Athens Institute for Education and Research
ATINER

ATINER's Conference Paper Series
CBC2013-0629

An Examination of Factors Affecting Liquidity Management in Indian Financial System

Shyam Bhati
School of Accounting and Finance
University of Wollongong
Wollongong Australia

Anura DeZoysa
School of Accounting and Finance
University of Wollongong
Wollongong Australia

An Introduction to
ATINER's Conference Paper Series

ATINER started to publish this conference papers series in 2012. It includes only the papers submitted for publication after they were presented at one of the conferences organized by our Institute every year. The papers published in the series have not been refereed and are published as they were submitted by the author. The series serves two purposes. First, we want to disseminate the information as fast as possible. Second, by doing so, the authors can receive comments useful to revise their papers before they are considered for publication in one of ATINER's books, following our standard procedures of a blind review.

Dr. Gregory T. Papanikos
President
Athens Institute for Education and Research

This paper should be cited as follows:

Bhati, S. and DeZoysa, A. (2013) **"An Examination of Factors Affecting Liquidity Management in Indian Financial System"** Athens: ATINER'S Conference Paper Series, No: CBC2013-0629.

An Examination of Factors Affecting Liquidity Management in Indian Financial System

Shyam Bhati
School of Accounting and Finance
University of Wollongong
Wollongong Australia

Anura DeZoysa
School of Accounting and Finance
University of Wollongong
Wollongong Australia

Abstract

Liquidity management has proved to be difficult in India after financial liberalisation in 1991. This paper studies the liquidity management in India from 1998 to 2010 and analyses the determinants of liquidity in India. The focus is on the liquidity in banks and nonbanking financial institutions. The finding indicates that the average increase in liquidity of banks was 2.77% per quarter from 1998 to 2010. The average increase in liquidity in non banking financial institutions from 1998 to 2010 was observed to be 1.13% per quarter. In all cases for banks, periods of liquidity decline were followed by periods of increase in liquidity but it was not the same with nonbanking financial institutions which suffered a cumulative liquidity decline of 27.7% between 2007 and 2010. Nonbanking financial institutions were affected more in terms of liquidity decline during global financial crisis as compared to banks in India. Discount rates and SLR have a negative influence on liquidity for banks while an increase in cash reserve ratio has a positive influence on liquidity of banks. In regard to liquidity in non banking financial institutions it is observed that determining factors are only discount rates and cash reserve ratio.

Key words: Liquidity, bank regulation, financial system, Indian banks

Corresponding Author:

Introduction

Liquidity and its drivers are considered of major importance in financial stability of a country after the onset of global financial crisis in 2008. Banks and financial institutions in many countries struggled to maintain adequate liquidity during the global financial crisis. According to a study by Bank for International Settlement (2011), many central banks across the globe provided liquidity support to their financial institutions to prevent bank failures. European Central Bank, Bank of England and US Federal Reserve provided considerable amount of credit to banks after the start of global financial crisis in order to prevent systemic bank failure. Compared to other types of risks for financial institutions, liquidity risk is however not very well investigated in banking literature. The purpose of this paper is to identify and study the factors that affect the liquidity of Indian financial system.

According to Mohan (2006), conduct of monetary policy and liquidity management has proved to be very difficult for India after the financial liberalisation of 1991. Before 1991 monetary policy was not a major issue in India because exchange rate was controlled and most interest rates were fixed administratively, portfolio flows were not permitted and foreign direct investment was negligible in India. After the start of financial liberalisation in 1991, economy was opened, interest rates were deregulated and foreign exchange rates were allowed to be market driven. Liquidity management in Indian financial institutions has become critical due to fluctuations in exchange rates and volatility in interests due to financial liberalisation. Liquidity management in Indian financial system has become a challenging task for the Reserve Bank of India. According to Srinivasan and Gupta (2007), a considerable mismatch between assets and liabilities of banks exists in India and this mismatch has increased to -12% as a proportion of outstanding deposits and -8% as a percentage of outstanding total assets for the Indian banking system. Although banks in India have been able to manage their liquidity profile based on asset management guidelines of Reserve Bank of India, issues relating to liquidity management in financial system (including banks) are largely unknown as there has been no prior study on the liquidity management of Indian financial system. Therefore, the purpose of this paper is to examine the factors affecting liquidity management in entire Indian financial system for the period 1998 to 2010, using a unique data set on levels of liquidity in Indian financial system obtained from Reserve Bank of India.

