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A NEWSLETTER OF THE FINANCE LAB

Volume 2, Issue 1



September 2013

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Indian Institute of Management Calcutta

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Editorial

This is the first issue of the new volume. You are aware that Artha will now be a bi-monthly number. The first issue under the new format will also have a section on Corporate Finance. I am pleased to inform you that the Finance discipline in IIM Calcutta has been ranked as number one in the Financial Times Ranking of Masters in Management Programme 2013. The ranking is done on seventy global business schools that offer such programmes.

The first article in this volume looks at the Indian cement industry and the recent UltraTech cement's acquisition of Jaypee Group's cement unit in Gujarat. The article finds that although the Competition Commission should think before approving any more acquisitions in this industry, the capital market response is positive. The second article highlights on the Indian rupee which has been on a depreciating trajectory. The author finds out that the external sector vulnerability of the Indian economy is going to deteriorate in the near future. This is going to affect the banking sector adversely both via the generalized confidence channel as well as formation of non-performing loans. The third article looked at creating an indexed rate taking into account Call, Repo and CBLO rather than picking up only one rate. The liquidity was estimated as ratio of daily Liquidity Adjustment Facility (LAF) and Net Demand and Time Liabilities (NDTL). The relationship between indexed rate and liquidity was tested and found to be rational. The article also found rational relationship between the spread and ratio of LAF and NDTL along with money market transaction volume.

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

Ashok Banerjee

Cement Industry in India: Sign of Consolidation

Ashok Banerjee



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In early September 2013, UltraTech cement announced acquisition of Jaypee Group's cement unit in Gujarat at a value of Rs. 3,800 crore (about \$630 million) through a non-cash deal. The installed capacity of the Gujarat unit of Jaypee cement is five million tonnes per annum (mtpa). This deal will take Aditya Birla Group's cement capacity- the largest in India- to 59 mtpa and as per plans the Group will have another 10 mtpa additional capacity by 2016. The transaction had valued the cement unit capacity at \$124 per tonne- much lower than what Ambuja (\$133 a tonne) is paying to acquire ACC's units. Its close competitor, Holcim, on the other hand, plans to add around eight mtpa by 2015, which will take the combined capacity of its two group companies - Ambuja Cement and ACC - to 65 mtpa.

The Industry a decade ago

The Indian cement industry, which had historically been a Government-controlled sector since 1914, was totally decontrolled in 1989 and subsequently de-licensed in 1991. As a result, the industry assumed all the characteristics of a competitive market. There were several small players with single location plant. For example, in the late nineties of the last century there were thirty eight small players with 38 mtpa installed capacity. Interestingly, seventy percent of these plants were in markets with excess capacity- Madhya Pradesh had 18 plants with a capacity of 24 mtpa against demand of 4 mtpa. Many mid-sized and larger players were part of diversified groups facing competing demands on their scarce financial resources from their other capital intensive projects. Some examples of such diversified companies include Tata Cement (now part of Lafarge), J K Cement. Even in early 2000s, the industry was highly fragmented with an installed capacity of 130 mtpa as on March 2002. The installed capacity was distributed over approximately 120 large cement plants owned by around 54 companies. The fragmented structure was a result of low entry barriers in the post decontrol period and easy availability of technology. The industry was characterized by high-leverage with an average debt-equity ratio of 2.32 and was growing at a 5-year CAGR of 6.8%. Private companies with 92% share in the total capacity dominated the industry. The industry had witnessed signs of consolidation since 2002. This concentration was mainly because of the focus of the larger and the more efficient players to consolidate their operations by restructuring their business and taking over relatively weaker units. Another reason for consolidation was that the industry experienced tremendous pressure on the bottomline since complete decontrol of the industry. This situation prompted

big players to grow through acquisition and leverage on the economies of scale to maintain profitability. During this period, the Indian cement industry saw entry of multinational companies. Lafarge (the French cement major), for example, had entered Indian market by acquiring cement plants of Tata and Raymond. However, there was a fear that the consolidation might lead to some kind of 'market understanding' between major players to curtail production and supply of cement across the country in order to maintain a cement price within a range.

Further Consolidation

Table 1 shows that in 2002 top 5 companies controlled 49% of the total installed capacity in the cement industry. In 2009 the top companies controlled 50% of cement capacity in India. This is quite significant and the Indian cement industry is following the trend that the industry in the other Asian countries had witnessed in the nineties of the last century. For example, in Thailand, Indonesia and South Korea, the top three players controlled more than 70% of cement capacity. It is, however, evident that in the past four year, the cement industry in India has witnessed more than 100 mtpa capacity addition and as per one estimate it is expected to go up by another 50-70 mtpa capacity by 2016. Still per capita cement consumption in India is very low as compared to world average. Hence, the industry will witness further growth.

Table 1: Capacity Control (MTPA)

| | 2002 | | 2006 | | 2009 | | 2013 | |
|---------------------------------|--------|-----|--------|-----|--------|-----|--------|-----|
| | Volume | % | Volume | % | Volume | % | Volume | % |
| L&T | 16 | 12% | | | | | | |
| Grasim | 13 | 10% | | | | | | |
| UltraTech | 29 | 22% | 30 | 19% | 49 | 22% | 56 | 17% |
| ACC | 15 | 11% | | | | | | |
| Gujarat Ambuja | 12.5 | 10% | | | | | | |
| Holcim | 27.5 | 21% | 36.2 | 23% | 48.2 | 22% | 52.1 | 16% |
| India Cement | 8.06 | 6% | 8.5 | 5% | 14.1 | 6% | 14.1 | 4% |
| TOTAL INSTALLED CAPACITY (MTPA) | 130.85 | 49% | 160 | 47% | 221.44 | 50% | 329.34 | 37% |

The market share of top three companies in India (Table 2) was about 48% in 2011. It implies that the three major cement companies (considering ACC and Ambuja Cement as one combination) have produced more than 50% of the total national cement production.

Table 2: Market Share (%)

| | 2001 | 2002 | 2011 |
|-----------------------|------|-------|------|
| L&T | 11.9 | 13.62 | |
| Grasim | 9.2 | 12.4 | |
| UltraTech | 21.1 | 26.02 | 22 |
| ACC | 11.2 | 14.19 | |
| Gujarat Ambuja | 10.6 | 10.78 | |
| Holcim | 21.8 | 24.97 | 21 |
| India Cement | 7.3 | 6.18 | 5 |
| Total Market Share(%) | 50.2 | 57.17 | 48 |

The consolidation in the cement industry has happened through organic and inorganic routes. Major players have significantly increased their capacities through acquisitions in the past ten years or so. However, the acquisitions of cement units have become costlier recently.

One positive of market consolidation is that the top cement manufacturers in India now enjoy significant economies of scale and have therefore become more efficient. The cement majors have also improved their profitability and health of balance sheet. The negative side to the consolidation story is that the major players may form cartels to control production and hence influence the price. Table 4 shows that the average cement price has more than doubled in the past seven years. This is in spite of three years of recession.

