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Estimating Liquidity Created by Banks in Pakistan

Sabahat

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Estimating Liquidity Created by Banks in Pakistan

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Abstract

The saving-investment facilitation, the core function of the banking system results in liquidity creation. The on-balance sheet and off-balance sheet activities of banks play a vital role in liquidity provision: banks create liquidity while actively managing their portfolios of assets and liabilities of different maturities. This study attempts to measure the liquidity created by Pakistan's banking system using methods employed by Berger and Bouwman (2009). Four measures LIC-C1, LIC-C2, LIC-T1 and LIC-T2 have been constructed for banks. We also group banks according to their size. Analyses of these measures indicate that, compared to other measures, the LIC-C1 measure records the highest amount of liquidity created during Sep07-Jun16. In absolute terms, liquidity of Rs 2.55 trillion was created at the end of Jun 2016, equal to 16.5 percent of the total assets of the banking industry. Further, a disaggregated analysis shows that most of the participation has come from large banks; medium sized banks' ability remained subdued, whereas the group of small banks performed well in liquidity provision.

Keywords: Liquidity Creation, Banking System, Balance Sheet
JEL Classification Codes: G10, G21, E50, E58

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Non-technical Summary

The importance of banking system is well documented; banks serve economic system by channelizing savings to potential investments. Banks also act as agents and fulfill long term borrowing needs from short term financing. The financing of liquid liabilities from illiquid assets is called liquidity creation and in this process banks generate economic value. While creating liquidity, banks deal with asymmetries in liquidity needs of borrowers and lenders of funds and fulfill their borrowing and lending needs: banks facilitate smooth consumption and uninterrupted production respectively. It is also imperative to draw a clear distinction between the term of 'liquidity creation' and bank's own liquidity. A bank may create excessive liquidity in the market by transforming its short-term liabilities into long-term loans, but at the same time, its own balance sheet may become more illiquid. The reverse may be true for another bank, which could not perform well in the liquidity market, but its balance sheet is fairly liquid.

There are different views about how to gauge the liquidity creation of the banking system. In some studies the size of created liquidity is measured through the asset size of balance sheet and in others through the liability side. More recent studies account for the overall balance sheet of the banking system. Most of the literature dealt with the banking system of developed or advance economies; however any empirical measurement for the developing countries like Pakistan is missing. Conventionally, the liquidity profile of banks' balance sheet is tried to be gauged by some variables, such as bank loans, liquid assets to total assets, loans to deposit ratio, and maturity profile of bank's assets or liabilities.

This study estimated four different measures of liquidity creation for Pakistan's banking system i.e., LIC-C1, LIC-C2, LIC-T1 and LIC-T2[1]. These measures are computed following Berger & Bouwmen (2009) approach. This study found that banks in Pakistan created the largest liquidity if estimated using LIC-C1 measures. While using this measure, liquidity of Rs 2.55 trillion was created at the end of June 2016, compared to Rs 1.4 trillion recorded at the end of June 2007. For three of these measures, bank wise analyses suggested that the liquidity creation in absolute rupee terms is directly related to the size of gross total assets (GTA); the groups having higher GTA contributed the most in liquidity creation and vice versa.

In the end, I explored the link between (conventionally used) liquidity ratios of banks and the liquidity by the banks in the market as estimated in this study. A negative association between liquidity creation and banks' 'own liquidity' was found. There is a need to further explore the links between the liquidity created by the banks and variables of policy interest like inflation, economic growth and banking soundness for the case of Pakistan economy.

[1] LIC stands for liquidity creation measure. The measures differ on the basis of classification of advances and inclusion/exclusion of off-balance sheet activities. The term 'C' refers to category wise classification of advances, whereas 'T 'denotes the maturity wise classification of advances. Similarly '1' represents inclusion of off-balance sheet activities and '2' shows exclusion of off-balance sheet activities.