Literature Review

The current literature on liquidity can be divided into many groups. The first group of papers address theoretical issues relating to liquidity management in banks. The first paper in this group is by BIS (2008) which lays down the principles of sound liquidity risk management by financial institutions. According to BIS (2008) liquidity is the ability of a bank to fund increases in

assets and meet liabilities as and when they become due. Every financial transaction or commitment to enter into any financial transaction has some implications for a bank's liquidity. Effective liquidity management consists of meeting cash flow obligations as and when they are due. Asserting that market turmoils can sometimes affect the liquidity management of financial institutions as it happened in 2007, the paper (BIS 2008) emphasizes the need for effective liquidity management and its supervision by regulators. The second paper by Bank for International Settlement (BIS, 2010) lays down the framework for liquidity risk management by banks and presents the reforms undertaken by BIS to strengthen the global capital and liquidity regulations. The purpose of this framework is to improve the banking sector's ability to absorb shocks arising from financial and economic stress. BIS has set two standards for funding liquidity through this framework. The first is the development of liquidity coverage ratios for improving short term resilience of bank's liquidity risk by ensuring that any bank has high liquid assets to meet its liabilities in short term. The second standard is about developing Net Stable Funding Ratio (NSFR) which will help in promoting resilience of a bank over a longer time period (time horizon of one year and above) and provide a sustainable maturity structure of assets and liabilities.

Rauch et al. (2009) examines the way in which macroeconomic factors and central bank's monetary policy influence the creation of liquidity in German saving banks from the period 1997 to 2006. They measure the liquidity created and its determination using GMM framework focusing on bank specific factors as well as macroeconomic factors and found that over the period from 1997 to 2006 the total amount of liquidity created in German saving banks increased by 51%. They also found that liquidity creation in German saving banks depend negatively on monetary policy indicators. A tightening of monetary policy induces the decrease in liquidity creation. However, this study did not find any bank specific factors to have any influence on liquidity creation. A paper by Uremedu (2009) studied liquidity creation in Nigerian banks from 1980-2005. Their study is based on analysis of time series data of financial system aggregates from 1980 to 2005 and used to evaluate the impact multiplier and liquidity ratings of Nigerian financial system using money market variables such as treasury bills, treasury certificates, eligible development stocks, certificate of deposits, commercial papers and bankers acceptance. Their results indicate that commercial papers had significant effect on bank liquidity followed by treasury certificates, eligible developmental stocks and treasury bills. They also found that commercial papers, treasury certificates, certificates of deposits and bankers acceptance had negative effect on bank liquidity ratio whereas treasury bills and eligible developmental stocks had a positive effect on bank liquidity ratio. The study recommends greater use of money market instruments to mop up excess liquidity in Nigerian financial system.

Aspachs et al. (2005) provide an analysis of determinants of UK banks' liquidity policy. They investigate how central bank's Lender of Last Resort (LOLR) policy may affect banks' liquidity. They test for liquidity moral hazard which arises when banks hold lower liquidity buffers than they otherwise

would when they expect to receive assistance from the LOLR and found strong evidence of liquidity moral hazard. They also found evidence to the effect that bank liquidity buffers are countercyclical. Banks appear to build liquidity buffers in periods of weak economic growth and draw buffers in periods of strong economic growth. The study revealed that that banks hold large buffers when short term rates are low and small buffers when short term rates are high. In their opinion, banks hoard funds when current profits are high and future lending opportunities are good. Banks have an incentive to increase their liquidity holdings in recession and decrease liquidity holdings in booms. In addition, they found that foreign owned banks in UK manage their liquidity centrally and that UK branches and subsidiaries of foreign owned banks use group internal capital market to raise funding as and when needed.

The study by Valla et al. (2007) presents an asset based measure of bank liquidity with the purpose of capturing and quantifying the dynamics of liquidity flows within French banking system between 1993 and 2005. They conclude that, on an average, positive flows of liquidity have been greater than negative flows of liquidity in French banking system resulting in net nominal liquidity flows growing by 1% every quarter between 1993 and 2005. Substantial liquidity expansion and contraction was observed to have taken place in the order of 6% to 5% per quarter implying an active market, trading beyond substantial growth in bank liquidity. It observes that this trading intensity has occurred in all market segments involved in liquidity trading which includes money market and capital markets. Large outflows occurred in 1996 and 2000 and increases in liquidity were noticed which later translated into negative liquidity adjustments.

Vodova (2011a) have identified determinants of liquidity of commercial banks in Slovakia. They identified four liquidity ratios and related them with bank specific and macroeconomic data over a period from 2001 to 2010 and found that bank liquidity dropped as a result of financial crisis. The study reveals that the share of liquid assets in total assets and liquid liabilities in deposits and short term funding decreases with bank profitability, higher capital adequacy and bigger size of banks. In their opinion big banks rely on the interbank market and on liquidity assistance of Lender of Last Resort (LOLR). Liquidity measured by share of loans in total assets and in deposits and short term borrowings increases with growth of domestic product. They did not find any significant relationship between interest rates on loans, interest rate on interbank transactions or monetary policy interest rates, interest rate margins, the share of non-performing loans and the rate of inflation with liquidity of Slovak banks.