Table 3: Acquisition Price per Tonne: Major Deals

| Acquirer | Target | Year | Capacity | Price/Tonne |
|------------------|--------------|------|----------|-------------|
| India Cement | Raasi Cement | 1998 | 1.8 | 2584 |
| India Cement | Sri Vishnu | 1999 | 1.2 | 1188 |
| Lafarge | Raymond | 2000 | 2.24 | 1594 |
| Zuari Italcement | Sri Vishnu | 2002 | 1.2 | 1025 |
| UltraTech | L& T cement | 2003 | 16 | 2662 |
| UltraTech | Jaypee | 2013 | 5 | 7688 |
| Ambuja Cements | ACC | 2013 | n.a. | 8246 |

The M&A deals in cement industry have seen marked increase in the capacity acquisition price in the last ten years (Table 3). Capacity acquisition cost has increased three-folds in the past ten years. The cement retail price per bag (50 kilograms) has also seen sharp increase over the same period (Table 4). In fact, the capacity acquisition cost has been highly correlated with the cement retail prices (figure 1)

Table 4: Average Retail Price per bag

| | Price/bag | Change(%) |
|---------|-----------|-----------|
| 2005-06 | 163 | |
| 2006-07 | 206 | 26% |
| 2007-08 | 238 | 16% |
| 2008-09 | 238 | 0% |
| 2009-10 | 243 | 2% |
| 2011-12 | 300 | 23% |
| 2012-13 | 330 | 10% |

Capital Market Reaction

The capital reacted positively to the market concentration. The share prices of the top three cement players have witnessed huge growth (Table 5). The only exception was India Cements. Interestingly, all these companies had witnessed a sharp decline in their share prices in 2008 when the cement price remained flat and profits of the cement majors dipped. The market prices

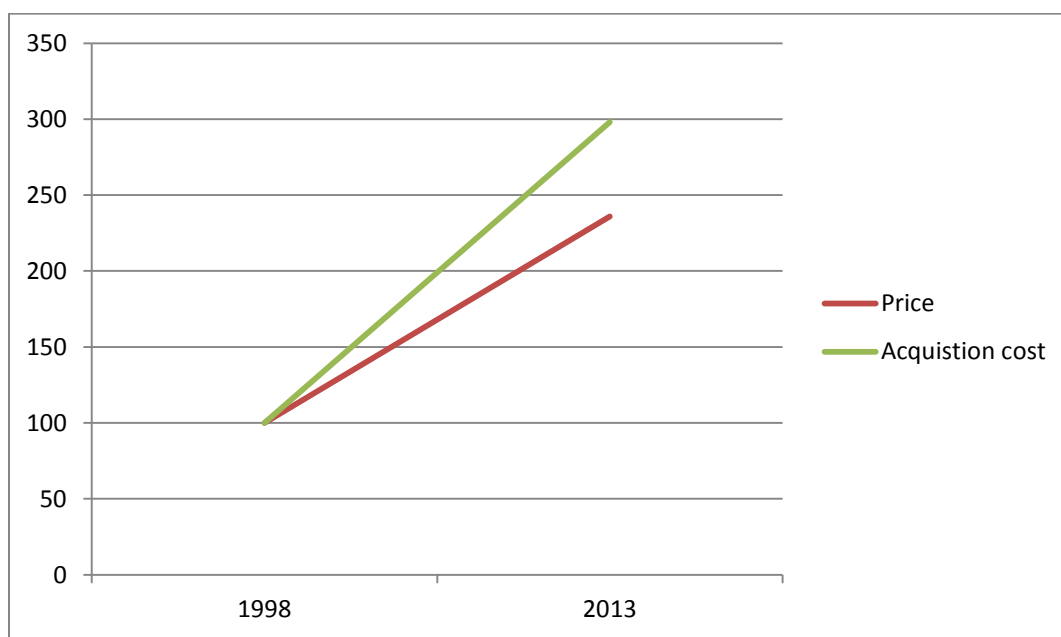
recovered heftily in next two years and share price of cement companies found their new highs by the end of 2012.

Table 5: Year-end Share Price (in INR)

| | 2004 | 2006 | 2008 | 2010 | 2012 | Change |
|---------------|-------|---------|--------|---------|--------|--------|
| UltraTech | 340.3 | 1099.65 | 385.5 | 1084.25 | 1986.3 | 484% |
| ACC | 338.7 | 1086.55 | 480.15 | 1075.6 | 1432.2 | 323% |
| Ambuja | 53.54 | 141.05 | 70.05 | 143.2 | 200.9 | 275% |
| India Cements | 58.95 | 234.95 | 97.7 | 108 | 90.85 | 54% |

Note: face value of Ambuja Cement Shares is Rs.2 per unit; all others Rs. 10 per unit

Figure 1: Cement Industry: Acquisition Cost and Cement Retail Price



High demand in the industry coupled with market concentration is conducive for cartel formation and abuse of market power. The regulators should be aware of the developments. The industry concentration (as measured by the Herfindahl's index) has crossed 1800 mark in India. It was less than 1000 in early 2000. Hence, the Competition Commission in India should take note of this fact while approving any future M&A deals in this industry. But the capital market seems to love it!

Scathed by the Exchange Rate Volatility and Deteriorating Asset Quality: Resilience *versus* Fragility of the Indian Banking Sector

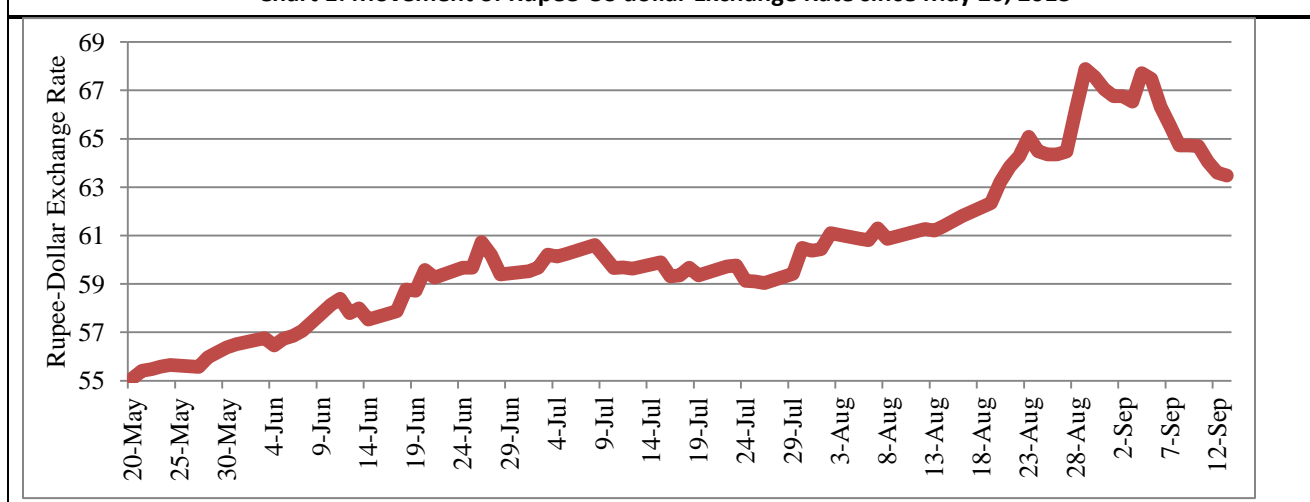
Partha Ray



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In recent times, Indian rupee has been on a depreciating trajectory. Following the announcement of the US Fed Chairman Ben Bernanke on May 20, 2013, the Indian rupee - US dollar exchange rate crossed the psychological mark of Rs 55 on May 21, 2013. Subsequently, within the next two months, it crossed Rs 60 mark on June 3, 2013 and Rs. 65 mark on August 23 2013. By end-August 2013 it reached an all time high (low in terms of dollar-rupee exchange rate) of close to Rs. 69, before rebounding back to some extent, following several crises management measures of the Government and the RBI (Chart 1).¹ Moreover, such a depreciating trend in nominal exchange rate is also visible in real effective exchange rate of Indian rupee. There have been various analyses about the possible causes of such downward journey of the rupee and factors like signaling of tapering of quantitative easing in the U.S on the part of the US Fed, high current account deficit in India (arising, *inter alia*, out of substantial imports of gold and petroleum products), and the fickle nature of portfolio flows have all been held responsible. Furthermore, since the portfolio investors withdrew quite a bit and caused forex outflows, the stock market was affected as well.