1. Introduction

A well functioning banking system is considered as an engine of economic growth. Banks channelize savings from resource rich segments of the society to resource starved segments and thus facilitate both savers and investors. In addition, banks facilitate the payment system and settle day to day transactions in the economy. During the process of intermediation banks create liquidity, the term first defined by Diamond and Dybvig (1983). According to their definition, liquidity creation is a process through which banks finance liquid liabilities from illiquid assets. In other word, liquidity creation by a bank is its ability to meet financial obligations when they come due, for instance bank issues the demand deposits which can be withdrawn at any moment and offers loan facilities to its borrowers committed for a specific time period. In the course of liquidity provision on the liability side and (mostly) illiquidity assurance on the asset side, bank creates benefits for both depositors and borrowers (Deep & Schaefer 2004). This shifting of resources facilitates smooth consumption and uninterrupted production respectively, thus by functioning as liquidity transformers, bank generate economic value. Due to its great significance for the economic system, liquidity creation has been considered as a core function of the banking system (Bouwman 2013).

As a core function of banks, the computation of notional amount of liquidity creation remained as a topic of interest among researchers. In theoretical literature different ideas have been presented to measure the monetary value of liquidity creation by the banking system. Some papers have assessed importance of liability side of the balance sheet, whereas others have focused on the asset side. Diamond and Dybvig (1983) emphasized on the banks' deposit taking, a major activity on the liability side of balance sheet. On the other hand, Deep and Schaefer (2004) assessed the importance of both sides of the balance sheet (in terms of assets and liabilities) in the liquidity creation. Going one step further, Kashyap et al.(2002) suggested that off balance sheet items such as loan commitments and similar claims to liquid funds of a bank may also contribute in liquidity creation. Among the latest, Berger and Bouwman (2009) created four measures of liquidity creation especially for the US banking systems.[2] These measures incorporate all balance sheet items such as loans, deposits, other assets & liabilities and off-balance sheet categories like guarantees, commitments and derivatives. These four measures differ on the basis of asset categorization and inclusion/exclusion of off balance sheet items and compute the notional level of liquidity creation for the whole banking system.

Presently, economic literature is in developmental process in creating meaningful links among liquidity creation and variables of policy interest for instance inflation, unemployment and investment etc. However, computation of notional level of liquidity creation is considered as the best available measure of total bank output as it incorporates all balance sheet items[3]. Berger and Sedunov (2016) have proved that the liquidity creation measure (LC) is a statistically and economically significant determinant of per capita GDP, whereas total assets and GTA do not explain the economic output.

Though, the liquidity creation is positively linked with economic growth, a very high level of liquidity might put pressures over the solvency of the banking system. In process of liquidity creation, banks have to deal with some important issues for instance, maturity mismatches between assets and liabilities, premature withdrawing of deposits, and information asymmetries. While dealing with all these issues, banks might expose themselves to multiple risks and put questions over their own

[2] Despite the fact that the importance of liquidity creation by banking industry is well documented, we are aware of only two papers that incorporated any empirical measurement of liquidity creation i.e., Deep and Schaefer (2004) and Berger and Bouwman (2009).

[3] Previously, literature focused on Gross Total Assets (GTA) as an indicator for financial development.

solvency[4]. A bank may create excessive liquidity in the market by transforming its short-term liabilities into long-term loans, but at the same time, its own balance sheet may become more illiquid (having more short term deposits and longer term loans). The reverse may be true for another bank, which could not perform well in terms of liquidity creation, but its balance sheet is fairly liquid (having more long term deposits and short term loans). In the first scenario banks create liquidity in the market but at the same time expose themselves to more risks, whereas in the second case banks are destroying the liquidity but taking less risk on their balance sheet. Both of these scenarios might have some repercussions for the economic system. An economy would suffer if banks decline to finance the long term projects, in order to attain more solvency, and conversely the whole financial system might face amplified risk if most of their asset portfolio is comprised of long term illiquid investments and loans[5,6].

As discussed earlier, the concept of empirical measurement of liquidity creation is relatively new, and studies, which adopted the measurement techniques of Deep and Schaefer (2004) and Berger and Bouwman (2009), are mostly confined to the banking system of US and European countries. However, literature is devoid of any empirical measurement of liquidity creation for the banking system of Pakistan[7]. The lack of appropriate measure opened up some caveats regarding the liquidity creation capacity of the banking sector in the country. As a consequence, there are some questions which require proper explanation, including: i) what is the size of overall liquidity created by the banking industry in Pakistan, ii) which bank performs well in liquidity creation and which destroys it, and iii) how does the created liquidity vary in different groups of the banking system?[8]