A further study carried out by Vodova (2011) identified liquidity determinants of Czech commercial banks. This study found that the bank liquidity increases with higher capital adequacy, higher interest rates on loans, higher share of non-performing loans and higher interest rates on interbank transactions. Bank liquidity was observed to decrease with higher inflation growth rate and higher rate of gross domestic products. The relation between size of bank and its liquidity was observed to be ambiguous. Unemployment,

interest margin, bank profitability and monetary policy interest rates were observed to have no statistical significant effect on liquidity of Czech banks.

Bonfim and Kim (2011) observed the collective risk taking strategies on herding behaviour of banks in pre-crisis period, reflecting in a deterioration of liquidity indicators. They found significant peer effects only on largest banks. These largest banks are more likely to compete among themselves and engage in similar profit maximizing and risk taking strategies. The largest banks were found to be using sophisticated risk management tools and had access to more diversified funding resources. These banks were perceived to be more likely to be bailed out in case of distress as they were too big and interconnected. The study conclude that serious moral hazard problem in banks encourage excessive risk taking and underscores the need to regulate largest financial institutions.

In a study of liquidity of Tanzanian banks, Aikaeli (2006) have investigated the determinants of liquidity in commercial banks in Tanzania and found that an increase in the rate of required reserves lowers excess liquidity in Tanzanian banks. The factors that affect liquidity of Tanzanian banks in the long term include: volatility of cash preference, the bank borrowing rate, variation of loans returns or credit risks. The rise in any of the variables mentioned cause an increase in excess liquidity in commercial banks in Tanzania. In the short run excess liquidity decreases if banks manage to accumulate substantial quantity of liquidity in previous period. The liquidity is also affected by central bank reserve requirements. In the event of an increase in reserve requirements, commercial banks hedge by accumulating liquidity. If the bank borrowing cost increases, banks respond by accumulating more reserves in the form of liquid assets. Similarly volatility in loan returns also induces banks to keep excess reserves. Reserve requirement regulation was found to be effective in achievement of medium and long term policy objectives. It was found to be ineffective in short run and necessitates the need for central bank to be innovative in its credit and monetary policy.

Liquidity management in Indian context has not received much attention as there is hardly any literature on liquidity management in Indian financial system. Recently, Mohan (2006) identified issues relevant to liquidity management in Indian financial system. After the financial system reforms started in India in 1991, India was able to sustain capital inflows which helped Indian central bank to smooth out interest rates. Introduction of Liquidity Adjustment Facility (LAF) helped India to manage liquidity and reduce volatility in the capital flows and short term interest rates. India evolved Market Sterilisation Scheme (MSS) to sustain open market operations, which helped monetary authorities to manage liquidity cycles. Indian monetary authorities also developed instruments such as Collateralised Borrowings and lending Obligations, market repo, interest rate swaps, Certificates of deposits and Commercial papers which helped the central bank meet liquidity needs. The central bank has also undertaken has developed link between overnight interest rates and T-bills and liquid dated securities. The lending and deposit rates have also helped in mopping up excess liquidity in Indian financial

system. The central bank through its monetary policy has been able to exercise control over short term interest rates and reduce their volatility. In spite of many reforms, inflation rate in India remains a challenge for liquidity management. Also due to central bank operations moral hazard is an issue because some market players may take excessive risk in managing their own liquidity when LAF is available from central bank. Also Statutory Liquidity Ratio is being gradually reduced by Reserve Bank of India, some of the market players are not covered by SLR creating liquidity gaps in part of financial markets. The central bank—Reserve Bank of India (RBI)—has used Cash Reserve ratio (CRR), Statutory Liquidity ratio (SLR) and bank discount rate (bank rate) as instruments of liquidity management for a long time. Although these instruments have been used by central bank, their relationship with liquidity levels have not been studied in India. In another study, Srinivasan and Gupta (2007) have identified some of the problems of liquidity management in Indian banks. In their opinion, banks have used excess statutory liquidity ratio (SLR) to fund the credit growth. They observe that banks borrow short term and lend long term in India increasing the mismatch between assets and liabilities. Srinivasan and Gupta (2007) expect the dependence of banks on short term resources further as inflationary pressures may force central bank in India to use monetary measures to curb inflation. In a recent study, Mishra et al. (2012) have developed a systemic liquidity index (SLI) for India for the purpose of evaluating liquidity conditions in India. This systemic liquidity index is not specific to banks as it includes corporate sector parameters. They have included four components in their SLI namely: difference between call rates and repo rates, difference between commercial paper rate and certificate of deposit rate, implied deposit rate in forex market and expectation about the liquidity conditions in the form of overnight swap curve. The SLI was constructed to monitor trends in short term in systemic liquidity conditions.