Chart 1: Movement of Rupee-US dollar Exchange Rate since May 20, 2013



¹ Of course, India is not alone in this club of countries experiencing adverse developments of exchange rates. Countries like South Africa, Brazil, Malaysia, South Korea and Turkey have all experienced significant depreciation of their currencies in recent times, say over the last three months.

On another front, it is now well-known that the asset quality of Indian banks has deteriorated in recent times reflecting the impact of the, “slowdown in the economy and the emergence of sector-specific issues amid structural bottlenecks in the economy” (RBI, Annual Report, 2012-13). Gross NPA for scheduled commercial banks, as a percentage of gross advances, increased markedly - from 2.4 per cent in March 2011 to 3.9 per cent in June 2013 (Table 2). While public sector banks account for a disproportionate share of this increase, the amount of restructured advances has been considerable during this period. The slippage ratio, capturing fresh NPAs, increased from 2.1 per cent in March 2011 to 3.1 per cent in September 2012, but declined subsequently to 2.8 per cent in March 2013.

Table 1: Bank Group-Wise Asset Quality Indicators

| | All Banks | | Foreign Banks | | New Private Sector Banks | | Old Private Sector Banks | | Public Sector Banks | |
|---|-----------|-------|---------------|-------|--------------------------|-------|--------------------------|-------|---------------------|-------|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| Gross NPAs to Gross Advances (%) | 2.94 | 3.42 | 2.68 | 2.97 | 2.18 | 1.91 | 1.80 | 1.91 | 3.17 | 3.84 |
| Net NPAs to Net Advances (%) | 1.24 | 1.68 | 0.61 | 1.00 | 0.44 | 0.44 | 0.59 | 0.74 | 1.47 | 2.02 |
| Restructured Std. Asset to Gross Advances (%) | 4.69 | 5.83 | 0.10 | 0.16 | 1.06 | 1.20 | 3.54 | 4.00 | 5.74 | 7.21 |
| CRAR | 14.24 | 13.84 | 16.75 | 17.49 | 16.66 | 17.52 | 14.12 | 13.72 | 13.23 | 12.38 |
| Slippage Ratio % | 2.55 | 2.79 | 2.31 | 1.60 | 1.17 | 1.24 | 1.12 | 1.45 | 2.95 | 3.24 |

Source: Annual Report, 2012-13, RBI.

What is the impact of these two adverse developments on Indian banks? The present note seeks to delve into this question. Needless to say, given the proximity to the events, maintaining an objectivity of analysis could be difficult and hence the treatment adopted in this piece is less than rigorous and is based on various tentative indicators.

It is axiomatic to say that the impact of depreciating rupee on banking sector’s vulnerability will crucially depend upon their exposure to foreign exchange assets. For example, in a country which has a huge presence of foreign banks, it is likely that the impact will be much more than in a country with less foreign banks. Also, the impact would be more in a country which is intrinsically weak in its economic muscle. Illustratively, in many of the countries in Sub-Saharan Africa, irrespective of their nature of exchange rate regime, the US dollar or euro is widely accepted as a mode of payment.² India would not get classified as such a country and

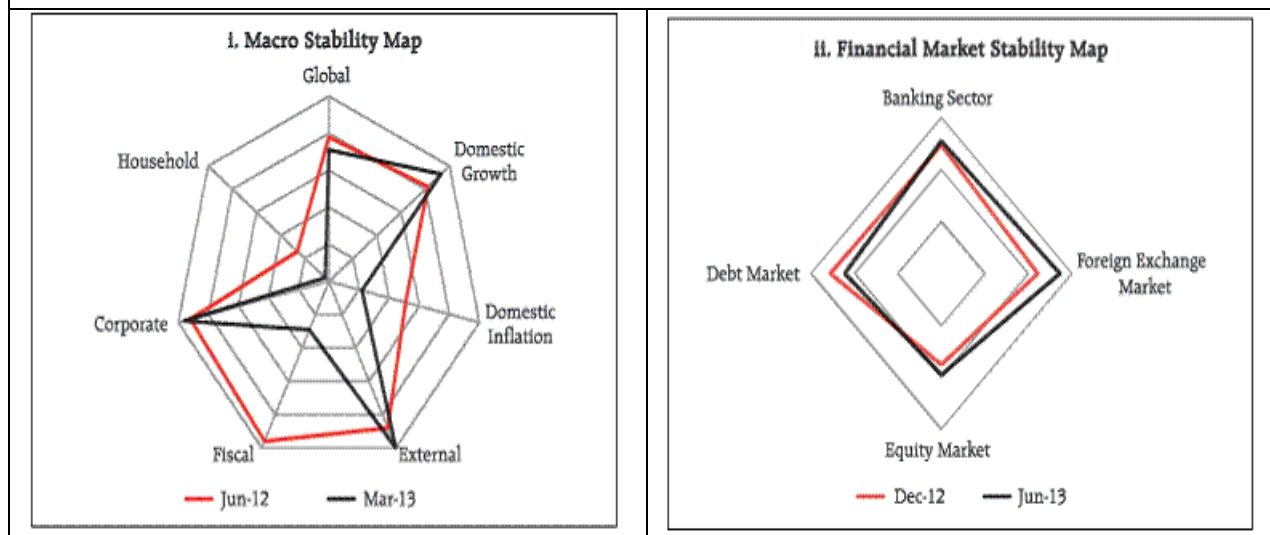
² For example, Biggs (2011) in describing the impact of dollar exchange rate in Mozambique’s economy went on say, “To underscore the importance of the exchange rate in the economy of Mozambique just ask any taxi driver in Maputo for the latest US dollar or Rand or Euro exchange rate and he can tell you right away. But ask him about other important prices, such as the latest bank interest rates or evolution of the consumer price index, and he will generally draw a blank. The taxi-driver’s intimate knowledge of exchange rates stems from the fact that foreign currency rates are ubiquitous to everyday life in Mozambique”.

given the strategy of calibrated capital account liberalization in India, households' exposure to dollar denominated assets is expected to be fairly low.

The same observation is not true for the corporates. However, despite the presence of sizeable trade deficit, Indian corporates could be *net* exporters and hence currency depreciation could affect them favorably. Interestingly, a recent study investigating the relationship between exchange rate changes and stock returns for a sample of 361 Indian non financial firms over 2006 – 2011, found that only 16 percent of the Indian firms are exposed to exchange rate exposure.³ Out of these firms, 86 percent firms are negatively affected by an appreciation of the rupee which confirms that Indian firms are net exporters.

What could be the impact of these adverse exchange rate developments on banks? As far as published data are concerned, we do not have any recent estimates. Nevertheless, the June 2013 *Financial Stability Report* of the RBI reports the Macro-Stability Map and the Financial Markets Stability Map as of March 2013 and June 2013, respectively (Chart 2). As per these numbers, risks on account of external front has increased in March 2013 as compared with June 2013; similarly, as far as financial market stability map is concerned, risks on account of foreign exchange market in June 2013 has increased over December 2012.