The principal objective of this study is therefore to estimate comprehensive measures of bank liquidity creation for the banking industry of Pakistan and to answer above questions. These measures have been constructed as in Berger and Bouwman (2009), by combining different items related to on-balance sheet and off-balance activities of banking industry. Quarterly balance sheets for all the banks from June 2007 till June 2016 are used in the study. Once the actual size of the liquidity creation is computed, the study would explore as to which banking group created the highest amount of liquidity

[4] It is imperative to draw a clear distinction between the term of 'liquidity creation' and the bank's own balance sheet liquidity, both these concepts should not be treated as same. According to Elliott D. J. (2014) Banks' own liquidity is defined as a measure of its ability to readily find the cash it may need to meet demands upon it. Most of the time the own liquidity of banks is gauged by liquid assets to total assets', 'loans to deposit ratio' statutory liquidity ratios (SLR), and maturity profile of bank's assets or liabilities.

[5] To minimize the associated risks of liquidity creation, BASEL has introduced two new ratios i.e. 'Liquidity Coverage Ratio (LCR)' and 'Net Stable Funding Ratio (NSFR)'. According to BIS, the LCR supports the short-term resilience of the liquidity risk profile of banks. It ensures that banks have sufficient stock of high-quality liquid assets which can be converted easily and immediately into cash to meet their liquidity needs for a 30 calendar day liquidity stress scenario. The NSFR requires banks to maintain a stable funding profile in relation to the composition of their assets and off-balance sheet activities. It can be defined as the amount of available stable funding relative to the amount of required stable funding; the ratio should be equal to at least 100% on an on-going basis (BIS (2011)).

[6] The level of liquidity creation, a bank can undertake, for a given level of exposure to associated risks would be an inspiring research area especially for the Pakistan's banking system. The estimation of such a liquidity creation level is quite recent concept and so far only one study, Roulet (2011), estimated the level of liquidity creation for European and US banking system given the level of maturity transformation risk. Roulet (2011) used the net stable funding ratio as a maturity transformation risk indicator.

[7] Rather the liquidity profile of banks' balance sheet is tried to be gauged by some variables, such as bank loans, 'liquid assets to total assets', 'loans to deposit ratio' SLR', and maturity profile of bank's assets or liabilities. Where? some reference?

[8] When the literature is deficient in primary research, it would not be possible to explore some of the advance stage issues such as, what amount of liquidity a bank should create given its specific risks and how the liquidity creation is affected by different banking and economic variable?

and which group destroyed it most, and how it varies across the different banking groups. The paper would also analyze the links between liquidity ratios of banks and their created liquidity in the market.

In this study, four different measures of liquidity creation have been estimated by using a three-stage procedure, as employed by the Berger and Bouwman (2009). In step 1, all on-balance sheet and off-balance sheet activities are classified as liquid, semi-liquid, or illiquid; the classification is based on the ease with which banks and customers acquire their funds and dispose their commitments. In step 2, different weights are assigned to the activities classified in step 1; the weights are either +1/2, 0 or -1/2, depending upon liquidity feature associated with the given activity. In step 3, all the on-balance sheet and off-balance sheet activities are combined to construct the desired liquidity creation measures. These measures are differentiated based on classification of loans and inclusion and exclusion of off-balance sheet activities. For instance, the measures which classify the loans categorically are termed as "C" and those which classify them maturity wise are termed as "T". Similarly, "1" refers to measures, which include off-balance sheet activities, where as "2" shows the exclusion of off-balance sheet activities. Finally, four liquidity creation measures named as LIC-C1, LIC-C2, LIC-T1 and LIC-T2 are formed on the methods employed by Berger and Bouwman (2009)[9].

Analysis of measures revealed that most of the liquidity is recorded when measured by LIC-C1 measure, whereas LIC-T2 recorded least liquidity creation during June 2007-June 2016. As on Jun 2016, liquidity of Rs 2.55 trillion was created in banking industry by employing LIC-C1 measure which is 79.0 percent higher as compared to liquidity created in June 2007. Among all, liquidity creation remained higher for those measures which include off–balance sheet activities (LIC-C1, LIC-T1), relative to those measures which excluded them (LIC-C2, LIC-T2).

Based upon Gross Total Assets (GTA) of banks, the sample set has been divided into three groups: banks with GTA of more than Rs 600 billion are classified as, 'Large banks', between Rs. 100 billion and Rs. 600 billion as 'Medium banks' and those with GTA up to Rs 100 billion are considered as 'Small banks'. For all four measures, the group of large banks outperformed other two groups by creating the highest level of liquidity in rupee terms during the period.