As the preceding review on liquidity literature indicates, there is no prior study examining the liquidity conditions in India on a long term basis, understanding the dependence of liquidity measures on different policy and macroeconomic variables in India. Therefore, this study seeks to fill in the gap in the literature by studying the relationship between liquidity levels and other relevant variables in Indian context. The purpose is to evaluate how the liquidity conditions change over a long term horizon in relation to monetary policy measures.

Methodology

Liquidity risk has been measured by two methods in the academic literature. The first method is liquidity gap which is the difference between assets and liabilities at present and future dates. The second method uses various liquidity ratios. These liquidity ratios are various balance sheet ratios of banks and financial institutions which help in identifying liquidity trends. Liquidity ratios involve variables such as cash reserve, minimum required

reserve, government securities, holding liabilities such as deposits or borrowings. Vodova (2011), Moore (2010) and Rychtanik (2009) have used liquidity ratios in estimating liquidity risk.

In this study, we employed the liquidity positions of banking and non banking financial institutions provided by the Reserve Bank of India to examine the determinants of liquidity. These liquidity variables represent the dependent variables in the model and are defined below in accordance with the definition given by Reserve Bank of India (RBI, 1998).

NM3	=	Currency with public + demand deposits with the banking system + other deposits with Reserve bank of India + short term time deposits of residents + long term time deposits of residents + call/Term funding from financial institutions.
L1	=	NM3 + All deposits with post office saving banks
L2	=	L1+ Term deposits with term lending institutions and refinancing institutions + Certificate of deposits issued by financial institutions
L3	=	L2 + Public deposits of non-banking financial companies
		From these variables another variable was constructed to represent liquidity in non banking financial institutions
LNBFI	=	All deposits with post office saving banks + Term deposits with term lending institutions and refinancing institutions + Certificate of deposits issued by financial institutions + Public deposits of non-banking financial companies

These variables are available in Rupee amount over the period from 1998 to 2010. Since India has experienced considerable inflation during this period, the rupee amount was normalised for inflation by using consumer price index to obtain liquidity variables at constant prices. The new variables were named NM3C, L1C, L2C, L3C and LNBFIC.

Various studies have used bank specific and macroeconomic variables as determinant of liquidity. Liquidity ratios are assumed to be dependent on following factors:

● Interest margin as a measure of opportunity cost (Aspach et al. 2005)
● Gross domestic product growth (Aspach et al. 2005; Fielding 2005; Gunsel 2008)
● short term interest rate (Aspach et al. 2005)
● interbank rate (Lucchetta 2007)
● Rate of inflation (Vodova 2011; Gunsel 2008)
● exchange rate regime (Gunsel 2008)
● lending interest rate (Lucchetta 2007)

- discount rate (Fielding 2005; Rauch 2009; Lucchetta, 2007)
- Reserve requirement (Fielding 2005)
- cash to deposit ratio (fielding 2005)

A number of independent variables were evaluated for the dependence of liquidity level on macroeconomic variables. These are: Share price index, Call rate, discount rate, lending rate, cash Reserve ratio, Statutory Liquidity Ratio, Exchange rate, Foreign exchange reserve, Gross domestic product, rate of inflation. Data on these variables were obtained from Reserve Bank of India (2012) and International Financial Statistics (2012). The result of univariate analysis reveals that there is high correlation among many of these variables. Therefore, three variables which did not have any significant correlation were used to study the dependence of liquidity levels. This helped us in minimising the possible correlations and bias among the relevant variables. The results obtained from the regression are discussed in the next section.

Results and Discussion

The purpose of this study is to investigate the determinants of liquidity in Indian financial system based on the data for the period from 1998 to 2010. The data set is defined in the previous section and consists of five variables NM3C, L1C, L2C, L3C and LNBFIC. NM3C and LNBFIC represent the liquidity levels in banking and nonbanking financial institutions respectively whereas L1C, L2C and L3C are combinations of various liquidity levels as defined in the previous section. Fig 1 shows the % change in NM3C, the liquidity levels in India from 1998 to 2010 and Fig. 2 shows the percentage change in LNBFIC from 1998 to 2010. The average increase in liquidity in banks as measured by NM3C was observed to be 2.77% per quarter from 1998 to 2010. The average increase in liquidity in non banking financial institutions from 1998 to 2010 was observed to be 1.13% per quarter.