Chart 2: Macro and Financial Markets Stability Map



Note: Data for External, Corporate and Household dimensions pertain to December 2012. Data for the Financial Markets Stability Map are as on June 20, 2013. Movement away from the center depicts increasing risk.

Source: Financial Stability Report, June 2013, RBI.

See Biggs, Tyler (2011): “Impact of Exchange Rate Fluctuations on The Economy of Mozambique”, USAID (Mozambique) *Working Paper*, available at <http://www.cta.org.mz/lib>

³ Kanagaraj, A. and Ekta Sikarwa (2011): “A Firm Level Analysis of the Exchange Rate Exposure of Indian Firms”, *Journal of Applied Finance & Banking*, vol.1, no.4, pp. 163-184.

Going by the recent developments in the foreign exchange market, both these risks (viz., macroeconomic stability as well as financial market stability) are likely to go up in near future (Table 2). Furthermore, as per the latest data available there has been deterioration in the external sector vulnerability indicators. In fact, the recently published Annual Report, 2012-13 of the RBI (released on August 22, 2013) candidly observed:

“ With increasing external debt and its shortening maturity, debt servicing requirements may pose a concern for the CAD In fact, income payments, which mainly reflect payments on account of debt servicing, have shown a significant increase in recent quarters. Reflecting the widening CAD, the net international investment position (NIIP) as a ratio to GDP increased Hence, deterioration in external vulnerability indicators points to the need for reducing the CAD and encouraging the non-debt creating flows to finance the CAD. ... The CAD has remained high and above the sustainable level during 2012-13. Current indications suggest that while the CAD may be somewhat lower in 2013-14, it will continue to stay above the sustainable level” (Paras II.6.21 & II.6.22).

| Indicator | End-March 2011 | End-March 2012 | End-March 2013 |
|---|---------------------------|---------------------------|---------------------------|
| 1. Ratio of Total Debt to GDP | 17.5 | 19.7 | 21.2 |
| 2. Ratio of Short-term to Total Debt (Original Maturity) | 21.2 | 22.6 | 24.8 |
| 3. Ratio of Short-term to Total Debt (Residual Maturity) # | 42.2 | 42.6 | 44.2 |
| 4. Ratio of Concessional Debt to Total Debt | 15.5 | 13.9 | 11.7 |
| 5. Ratio of Reserves to Total Debt | 99.7 | 85.2 | 74.9 |
| 6. Ratio of Short-term Debt to Reserves | 21.3 | 26.6 | 33.1 |
| 7. Ratio of Short-term Debt (Residual Maturity) to Reserves # | 42.3 | 50.1 | 59.0 |
| 8. Reserves Cover of Imports (in months) | 9.5 | 7.1 | 7.0 |
| 9. Debt Service Ratio (Debt Service Payments to Current Receipts) | 4.4 | 6.0 | 5.9 |
| 10. Net International Investment Position (NIIP) (US\$ billion) | -207.0 | -249.5 | -307.3 |
| 11. NIIP/GDP ratio | -11.9 | -14 | -16.7 |
| ; #: RBI Estimate | | | |
| Source: Annual Report, 2012-13, RBI. | | | |

Thus, by all counts, the external sector vulnerability of the Indian economy is going to deteriorate in the near future. This is going to affect the banking sector adversely both via the generalized confidence channel as well as formation of non-performing loans.

All together, the combination of deteriorating asset quality along with increased external sector vulnerability indicators does not auger well for the Indian banking sector. The resilience of the Indian banking sector is now put to test – it remains to be seen, how far they get hurt in the near future or come out unscathed.

Money Market Dynamics

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.

Introduction

The money market is an important part of the financial system. The central bank of a country uses the money market in its pursuit of monetary policy objectives. The money market typically caters to 3 broad functions: (i) it allows intermediation of demand and supply of short-term funds among the banks and institutions; (ii) it helps the borrowers and lenders of short-term funds to fund their positions at an efficient and typically low market price; (iii) central banks around the world use the market to influence cost and level of liquidity in the financial system. The last objection integrates the real sector to financial sector through transmission of monetary policy impulses. It is the objective of the central bank to align the short term rates in the market with the key policy rates announced from time to time. Since the policy rates form a kind of resistance and support level for Banks and primary dealers, money market rates are expected to hover around the policy rates depending on the level of liquidity in the market. Any long term wide deviation of the short term rates from the policy rates is seen as a poser to the efficiency of the monetary policy stance. Efficient functioning of the short term markets like Repo, Call and Collateralized Borrowing and Lending Obligations (CBLO) are important for the effectiveness of monetary policy. The interest rate channel is used as the primary mechanism of monetary policy transmission in conventional macroeconomic models where an increase in nominal interest rates, given some degree of price stickiness, translates into an increase in the real rate of interest and the user cost of capital. These changes are expected to affect the aggregate demand and supply in the economy that may result in keeping the price level at a desired zone. Hence the short term money market is used as a channel for monetary policy transmission by central banks.

Short Term Markets in India

The daily Liquidity Adjustment Facility (LAF) conducted by the Reserve Bank of India (RBI) is aimed at moderating supply of liquidity in the market. LAF Repo and Reverse Repo form the foundation of short term markets in India. Other markets like Call, Repo and CBLO are directly

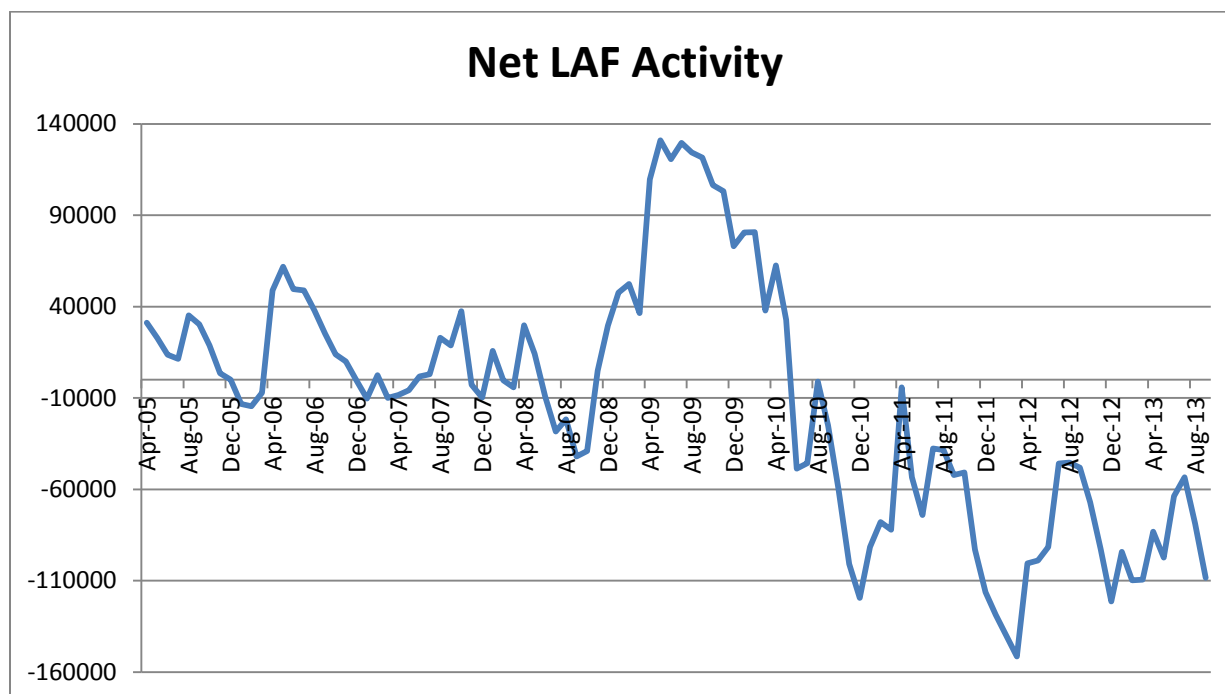
linked to the daily LAF operations of the central bank. LAF Operatives have seen many changes since its introduction in 2001. The system started with single LAF window and experimented with multiple LAFs, quantitative restriction of parking of funds with RBI limiting to Rs.3000crores in all (removing the cap after few months as the rates started dropping to very low level due to availability of excess liquidity in the system), introducing Marginal Standing Facility in May 2011, restricting Bank's borrowing under LAF Repo window to 1% of NDTL (July'13) as a measure to tame the volatility in exchange rate and bringing it down further to 0.5% of NDTL (July'13) and finally. The interest rate corridor for MSF rate was hiked 300bps in July'13 from 100bps earlier to control the Rupee volatility. MSF is considered as a Penal Rate (equivalent to Bank Rate) and the scheme was introduced as Banks did not have any other window to access liquidity from central bank in case of an emergency. This scheme was expected to reduce volatility in the overnight rates and improve monetary transmission. The central bank uses the LAF window to ensure that banks manage their liquidity in an objective manner so that neither a large surplus in the system can dilute monetary transmission nor a large deficit chokes off fund flows. Monetary transmission does not give the desired results when the market has excess liquidity of funds and banks do not borrow from central bank at Repo rate. The short term rates also move southward and operate below the Reverse Repo rate due to excess liquidity. In case banks have excess liquidity on any day due to low demand for credit and investment, they can park such funds on overnight basis with RBI and get remunerated at Reverse Repo Rate (currently the corridor for the same is 100bps below Repo rate). Similarly, banks can borrow money from RBI at repo rate if they find shortage of funds. However, the LAF window closes early in the day and any other excess of shortage