The remainder of this study is organized as follows. The next section describes the construction of liquidity creation measures in the light of existing literature. Section 3 briefly discusses the data set of Pakistan's banks over June 2007 to June 2016. Section 4 analyzes how different individual banks created liquidity over time and over the cross section of banks and finally what is the link between liquidity ratios of banks and their created liquidity in the market. In this section, paper also discusses significance of estimated liquidly measures in analyzing behaviour of some variables of interest like inflation and real economic activity. The paper is concluded in section 5.

2. Estimation of Liquidity Indices

As discussed earlier, Deep and Schaefer (2004) is the first study which attempted to construct a metric for measuring liquidity creation by banks. Using a sample of two hundred large US banks, they have argued that measuring liquidity transformation requires a determination of the extent to which the liquidity of a bank's assets differs from the liquidity of its liabilities. They captured the difference between liquid liabilities and liquid assets as a percentage of total assets and called it Liquidity Transformation gap (or LT Gap). According to them, LT Gap indicates the net amount of liquidity

[9] These measures were named as CAT-FAT, CAT-non FAT, MAT-FAT and MAT-non FAT in the pioneer article of Berger and Bouwman (2009). To have more clarity these measures are renamed as LIC-C1, LIC-C2, LIC-T1 and LIC-T2 in this study.

transformation a bank undertakes as a fraction of total assets that it holds. In formulation of LT Gap, they categorized assets and liabilities according to their maturity profile and explicitly excluded loan commitments and other off-balance sheet activities because of their contingent nature.

Berger and Bouwman (2009) constructed a more comprehensive measure of liquidity creation and included large, medium, and small US banks in their sample. Their empirical work had an edge over the LT Gap as formulated by Deep and Schaefer (2004) in two ways. First, Berger and Bouwman (2009) classified loans by category (CAT), rather than by maturity in their preferred LIC-C1 liquidity creation measure, as compared to maturity wise classification of loans by Deep and Schaefer(2004). Second, Burger and Bouwman(2009) included off-balance sheet activities in their preferred measure, whereas Deep and Schaefer (2004) using LT Gap excluded all of these.

This study will employ four measures of liquidity creation developed by Berger and Bouwman (2009). The construction is based on three-step procedure. All on-balance sheet and off-balance sheet activities are classified as liquid, illiquid and semi liquid in first step. For instance, classification of assets as liquid semi liquid and illiquid is based on the degree of ease with which banks can immediately liquidate their assets without incurring significant loss to their values. Using same intuition, banks' liabilities and equity are classified as liquid, semi liquid and illiquid based on the degree of ease with which depositors may withdraw their deposits without incurring any penalty. Off-balance sheet guarantees are classified consistently with treatments of functionally similar to on-balance sheet items.

All of the activities, other than advances, are classified according to their category(C) as well as on their maturity (T) profile. Advances are classified either on their maturity (T) or on their category (C) basis, because maturity wise segregation of particular categories of advances is not available; hence it distinguishes LIC-C and LIC-T indices of liquidity creation.

On the category basis, some advances are termed as illiquid, because these items typically cannot be sold quickly without incurring a major loss, for example, in case of Pakistan all commercial loans, agriculture loans, commodity financing to private sector, and other loans. Other loans such as consumer loans and commodity financing to public sector are considered here as semi-liquid. Since these loans are easy to scrutinize, in particular that of government entities, therefore they are considered as informationally transparent. A detailed description of category-wise classification of assets can be viewed in Table1.1. On the maturity profile, shorter maturity loans are considered as more liquid than long-term loans. Similar to Berger and Bouwman (2009), all loans having maturity of more than one year are classified as illiquid and those having maturity of up to one year as semi-liquid , no loan has been classified as liquid loans.

In assets other than advances, certain types of assets such as investment in subsidiaries, intangible assets and capital work in progress are considered as illiquid, because banks cannot immediately liquidate these assets without incurring a loss. On the other hand, cash and balance with treasury and other banks are classified as liquid assets because banks can use these assets to meet liquidity needs quickly.