A comparison of Fig 1 and Fig 2 suggests that banking institutions in India have suffered decline in liquidity of about 1 % in 2004, 1% in 2006 and almost 3% in 2009-2010. The last decline was as a result of global financial crisis. In comparison, non banking financial institutions have suffered liquidity decline of about 2% in 2001, about 0.5% in 2006 and continuous liquidity decline from 2007 to 2010. In all cases for banks, periods of liquidity decline were followed by periods of increase in liquidity but it was not the same with nonbanking financial institutions which suffered a cumulative liquidity decline of 27.7% between 2007 and 2010. Nonbanking financial institutions were affected more in terms of liquidity decline during global financial crisis as compared to banks in India. Non-banking financial institutions are, therefore at a risk of getting into liquidity problems in India.

Fig. 3 gives the ratio in % terms of liquidity levels in nonbanking financial institutions as compared to liquidity in banks. From Fig. 3, it is observed that liquidity levels in nonbanking financial institutions have declined in percentage

terms relative to banks from about 5.5% in 1998 to about 2.5% in 2010. The average ratio of liquidity in nonbanking financial institutions to liquidity in banks was 4.52% from 1998 to 2010. After 2006, this ratio has declined from 4.98% in 2006 to 2.57% in 2010 indicating that liquidity in nonbanking financial institutions declined considerably relatives to banks in India from 2006 to 2010.

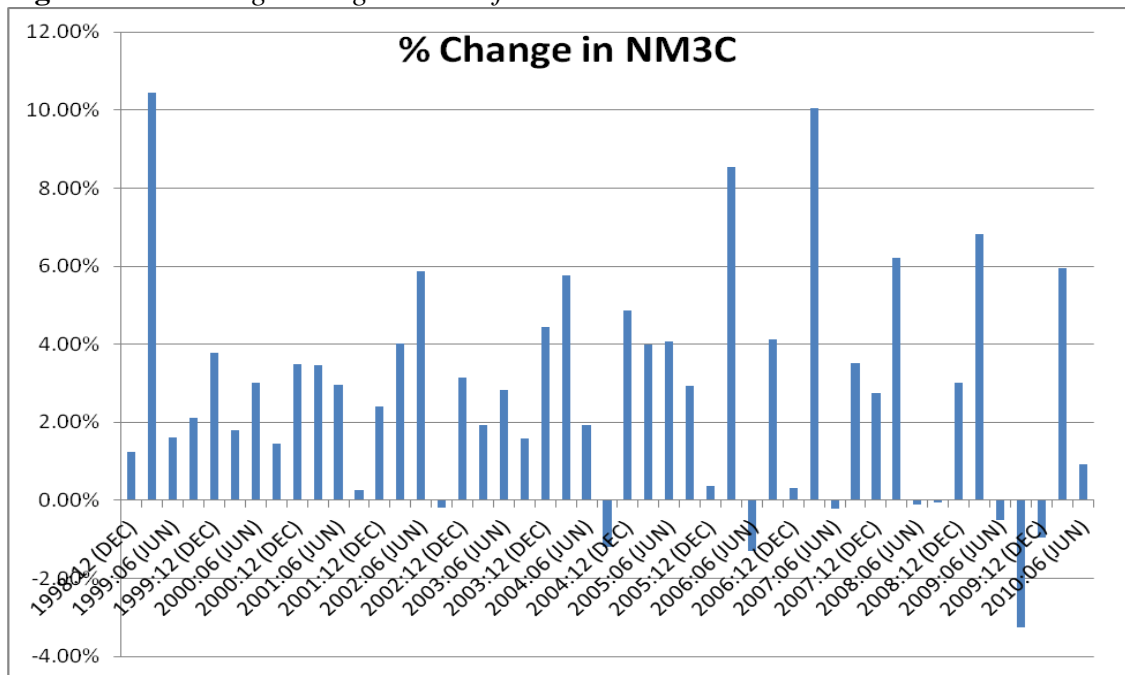**Figure 1.** *Percentage change in NM3 from 1998 to 2010*