Other short term markets like Call, Repo and CBLO help the market participants to even out excess and shortage of liquidity at a price appropriate to the liquidity in the system as well synchronizing with the policy rates of the central bank. Call market is a pure inter-bank market in which Banks and Primary Dealers (PDs) trade among themselves. Since this is a clean market without any collateral on offer, the rates are expected to be higher vis-à-vis a collateralized market rate. The call market has seen major revamp during last one decade or so. The non-bank entities have been phased out of this market and the exposures of the participants have also limitations and linked to their net owned funds in order to have better discipline and ensure that the short term market is not used largely for creating long term assets thereby creating structure asset-liability mismatch and systemic risk. The call market used to form the large chunk of the short term market in 2004 but the various reforms introduced in this market helped to bring down the same to about 15-20% of the short term market. Banks and PDs not having excess SLR typically use this market to borrow funds and pay a premia over the collateralized rate. Repo market is a collateralized market which uses Government securities (T-bills, dated securities and SDLs) excluding special securities like Oil bonds as collaterals for borrowing. Further, banks falling short of collaterals also use this market to borrow securities from others who have excess securities. The technology

enhancement of this market has brought a great deal of transparency to this market. This is pure OTC market and settlement is direct between the participants. Unlike Call market, this market enables non-bank entities like Mutual funds (MFs) and Insurance Companies to participate and more often they are the largest lenders of money. The market also moved from a bi-lateral OTC market to an anonymous order driven market after CCIL introduced new dealing system in Repo called CROMS. The system enables both Basket and Special Repo as per International standards. Since Repo is used in India more as a lending and borrowing of funds against collateral or borrowing collateral for SLR purpose, the Basket Repo forms the large part of the market. Traditional bi-lateral Repo market exists with the new electronic version as there is no compulsion for a Bank to channel its deals to any system in particular. However, the anonymous order matching systems has garnered about 80% of the market showing the reliance on electronic system by the market participants. Once the short-selling and Interest Rate Futures market become more vibrant with liquidity, special Repo is expected to see better volumes. Collateralized Borrowing and Lending Obligations (CBLO) was introduced in 2003 and became the flagship product of short term market with more participants using the same because of its flexibility and liquidity. The depth of the CBLO market makes it more attractive to both borrowers and lenders. Unlike the traditional Repo market, CBLO market allows a market participant to unwind its position any time during the life of the contract. This works more as a tradable Tri-party Repo in which CCIL freezes the security and unlike Repo, does not allow transfer of the security to the lender of money. The SLR benefit is not transferred to the lenders of funds in case of a CBLO deal while in Repo, the securities get transferred to the lender of money. CBLO accounts for more than 60% of the short term market. Due to the withdrawal of CRR benefit from CBLO, it is observed that on reporting Fridays, market participants move their position to Repo as it does not attract CRR. These 3 short term market segments fulfill the requirement of various entities. Non-bank entities like Mutual Funds and Insurance companies account for a major share in lending in CBLO and Repo markets.

Short Term Market Dynamics

LAF Activity: Daily LAF activity of the central bank is aimed to ensure adequate liquidity in the system. However, due to structural issues, we see large liquidity shortage or overhang in the system. Due to infusion of liquidity by central bank to fight financial crisis 2007-09, banks continuously had excess liquidity with them which was parked with RBI as credit off-take was below normal. Prior to June 2010, the market was generally in excess mode where banks parked funds with the central bank continuously from Nov 2008. However, prior to Nov 2008, the excess liquidity was not very high and remained within a manageable limit.



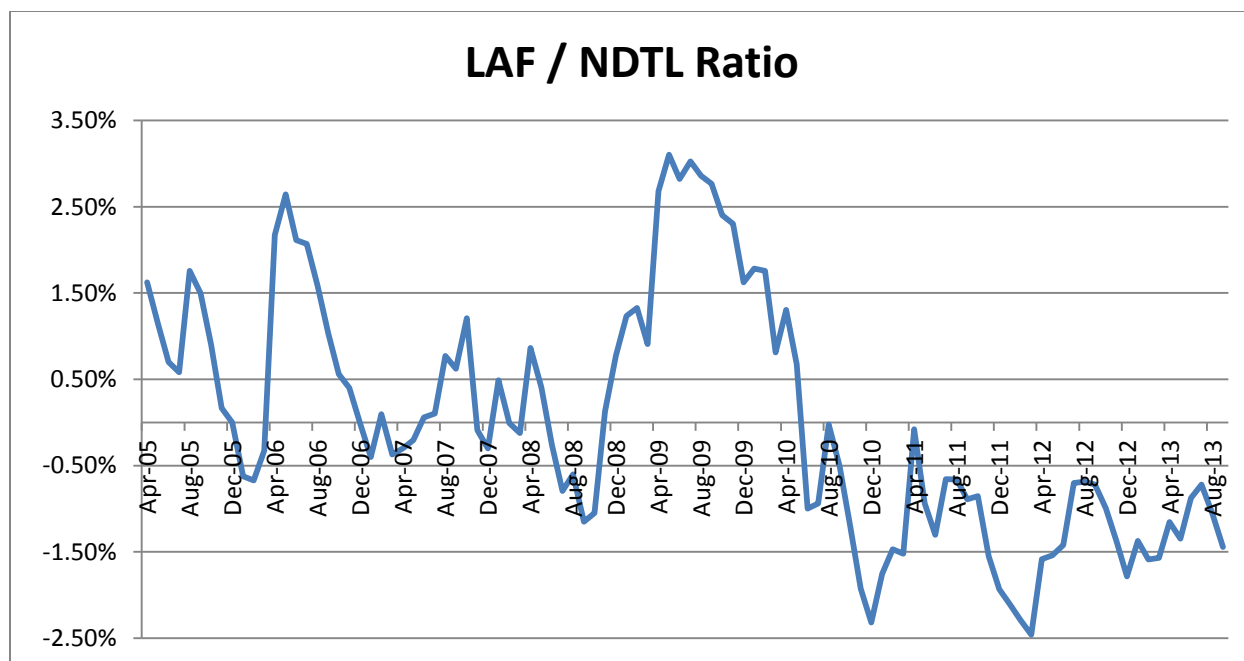
The period of Nov 2008 to May 2010 witnessed excess liquidity as RBI released close to Rs.500,000crores to the system through changes in CRR/SLR and rate cuts (Cumulative potential primary liquidity impact – over Rs.490,000crore (9 % of GDP) at that time). Once the cycle reversed due to domestic inflationary pressure and possible asset price bubbles, RBI started rising policy rates and CRR and tightened liquidity in the system. As of now the, market is looking towards stabilization of the economy with lower inflation expectations. The recent tightening measures to moderate net liquidity infusion adopted by RBI to stabilize Indian Rupee resulted in higher borrowings in MSF window at higher interest rate. This led to move T-Bills yields going upward.

