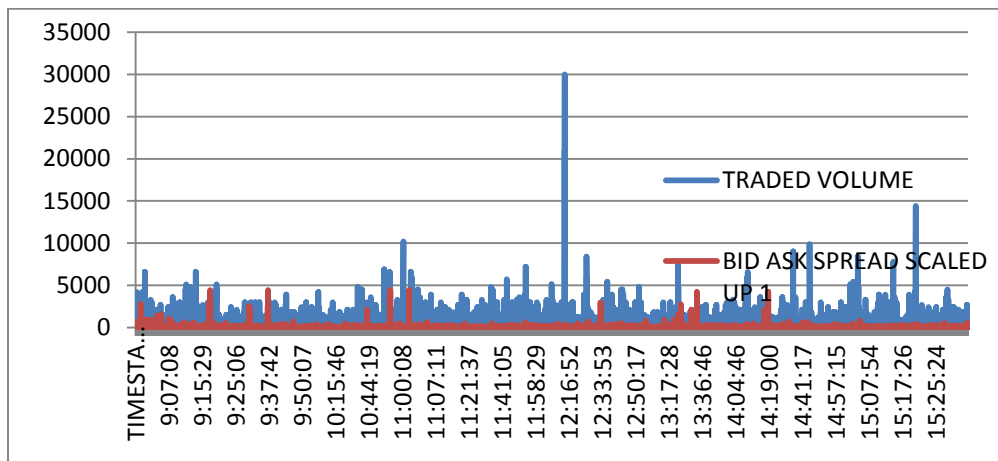


Exhibit 4: Bid-ask spread and Traded volume of Call options

A. BHEL Stocks (call) Options on 23 April 2010



B. Reliance Industries Ltd.'s Stocks (call) Options on 23 April 2010



Bank Capital in India: Is it an Elephant in the Room?

Prof. Partha Ray



Partha Ray, Ph.D., is Professor, Economics, Indian Institute of Management Calcutta (IIM-C). Prior to joining IIM-C, Prof. Ray, a career central banker, was the adviser to Executive Director, International Monetary Fund, Washington D.C. during 2007-2011.

The International Monetary Fund (IMF) has recently published its Financial System Stability Assessment Update of India.¹ While noting that the India commercial banking system is well capitalized and profitable, it examined the amount of equity capital domestic banks would need over the next 8 years ending March 2019 to “support economic growth and to meet Basel III minimum common equity capital requirement of 7.0 percent (minimum common equity of 4.5 percent with capital conservation buffer of 2.5 percent)”. Three hypothetical scenarios were considered:

- 1) **Low Growth:** Annual GDP growth rate of 7 percent with credit growth of 11.5 percent per year.
- 2) **Medium Growth:** Annual GDP growth rate of 8.5 percent with credit growth of 14 percent per year.
- 3) **High Growth:** Annual GDP growth rate of 10 percent with credit growth of 17 percent per year.

Basing their analysis on a sample of 30 banks (including public and private banks, and covering over 90 percent of commercial banking system’s assets), the report arrived at a startling finding that, “in a mid-growth scenario with average earnings generation, 14 banks are expected to fall short of Basel III minimum common equity requirement with a capital buffer at 7 percent, of which 13 are public banks”. As per IMF calculations, on average while in a mid-growth scenario, additional capital needs would amount to around US\$19.6 billion, a high growth scenario would bring the capital needs to around US\$50.6 billion and 23 banks would need additional capital, of which 20 are public banks. In totality, if the rate of economic growth were to exceed 7 percent, till 2019, between 9 to 20 public banks out of 21 could fall short of Basel III common equity capital requirements with average earnings growth (Table 1).

¹ “India: Financial System Stability Assessment Update”, IMF, January 15, 2013 (available at <http://www.imf.org/external/pubs/cat/longres.aspx?sk=40231.0>).

Table 1: Number of Banks falling short of Basel III Core Tier 1 Capital Requirements of 7%			
	Scenario 1	Scenario 2	Scenario 3
All 30 Banks			
With earnings generation (mean)	10	14	23
With earnings generation (low)	13	17	26
Additional Equity Capital needed (US\$ million)	5,200	19,635	50,564
Additional Equity Capital needed (% of GDP)	0.3	1.2	3.1
<i>Of which: 21 Public Sector Banks (81 % of assets in the sample)</i>			
With earnings generation (mean)	9	13	20
With earnings generation (low)	12	14	21
Additional Equity Capital needed with mean earnings (US\$ million)	5,134	19,370	49,886
Additional Equity Capital needed (percent of GDP)	0.3	1.2	3.1
Percentage of funds which can be raised From the private sector allowing for govt.'s shareholding to be reduced to 51%	65%	54%	51%
Source: IMF (2013); p. 19.			