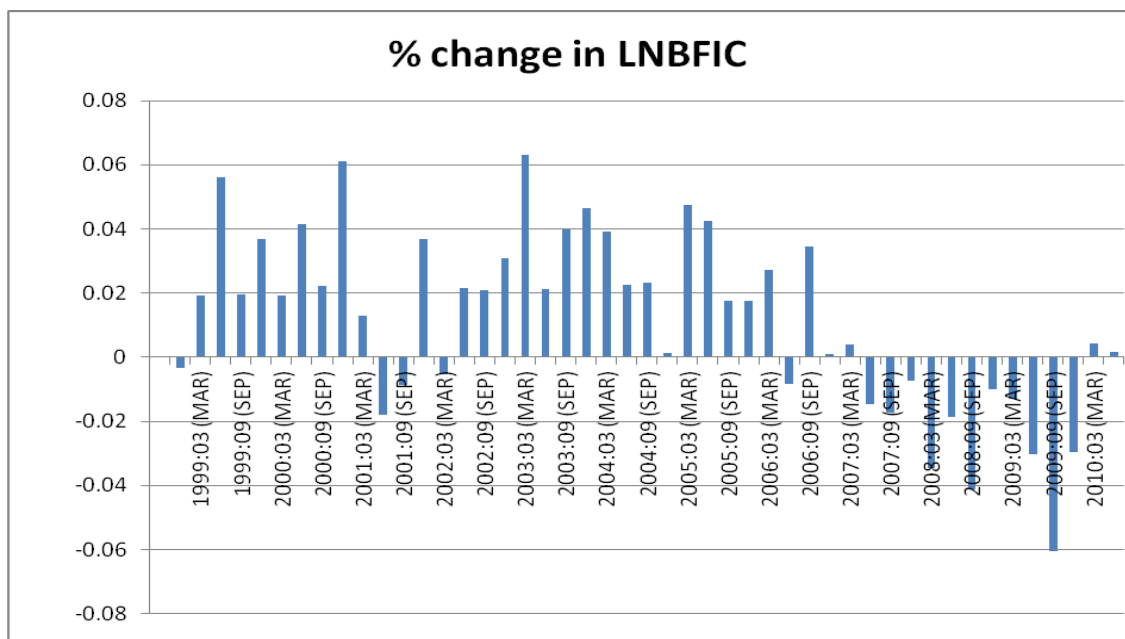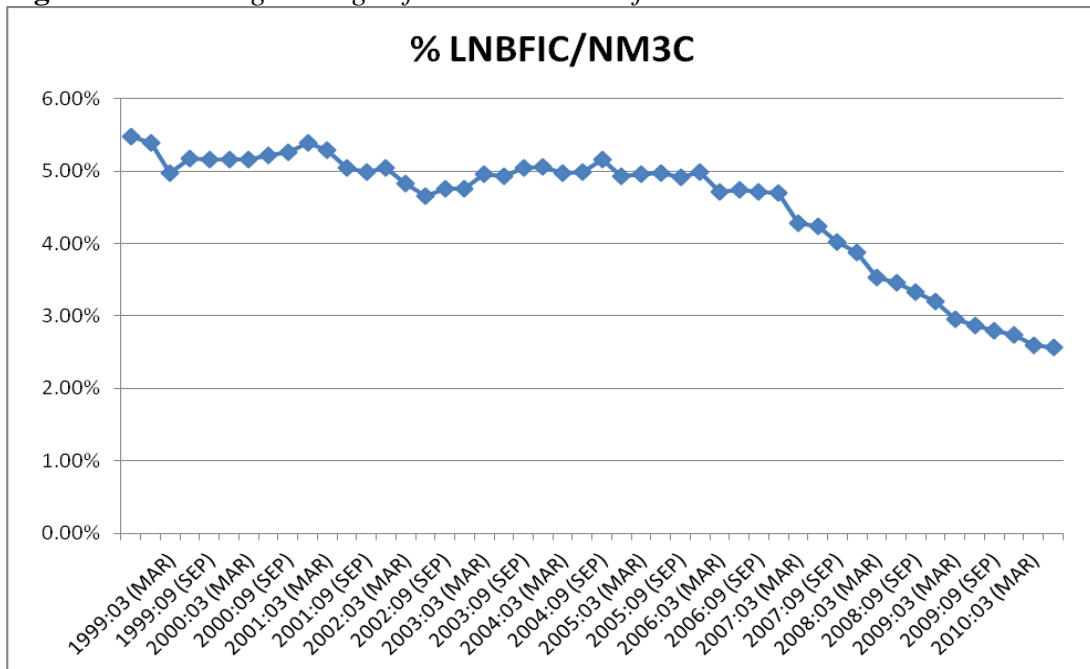**Figure 2.** *Percentage change in LNBFIC from 1998 to 2010*

Figure 3. *Percentage change of LNBFIC/NM3C from 1998 to 2010*

These results for India are similar to those of Rauch et al. (2009) for German banks who concluded that the development of liquidity in German banks over time was positive increasing by over 50% from 1997 to 2010. Our results also agree with those of Valla et al. (2007) who suggested that positive flows were greater than negative flows of liquidity in French banking system.