LAF/NDTL Ratio

The LAF/NDTL ratio is an important indicator of absorption of liquidity in the system. The ratio is used by the market to synchronize rate expectation. The spread of uncollateralized Call Rate over collateralized Repo rate is generally positive (not unusual to see negative spread at times) and during April'05 and Sep'13, the same was about 100bps on an average as given in the Table below. The spread has been calculated by using the average monthly Repo and Call rates in the market. We have used the rate on the respective Reporting Fridays rather than using an average rate for the entire fortnight because the pressure on the market on Reporting Fridays gets built up due to asset liability adjustments banks do on Reporting Fridays to cover up their CRR and SLR requirements. Reporting Fridays bring greater amount of volatility to the market.

| Parameters | Call-Repo Spread (Reporting Friday) | Call-Repo Spread (All days) |
|--------------------|-------------------------------------|-----------------------------|
| Mean | 0.58% | 0.34% |
| Standard Error | 0.12% | 0.06% |
| Median | 0.27% | 0.19% |
| Standard Deviation | 1.19% | 0.64% |
| Minimum | -0.08% | -0.01% |
| Maximum | 10.34% | 5.74% |
| Months | 102 | 102 |

Maintaining a higher shortage or an excess liquidity would make monetary policy transmission less effective and such shortages /excesses become structural and banks are exposed to more volatility and risk. Banks have been using short-term market to fund their assets (within the given parameters of asset-liability gap) and if is shortages/excesses are temporary in nature, banks may not venturing into creating medium and long term assets out of very short term liabilities like borrowing in overnight markets. On reporting Fridays, banks would avoid using overnight call/notice market as these obligations will be treated under the CRR coverage while doing a Repo transaction will not such issues as the transaction is done as a buy and sell back arrangement. But banks not having excess SLR would have no option but to borrow in call market to cover their CRR. Hence rates on Reporting Fridays capture multi-faceted dynamics and using the same for our analysis will make the study more robust. However, during last 4 years (aftermath of financial crisis) the ratio of LAF/NDTL (absolute) stayed beyond 1% level for a longer period indicating the less than effective transmission of monetary policy.



The study did not find a great correlation between spread and the LAF/NDTL (absolute) ratio – about 4% but the study empirically found that the shortage of liquidity (RBI supports market through net LAF infusion) has a higher cost than excess liquidity.

The spread between Call and Repo is considered as an additional cost banks need to pay if they have to borrow in Call market to cover their shortfall. This cost increases significantly at the time of shortage. The same is much higher when the shortage is more than 1% of the LAF/NDTL ratio. The Table-2 gives the pattern of spread in various liquidity situations (Jan 2007 to Dec 2011).

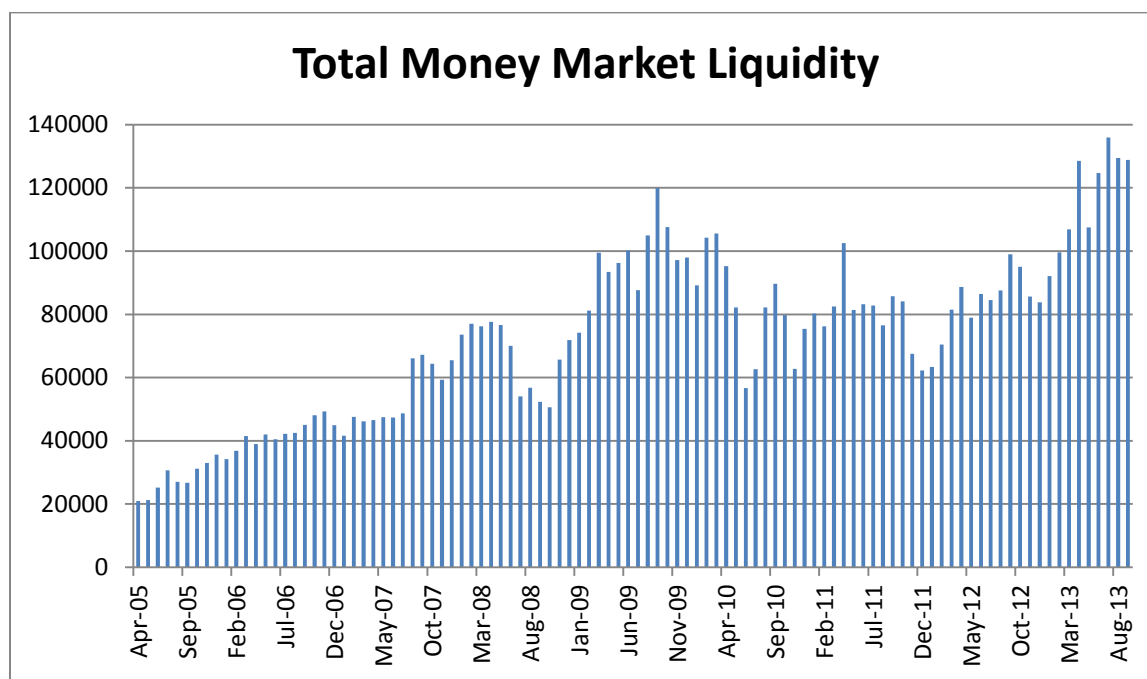
| | Shortage of Liquidity (RBI net support) | Excess Liquidity (Banks net deposit with RBI) | LAF >1% of NDTL (Excess Liquidity) | LAF >-1% of NDTL (Shortage of Liquidity) |
|--------|--|--|--|--|
| Spread | 1.07% | 0.76% | 1.06% | 1.78% |

Market Composition

The short-term money market in terms of sourcing funds for banks and financial institutions consists of Call, Repo and CBLO markets. Most of these markets are predominantly overnight in nature (typically for 3 days on Fridays). However, a year-wise analysis indicates that the Call market is losing its dominant position and CBLO is gaining the leading role over the years. CBLO has established itself as the most preferred money market instruments which Banks and Institutions use to lend and borrow funds. Notice and Term money forms negligible part of the market. Table-3 shows the growing importance of CBLO segment in Money Market. Due to excess liquidity in the short term market, call market dipped significantly in 2009/2010 and slowly gaining volumes due to tight liquidity conditions in the market in 2011 and 2012. Banks having excess cash would like to take the benefit of higher spread due to liquidity shortage in the market.

| Year | Average Daily Call Volume | Average Daily Repo Volume | Average Daily CBLO Volume |
|-----------|---------------------------|---------------------------|---------------------------|
| 2004 | 49.88% | 33.83% | 16.28% |
| 2005 | 44.86% | 23.50% | 31.64% |
| 2006 | 32.48% | 23.62% | 43.90% |
| 2007 | 25.45% | 24.53% | 50.02% |
| 2008 | 22.97% | 23.87% | 53.16% |
| 2009 | 11.99% | 26.76% | 61.25% |
| 2010 | 13.29% | 21.64% | 65.06% |
| 2011 | 18.53% | 20.29% | 61.18% |
| 2012 | 29.19% | 17.25% | 53.56% |
| All Years | 21.89% | 23.77% | 54.34% |

Market liquidity in terms of total volume transacted in short term market (Call+Repo+CBLO) has seen significant changes during last few years.