On the liability side of balance sheet, host of accounts, for example current deposits, are classified as liquid, because customers can quickly withdraw these deposits without paying any penalty, similar is the case with Repo and Call borrowing by banks. Liabilities which can be withdrawn with slight difficulty or penalty are considered as semi liquid, such as saving and time deposits and other borrowed money etc. Long-term liabilities, which cannot be withdrawn easily or quickly without a

major loss, are classified as illiquid, for example subordinated loans and deferred taxes etc. Table 1.2 gives a more detailed description of classification of liabilities under liquid, illiquid and semi liquid categories.

On the same intuition as Berger and Bouwman (2009), equity is classified as illiquid because of its long maturity profile. Moreover, once invested in the equity, investors cannot demand liquid funds from the bank. This argument also holds for banks' equity in Pakistan; all components of the equity are categorized as illiquid, whether they are reserves, share holders' equity or share capital.

Finally, rationale for inclusion of off-balance sheet activities in construction of liquidity creation measures has come from Kashyap et al. (2002) who suggest that banks may also create significant liquidity off the balance sheet, through loan commitments and similar claims to liquid funds. Direct credit substitutes as well as commitments are considered as illiquid guarantees. According to Berger and Bouwman (2009) these items are functionally similar to on-balance sheet business loans as these are obligations and are illiquid from banks' point of view; except in very unusual circumstances, when the bank must provide funds to customer upon demand.

After classification, weights are assigned to all on-balance sheet and off-balance sheet activities. Banks create liquidity whenever they offer the long term illiquid advances to public and in return public offers them liquid deposits. Following this intuition, as discussed in Berger and Bouwman (2009), positive weights are assigned to illiquid assets and liquid liabilities; whenever the later (for instance current deposits) are used to finance the former, liquidity is created. In contrast, negative weights are assigned to illiquid liabilities and liquid assets, as both activities are destroying liquidity on the banking balance sheet.

According to Berger and Bouwman (2009) the magnitude of the weights are based on the assumption of adding up constraints, i.e., when the bank transform 1 unit of liquid liability into 1 unit of illiquid assets, 1 unit of liquidity is created. In contrast to this when 1 unit of illiquid liability is used to finance 1 unit of liquid asset, liquidity is destroyed by 1 unit. Based on said explanation, they assigned a weight of +½ to both illiquid assets and liquid liabilities and a weight of -½ to both liquid assets and illiquid liabilities. Semi liquid assets and semi liquid liabilities get the weight of 0 as both of the activities play no part in creation of liquidity. For equity and off-balance sheet activities similar intuition is applied where equity is weighted by -½ and off balance sheet activities are weighted by +½.

Finally, for construction of liquidity creation measures, all activities are combined together to form four measures of liquidity creation. These measures named as, LIC-C1, LIC-C2, LIC-T1 and LIC-T2 are different from each other on the basis of classification of loan categories and inclusion or exclusion of off-balance sheet activities. For example, in LIC-C measures loans are classified according to their assigned category, whereas in LIC-T measures classification of loans is based on their maturity profile. Similarly, measures '1' include off-balance sheet activities; whereas measures '2'exclude them. As shown in Table 1.3, weights of+1/2, - 1/2 and 0 are multiplied with Rupee amount of balance sheet activities classified in Table 1.1 and 1.2. These weighted Rupee amounts are then added together to find out the Rupee value of liquidity creation by an individual bank. Finally, the liquidity value for entire banking industry is calculated by adding Rupee values of individual banks.