Table 1 shows the results of regression estimates for each of the liquidity variables defined in previous section. The aim is to find a model which has a highest coefficient of determination and simultaneously the variables are statistically significant. From table 1 it can be seen that while NM3C, L1C, L2C, L3C are determined by discount rate, SLR and CRR, LNBFIC is determined by discount rate and CRR only. The explanatory power of the regression is high and signs of coefficient correspond with our expectations. Discount rates and SLR have a negative influence on liquidity for banks which is consistent with banking theory that a higher discount rates leads to increase in cost of borrowings and lending rates which result in banks increasing their lending portfolio and reduces the liquid assets. Similarly increase in Statutory Liquidity ratio by the central bank leads to more investment in securities by banks resulting in less availability of liquid assets. An increase in cash reserve ratio has a positive influence on liquidity due to increase in cash balances maintained by banks.

Table 1. *Determinants of liquidity measured by NM3C, L1C, L2C, L3C and LNBFIC*

	NM3C	L1C	L2C	L3C	LNBFIC
Constant	71115.21*	71831.96*	71682.54*	71612.10*	487.65*
	(10455.78)	(10633.18)	(10589.06)	(10576.03)	(26.194)
Discount Rate	-2317.92**	-2383.87**	-2375.75**	-2372.68**	-54.763**
	(241.96)	(246.07)	(245.09)	(244.74)	(6.903)
SLR	-2227.62**	-2236.72**	-2231.67**	-2228.07**	
	(421.90)	(429.06)	(427.28)	(426.76)	
CRR	599.70**	609.84**	608.16**	607.98**	8.813**
	(109.84)	(111.70)	(111.24)	(111.10)	(3.123)
No. of observations	48	48	48	48	48
R^2	0.782	0.785	o.785	0.785	0.726
Adjusted R^2	0.767	0.771	0.771	0.771	0.714
F-stat	52.53	53.61	53.69	53.64	59.58

Note: **, * significant at 1%,and 5% level respectively. Numbers in parentheses are standard errors

In regard to liquidity in non banking financial institutions determined by LNBFIC, it is observed that determining factors are only discount rates and cash reserve ratio. A higher discount rate leads to increase in cost of borrowings and lending rates which results in NBFIs increasing their lending portfolio and reduces the liquid assets. Although cash reserve ratio is not applicable to NBFIs in the same way it is applicable to banks, an increase in cash reserve ratio also helps in increasing the liquidity of banks but Statutory Liquidity Ratio has no influence on NBFIs.

These results are in agreement with those of Rauch et al. (2009) for German banks who found that liquidity creation in German banks depend negatively on monetary policy indicators. A tightening of monetary policy induces decrease in liquidity creation. These results are, however, in disagreement with those of Vodova (2011) for Czech banks who did not find any association between monetary policy interest rates and liquidity of Czech banks.

Conclusions

This study addresses two aspects of liquidity in the financial system of India. The first aspect relates to change in liquidity levels of banks and non-banking financial institutions of India. The second aspect relates to the determinants of liquidity in Indian financial system.

The average increase in liquidity in banks as measured was observed to be 2.77% per quarter from 1998 to 2010. The average increase in liquidity in non-banking financial institutions from 1998 to 2010 was observed to be 1.13% per quarter. Banks in India have suffered decline in liquidity of about 1 % in 2004, 1% in 2006 and almost 3% in 2009-2010. The last one was as a result of global financial crisis. In comparison, non-banking financial institutions have suffered liquidity decline by about 2% in 2001, about 0.5% in 2006 and continuous liquidity decline from 2007 to 2010. In all cases for banks, periods of liquidity decline were followed by periods of increase in liquidity but it was not the same with nonbanking financial institutions which suffered a cumulative liquidity decline of 27.7% between 2007 and 2010. Nonbanking financial institutions were affected more in terms of liquidity decline during global financial crisis as compared to banks in India.

It is observed that ratio of liquidity levels in nonbanking financial institutions have declined in percentage terms relative to banks from about 5.5% in 1998 to about 2.5% in 2010. The average ratio of liquidity in nonbanking financial institutions to liquidity in banks was 4.52% from 1998 to 2010. After 2006, this ratio has declined from 4.98% in 2006 to 2.57% in 2010 indicating that liquidity in nonbanking financial institutions declined considerably relatives to banks in India from 2006 to 2010. These results are similar to the previous research conducted by Rauch et al. (2009) for German banks and Valla et al. (2007) for French Banks, suggesting the development of liquidity over time was positive and positive flows were greater than negative flows.