While Indian banks as of now is perceived to be well-capitalized, any bondage is as strong as its weakest link. In this context, sometimes there are apprehensions that while on the average Indian banks may be sound in terms of capital, there could be wide variations among different banks. Such apprehensions are not, however, borne from the actual data. Table 2 below reports the Basel II capital adequacy ratio (CRAR) all 46 Indian (public, old private and new private) banks – number of banks whose CRAR is less than 10 percent is one.

Table 2: Frequency Distribution of Capital Adequacy Ratios of Indian Scheduled Commercial Banks: 2012		
CRAR Range	Number of Banks	%
9 % - 10%	1	2.2
10% - 11%	0	0.0
11% - 12%	4	8.7
12% - 13%	12	26.1
13 % - 14%	15	32.6
14% & above	14	30.4
Total	46	100.0
Source: Author's Calculation from RBI data		

It is not that the Indian authorities are unaware of these needs. Quick estimates released in the *Financial Stability Report* of the RBI (December 2012) placed the additional capital requirement of banks on account of Basel III at Rs 5 trillion, of which non-equity capital will be to the order of Rs. 3.25 trillion while equity capital will be to the order of Rs. 1.75 trillion. These are large numbers. The RBI further noted that, “Additional challenges could be posed by the recent trends in asset quality of banks, regulatory changes in restructuring guidelines and the proposed implementation of dynamic provisioning norms that may increase the provisioning requirements of the banking sector”. However, while mentioning that “additional capital requirements of banks” could pose some concerns, the RBI in its *Systemic Risk Survey* of October 2012 classified it as a low risk event.

What has been the action so far? It may be recalled that as early as in 2009, during the heyday of the financial crisis, the World Bank sanctioned a loan to Government of India for providing financial support for implementing the economic stimulus program. An important part of the overall stimulus program is the provision of capital support to public sector banks. India’s Banking Sector Support Loan was for a quantum of \$3 billion programmatic operation with a first phase of \$2 billion and was expected to provide budgetary support to the Government of India.² The loan, requested in December 2008, was approved in September 2009 and disbursed in April 2010 but, “it was apparently delayed at the request of the government” (Independent Evaluation Office, World Bank, 2012).³

More recently (on December 22, 2012) the Finance Minister, Mr Chidambaram is reported to have said that public sector banks need Rs 1 trillion capital infusion and there are unconfirmed reports that the government has approved the first tranche of Rs 12,000 crore fund infusion in state-owned banks for enhancing their capital base, out of the budgetary provision of Rs 15,000 crore for recapitalisation of public sector banks in the current fiscal.

In recent period (since March 2012) the overall capital adequacy ratio has deteriorated, despite being well above the regulatory minimum. The decline in capital adequacy ratio was more pronounced for the public sector banks. Besides, asset quality of banks has seen considerable deterioration during the half year ended September 2012 (RBI, *Financial Stability Report*, 2012). In view of all these, it is high time that issues regarding bank capital are taken with all seriousness and it is encouraging to see the early indications and actions in this regard.

² The details of the Banking Sector Support Loan to India (Project ID: P116020) is available at <http://www.worldbank.org/projects/P116020/banking-sector-support-loan?lang=en>

³ Independent Evaluation Office (World Bank, IFC, MIGA) (2012): *The World Bank Group’s Response to the Global Economic Crisis*, available at http://ieq.worldbankgroup.org/content/dam/ieq/crisis/crisis2_full_report.pdf

Market Borrowings by States*

Dr. Golaka C. Nath



Dr. Golaka C Nath is a Senior Vice President at the Clearing Corporation of India Ltd. (CCIL). He has over 21 years of experience in the banking and financial sector, having previously worked with the National Stock Exchange of India Ltd. and Vijaya Bank. In the past, he has worked on a World Bank Project on “Developing Bond Market in South Asia”. He has also provided secretarial service to the High Powered Committee on “Corporate Bonds and Securitization” appointed by the Ministry of Finance, Government of India.

Higher Borrowings: State Governments in India have to fund a major part of their development expenses through market borrowing at the ongoing interest rate. The States have been regularly borrowing from the market using Auction mechanism through Reserve bank of India. Though most of the States use standard 10-year bonds to raise funds, some States like Karnataka and Gujarat have started looking at raising resources through issuance of short term bonds. Now market borrowings constitute about 70% in the Gross fiscal deficit (2011-12). The increased borrowing levels are due to: (a) the market based auction mechanism ensuring competitive market determined cost of borrowing; (b) the increased borrowing requirements after 2008-09; (c) the shortfall in net collections of small savings during 2008-09 and 2009-10.

The number of issuances has been rising over the years as unlike Government of India, State Governments do not reopen the issues and keep on issuing new securities as and when they need cash. This may be due to the fact that reopening of issues means a higher repayment coming up on a single date which will be difficult to manage for the States. But going forward, this aspect need to be closely examined as this helps in increasing liquidity.