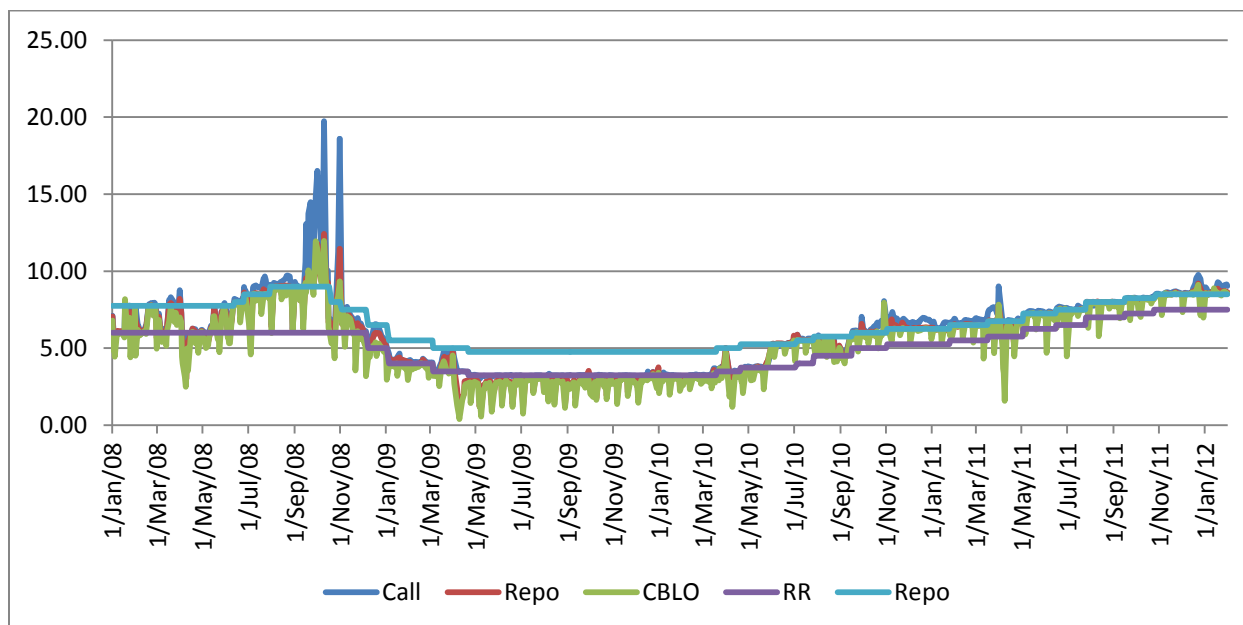


The average rates have seen significant changes keep in sync with the market environment. Higher liquidity during 2009/2010 saw rates dipping significantly and tightening of liquidity saw rates rising in 2011/12. The spread between clean call and collateralized repo is also widening in recent months due to liquidity pressure.

| | | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|-------|------|------|-------|-------|-------|------|------|------|------|
| CBLO | Rate | 4.23 | 4.85 | 6.01 | 5.38 | 6.84 | 2.84 | 4.58 | 7.21 | 8.56 |
| | STDEV | 0.65 | 0.66 | 0.77 | 3.10 | 1.64 | 0.72 | 1.35 | 1.06 | 0.10 |
| | MAX | 6.05 | 6.63 | 12.78 | 28.69 | 11.97 | 4.53 | 7.96 | 9.11 | 8.90 |
| | MIN | 2.70 | 2.11 | 4.81 | 0.02 | 2.50 | 0.39 | 1.19 | 1.57 | 8.41 |
| CALL | Rate | 4.61 | 5.12 | 6.44 | 6.62 | 7.71 | 3.49 | 4.97 | 7.62 | 8.91 |
| | STDEV | 0.48 | 0.47 | 1.13 | 5.45 | 2.11 | 0.47 | 1.35 | 0.79 | 0.21 |
| | MAX | 6.30 | 7.16 | 16.89 | 55.59 | 19.74 | 5.25 | 8.06 | 9.77 | 9.28 |
| | MIN | 4.07 | 4.52 | 5.47 | 0.13 | 5.26 | 2.99 | 3.12 | 5.88 | 8.62 |
| REPO | Rate | 4.23 | 4.95 | 6.12 | 5.67 | 7.20 | 3.09 | 4.76 | 7.40 | 8.65 |
| | STDEV | 0.63 | 0.52 | 0.89 | 3.06 | 1.45 | 0.73 | 1.32 | 0.90 | 0.09 |
| | MAX | 6.00 | 6.53 | 14.88 | 26.12 | 12.42 | 5.10 | 6.87 | 9.20 | 8.87 |
| | MIN | 3.17 | 3.61 | 4.92 | 0.14 | 3.02 | 0.98 | 2.06 | 3.72 | 8.45 |

Policy Rates and Market Rates

Policy Rate like Repo and Reverse Repo rates drive the short term market rates and typically market rates like Call, Repo and CBLO hover around the said policy rates depending on shortage or excess liquidity in the system. Till June 2010, the market had excess liquidity for which most of the time, the market rates were hovering around Reverse Repo rates and from July 2010, the shortage of liquidity forced the rates to hover around Repo rate.