The results of regression estimates for each of the liquidity variables suggest that discount rates and SLR have a negative influence on liquidity for banks. An increase in cash reserve ratio has a positive influence on liquidity of banks. In case of non-bank financial institutions, the determining factors of liquidity are only discount rates and cash reserve ratio. Statutory Liquidity Ratio has no influence on liquidity of NBFIs. These results are in agreement with those of Rauch et al. (2009) which suggests liquidity creation depend negatively on monetary policy indicators and a tightening of monetary policy induces decrease in liquidity creation. However, these results are in disagreement with those of Vodova (2011) did not find any association between monetary policy interest rates and liquidity in case of Czech banks.
This research is however limited by the use of consolidated liquidity parameters for banks and non-banking financial institutions obtained from Reserve Bank of India. Data of individual banks was not used and bank specific variables were not considered for this study.

References

Aikaeli, J. (2006), "Determinants of excess liquidity in Tanzanian banks", http://ssrn.com/abstract+971750. Accessed: June 12, 2012.

Aspachs, O., E.Nier and M. Tiesset (2005), "Liquidity, banking regulation and the macroeconomy: Evidence on bank liquidity holdings from a panel of UK-resident banks". Bank of England Papers, pp. 1-26.

Bank for International Settlements (2008), "Principles for sound liquidity risk management and supervision." Basel Committee on Banking Supervision.

Bank for International Settlements (2010), "Basel.III: International framework for liquidity risk measurement, standard and monitoring" Basel Committee on Banking Supervision.

Bank for International Settlements (2011), "Global liquidity – concepts, measurements and policy implications." Committee on the Global Financial System, CGFS Papers no. 45.

Bonfim, D. and M. Kim, (2011), "Liquidity risk in banking: Is there herding?' Banco de Portugal papers, September, pp. 1-32.

Fielding, D., (2005), "Shortland political violence and excess liquidity in Egypt" Journal of Development Studies Vol. 41, No. 4, pp.542-557.

Gunsil, N. (2008), "Micro and macro determinants of bank fragility in North Cyprus economy" International Research Journal of Finance and Economics, Issue 22, pp. 66-82.

International Financial Statistics (2012), Country Tables, India, Interest rates, Discount rates. Access dated 09/07/2012. Http://elibrary-data.imf.org.ezproxy. uow.edua.u/datareport.aspx?c=1449311.

Lucchetta, M., (2007), "What do data say about monetary policy, bank liquidity and bank risk taking?" Economic notes by Banca Monte Dei Paschi di Siena Spa, Vol. 6, No. 2, pp. 189-203.

Mishra, R.N., G.Jagan Mohan and S.Singh (2012), "Systemic liquidity index for India" Department of economics and Policy Research, Reserve Bank of India, RBI working paper Series 10/2012.

Mohan, R. (2006), "Coping with liquidity management in India: A practitioner's view", paper presented at Eighth annual conference on money and finance in the Indian economy, Indira Gandhi Institute of Development Research. Pp. 1-20.

Moore, W. (2010), "How do financial crisis affect commercial bank liquidity? Evidence from Latin America and Caribbean" MPRA paper no. 21473, March 2010.

Rauch, C. (2009),, S.Steffen, A.Hackethal and M.Tyrell, "Saving bank, liquidity creation and monetary policy"

Reserve Bank of India (1998), " Monetary statistics", Manual on financial and banking statistics: part 1: Financial statistics.

Reserve Bank of India, (2012), "Database on Indian economy" Department of Statistics and Information management, data Profile (Version 2012.20), http:// dbie.rbi.org.in?DBIE Access date 3July 2012.

Rychtarik, S., (2009), 'Liquidity scenario analysis in the Luxemburg banking sector", BDCL working paper no. 41.

Srinivasan, K. and V.Gupta (2007), "Liquidity management in banks - An increasingly complex affair" ICRA Rating Feature, February, pp.10.

Uremedu, S.O. (2009), "Determinants of financial system liquidity (1080-2005): Evidence from Nigeria" Annals of University of Bucharest Economic and administrative Series No. 3, pp. 123-137.

Valla, N., B.Saes-Escorbiac and M. Tiesset (2006), "Bank liquidity and financial stability", Banque de france Financial Stability Review, pp. 89-104.

Vodova, P. (2011), " Liquidity of Czech commercial banks and its determinants'
International Journal of Mathematical Models and Methods in Applied Sciences,
Vol. 5, p. 1060-1067.

Vodova, P. (2011a), "Determinants of commercial bank liquidity in Slovakia" Paper
prepared for Czech Science Foundation (Project GACR P403/11/P243).