Table – 1: State Governments’ Borrowings and Repayments

Period	Issuances	Average Coupon (%)	Issuance Amt. (₹ Cr.)	Spread Over G-Sec (bps)	Average Issue Size (₹ Cr.)	Redemptions (₹ Cr.)	Net Issuances (₹ Cr)
2006-07	72	8.10	20824.57	34.10	286.23	6550.85	14273.72
2007-08	120	8.25	67778.59	45.47	564.82	11554.52	56224.07
2008-09	141	7.87	118137.66	92.36	837.86	14371.33	103766.33
2009-10	159	8.11	130621.69	70.54	824.66	16238.42	114383.27
2010-11	147	8.39	104039.26	41.79	707.75	15641.19	88398.07
2011-12	196	8.79	158632.30	37.01	809.35	21989.24	136643.06
2012-13 (October 2012)	118	8.93	96611.81	61.65	801.80	15434.84	81176.97
Average	136	8.35	99520.84	54.70	690.35	14540.06	84980.78

* Personal views of the author only and not the views of his organization

Yield Spread: The yield spread States pay over comparable Government of India securities while borrowing in the market is about 50-55bps on an average but the same changes with the availability of liquidity in the market. In the times of shortage of liquidity, the spread increases substantially. The shortage of liquidity during 2008-09, pushed up the spread to 92bps as investors preferred to invest in more liquid assets like Government bonds rather than holding State papers. As the situation started improving in 2010-11 and 2011-12, the spreads started dropping. However, as the liquidity shortage started cropping up in again in 2012-13 which resulted in spread moving upward.

Concentration: The borrowing is concentrated among few large States as only 9 States have the market share of more than 79% of the total borrowings of States while first 5 States account for more than 50% of the borrowings. These States have generally higher than average maturity of loans as well as they pay average higher coupon.

State	Market Share (%)	Maturity in Years	Coupon (%)	Spread bps
West Bengal	12.28%	6.65	8.20	68
Maharashtra	11.91%	6.75	8.09	63
Andhra Pradesh	10.61%	6.70	8.07	59
Uttar Pradesh	10.27%	6.48	8.20	65
Tamil Nadu	9.36%	7.06	8.17	62
Gujarat	9.10%	6.91	8.17	57
Kerala	5.42%	6.80	8.20	63
Punjab	5.11%	6.79	8.19	61
Rajasthan	5.02%	6.27	8.01	61
Karnataka	4.08%	5.83	8.04	55
Madhya Pradesh	3.23%	6.06	7.96	69
Haryana	3.21%	7.35	8.24	60
Bihar	2.13%	6.36	8.01	61
Jammu & Kashmir	1.80%	6.49	8.35	65
Himachal Pradesh	1.29%	5.83	7.97	59
Jharkhand	1.10%	5.98	7.91	63
Assam	1.05%	5.00	7.99	66
Uttarakhand	0.75%	4.81	7.66	-
Nagaland	0.40%	6.11	8.08	74
Goa	0.40%	6.52	8.13	60
Puducherry	0.31%	7.43	8.50	-
Manipur	0.26%	6.11	7.92	57
Meghalaya	0.22%	6.05	8.05	61
Mizoram	0.18%	5.99	8.10	59
Tripura	0.18%	6.12	7.91	54
Sikkim	0.16%	5.70	7.83	65
Chhattisgarh	0.10%	3.74	6.95	-
Arunachal Pradesh	0.07%	5.05	7.77	63
Orissa	0.00%	1.78	6.51	-
Average		6.56	8.11	62

West Bengal remains the most indebted State closely followed by Maharashtra. Some of the States like Orissa have not been borrowing from the market at all and managing their resources internally. Among the highly indebted States, West Bengal pays the highest yield spread followed by Uttar Pradesh and Maharashtra. States like Gujarat and Karnataka pay comparatively low spread because of perceived high credit quality of the bonds as well as these States have been increasingly issuing short term bonds which demand lower yield spread vis-à-vis long term bonds.

Liquidity: The State Loans are generally illiquid when compared with dated central government securities and treasury bills. Trading is also concentrated on newly issued “on-run-securities”. The current practice of frequent new issues with low volumes across all the states is the major cause of the illiquidity of SDLs. The high illiquidity of SDLs also indicates that most of the securities are purchased by investors with “buy and hold” strategy. Because of this reason, the yield spread is relatively higher than what it should have been as State Loans are also treated as SLR securities. About 58% of the trading happens within 15 days of issuance and 70% of the trading is taking place in securities which are about one month old. Continuous availability of new State securities makes the older securities very illiquid. Trading is also concentrated on larger States with 5 States accounting for more than 60% of the total secondary market trading.

Issues: The illiquidity in State Bonds is an important issue and this illiquidity results in higher borrowing costs for the States. The States need to explore the possibility of reopening of the issues so that outstanding stock in a particular tenor increases. States also need to look at raising loans for different maturities rather than concentrating on standard 10 year maturity. Only couple of States has started looking at issuing at shorter duration bonds but other States should look at this option.