Relation between Short term Rates and Liquidity Shortage

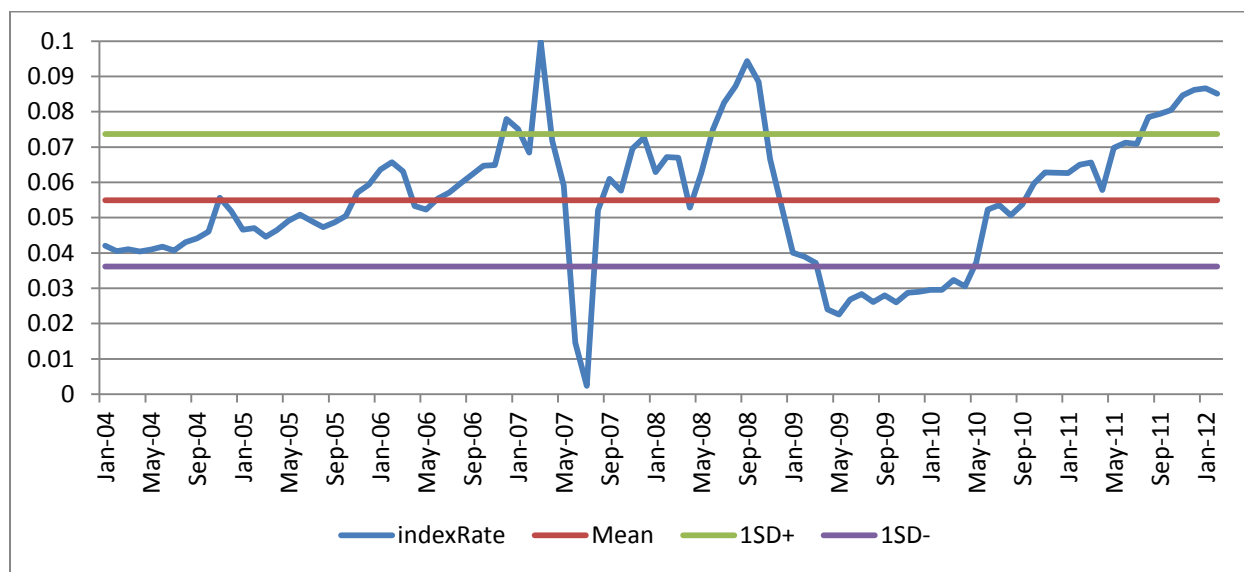
Short term rates in the market are very sensitive the liquidity availability in the system. In order to study the impact of liquidity we have created an indexed short term-rate (predominantly overnight rate) using all 3 segments of the market and the weight has been the volume of trading in that segment. The indexed rate is give as below:

$$I = \frac{(CallRate * CallVol + RepoRate * RepoVol + CBLORate * CBLOVol)}{(CallVol + RepoVol + CBLOVol)}$$

The index rate is scientific as it gives due weight to the volume and has the following behavior (Jan 2004 to Feb 2012) given in Table-:

| | |
|--------------------|---------|
| Mean | 0.0549 |
| Standard Error | 0.0019 |
| Median | 0.0545 |
| Standard Deviation | 0.0188 |
| Sample Variance | 0.0004 |
| Kurtosis | -0.1190 |
| Skewness | -0.0730 |
| Minimum | 0.0023 |
| Maximum | 0.0999 |
| Count | 98 |

The indexed rate has hovered within +/-1 standard deviation for most of the period though at times it moves away from the range but returns soon to the trajectory.



The rational expectation is that the indexed rate will be higher at the time of liquidity shortage and lower at the time of liquidity excess. Hence we have tested to establish the relevance of the relationship through a simple linear regression in which indexed rate is a dependent variable while liquidity measured in terms of LAF/NDTL ratio is the independent variable. The estimated equation is

$$I_t = 0.0684 - 1.1536 * (LAF/NDTL)_t$$

As expected the relationship is negative – higher rate with lower liquidity and vice versa. The model was also tested for lagged effect but the estimation did not change significantly (improved R Square marginally):

$$I_t = 0.0689 - 1.2431 * (LAF/NDTL)_{t-1}$$

The other information on the regression is given in the Annexure-II

Conclusion

The short term market is an important source for banks and institutions to secure funds to align their short term asset liability mismatches. RBI uses the market to signal policy stance changes. The short-term rates generally synchronize with policy rates in a manner that helps smooth transmission of monetary policy. In India, the short term market heavily revolves around daily LAF of RBI as well as Call, Repo and CBLO markets. Predominantly, these markets are overnight in nature. Effort to develop a term money market has not been very successful.

The article looked at creating an indexed rate taking into account all three segments into consideration rather than picking up only one rate. The liquidity was estimated as ratio of LAF and NDTL. The relationship between indexed rate and liquidity was tested and found to be rational. The article also found rational relationship between the spread and ratio of LAF and NDTL along with money market transaction volume.

Reference:

Kuttner and Mosser (2002): The Monetary Transmission Mechanism: Some Answers and Further Questions, FRBNY Economic Policy Review / May 2002

Annexure – 1:

| St=0.4213+0.8818*LAF/NDTLt+0.0379*Log(Volt) | | | | | | | | |
|---|---------------------|-----------------------|---------------|----------------|-----------------------|------------------|--------------------|--------------------|
| | | | | | | | | |
| <i>Regression Statistics</i> | | | | | | | | |
| Multiple R | 0.3622 | | | | | | | |
| R Square | 0.1312 | | | | | | | |
| Adjusted R Square | 0.1176 | | | | | | | |
| Standard Error | 0.0253 | | | | | | | |
| Observations | 131 | | | | | | | |
| | | | | | | | | |
| <i>ANOVA</i> | | | | | | | | |
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> | | | |
| Regression | 2 | 0.0124 | 0.0062 | 9.6662 | 0.0001 | | | |
| Residual | 128 | 0.0822 | 0.0006 | | | | | |
| Total | 130 | 0.0946 | | | | | | |
| | | | | | | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>Lower 95.0%</i> | <i>Upper 95.0%</i> |
| Intercept | 0.4213 | 0.0996 | 4.2275 | 0.0000 | 0.2241 | 0.6184 | 0.2241 | 0.6184 |
| LAF | 0.8818 | 0.2879 | 3.0633 | 0.0027 | 0.3122 | 1.4515 | 0.3122 | 1.4515 |
| MarketVol | -0.0379 | 0.0091 | -4.1776 | 0.0001 | -0.0558 | -0.0199 | -0.0558 | -0.0199 |

Annexure - II

| =0.0684-1.1536*LAF/NDTL | | | | | | | | |
|------------------------------|---------------------|-----------------------|---------------|----------------|-----------------------|------------------|--------------------|--------------------|
| <i>Regression Statistics</i> | | | | | | | | |
| Multiple R | 0.42517 | | | | | | | |
| R Square | 0.18077 | | | | | | | |
| Adjusted R Square | 0.166645 | | | | | | | |
| Standard Error | 0.020203 | | | | | | | |
| Observations | 60 | | | | | | | |
| ANOVA | | | | | | | | |
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> | | | |
| Regression | 1 | 0.005224 | 0.005224 | 12.79816 | 0.000708423 | | | |
| Residual | 58 | 0.023673 | 0.000408 | | | | | |
| Total | 59 | 0.028897 | | | | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>Lower 95.0%</i> | <i>Upper 95.0%</i> |
| Intercept | 0.068387 | 0.004387 | 15.59017 | 2.1E-22 | 0.059606682 | 0.077168 | 0.059607 | 0.077168 |
| LAF/NDTL | -1.15359 | 0.32246 | -3.57745 | 0.000708 | -1.799060199 | -0.50811 | -1.79906 | -0.50811 |
| =0.0689-1.2431*LAF/NDTL | | | | | | | | |
| <i>Regression Statistics</i> | | | | | | | | |
| Multiple R | 0.457739 | | | | | | | |
| R Square | 0.209525 | | | | | | | |
| Adjusted R Square | 0.195657 | | | | | | | |
| Standard Error | 0.019886 | | | | | | | |
| Observations | 59 | | | | | | | |
| ANOVA | | | | | | | | |
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> | | | |
| Regression | 1 | 0.005975 | 0.005975 | 15.1085 | 0.000267233 | | | |
| Residual | 57 | 0.02254 | 0.000395 | | | | | |
| Total | 58 | 0.028515 | | | | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>Lower 95.0%</i> | <i>Upper 95.0%</i> |
| Intercept | 0.068877 | 0.004319 | 15.94867 | 1.12E-22 | 0.060229224 | 0.077525 | 0.060229 | 0.077525 |
| LAF/NDTL(-1) | -1.24313 | 0.31982 | -3.88697 | 0.000267 | -1.883557096 | -0.6027 | -1.88356 | -0.6027 |