Table 1.1: Category Wise Classification of Assets

Liquid Assets (weight = -1/2)	Cash			Local Currency Foreign Currency Cash in Transit Prize Bonds Gold + Silver
	Balances with other banks			Current accounts with other banks in Pakistan Deposit accounts with other banks in Pakistan Current accounts with other banks outside Pakistan Deposit accounts with other banks outside Pakistan Balance with co-operative banks Balance with NBFIs - Inside Pakistan
	Balance with treasury bank	SBP		Local currency (Current + Deposit) Foreign currency (Current + Deposit) Other balances
		NBP		Local currency (Current + Deposit) Foreign currency (Current + Deposit)
		With other central banks		With other central banks
	Investment (regardless of maturities)			Investment (Regardless of maturities)
	Lending to financial inst.(Included only repo and call)			Repo lending Call lending
Illiquid Assets (weight = 1/2)	Advances	Commercial loans	Fixed investment	Fixed investment provided to public companies in corporate and commercial sector Fixed investment provided to private companies in corporate and commercial sector Fixed investment provided to public companies in SMEs sector Fixed investment provided to private companies in SMEs sector
			Working capital	Working capital other than trade finance provided to public companies in corporate and commercial sector Working capital other than trade finance provided to private companies in corporate and commercial sector Working capital other than trade finance provided to public companies in SMEs sector Working capital other than trade finance provided to private companies in SMEs sector
			Trade financing	Trade finance provided to public companies in corporate and commercial sector Trade finance provided to private companies in corporate and commercial sector Trade finance provided to public companies in SMEs sector Trade finance from own source & SBP refinance provided to private companies in SMEs sector
		Agriculture loans		Agriculture loan-public sector Agriculture loan- private sector
		Commodity financing to private sector		Cotton Rice Sugarcane Wheat Others
		Other Loans		Others-public sector Others- private sector
	Assets other than advances			Investment in subsidiaries, Intangible assets, Capital work in progress, Property & equipment, Deferred tax assets, Other assets
Semi Liquid Assets (weight=0)	Advances	Consumer loans		Credit cards- private sector Auto loans- private sector Consumer durable-private sector Mortgage loans- private sector Other personal loans- private sector Staff loans- housing finance Staff loans- other than housing finance- private sector
		Commodity financing to public sector		Cotton Rice Sugarcane Wheat Others
	Assets other than advances	Lending to financial Inst.(other than repo and call)		Other landings - to banks Other landings - to DFIs Other landings - to Financial institutions other than scheduled banks and DFIs

Table 1.2: Classification of Liabilities, Equity and Off-Balance Sheet Activities

Liquid Liabilities (weight = 1/2)	Deposits	Current deposits	Current accounts - remunerative - customers Current accounts - non-remunerative - customers Others - customers Remunerative deposits - financial institutions Non-remunerative deposits - financial institutions Total current deposits
	Bills payable		Bills payable
	Borrowing fromfinancial Inst.(included only repo and call)		Repo Borrowing Call borrowing
Semi-Liquid Liabilities (weight = 0)	Deposits		Saving deposits Time deposits
	Other borrowed money	From other than SBP	Borrowing from financial iInstitutions Borrowing from DFIs. Borrowings From subsidiary companies, modarabas & associated undertakings- secured Borrowings from government Borrowings from directors (including chief executive) of the Bank-secured Overdrawn nostro accounts Borrowings from financial institutions- DFI-secured Other secured borrowing Others unsecured borrowings
		From SBP	Under export refinance scheme Against usance bills Against FE-25 deposits Others
Illiquid Liabilities (weight=-1/2)			Subordinated debt Deferred taxes Other liabilities
Equity (weight = -1/2)	Shareholders' equity	Share capital	Share capital held - fully paid in cash Share capital held - issued as bonus shares Share capital held - issued for consideration other than cash Head office capital account (for bank incorporated outside Pakistan)
		Reserves	Capital reserves Statutory reserve Revenue reserve
		Un-appropriated profit	Un-appropriated profit
Off-Balance Sheet Guarantees (weight = 1/2)	Direct credit substitute		
	Commitments	In respect of forward lending	Forward call lending Forward repurchase agreement lending Commitments to extend credit Others
		In Respect of Forward Exchange Contracts	Purchase Sale
		In respect of Operating Lease	
		For the acquisition of operating fixed assets	
		Other commitments	

Table 2: Computation of Liquidity Creation Index

1)	**LIC-C1**[a] = + ½ * illiquid assets	+ 0 * semi-liquid assets	– ½ * liquid assets	
		+ ½ * liquid liabilities	+ 0 * semi-liquid liabilities	– ½ * illiquid liabilities
				– ½ * equity
				+ ½ * illiquid guarantees
2)	**LIC-C2**[a] = + ½ * illiquid assets	+ 0 * semi-liquid assets	– ½ * liquid assets	
		+ ½ * liquid liabilities	+ 0 * semi-liquid liabilities	– ½ *illiquid liabilities
				– ½ * equity
3)	**LIC-T1**[b] = + ½ * illiquid assets	+ 0 * semi-liquid assets	– ½ * liquid assets	
		+ ½ * liquid liabilities	+ 0 * semi-liquid liabilities	– ½ * illiquid liabilities
				– ½ * equity
				+ ½ * illiquid guarantees
4)	**LIC-T2**[b] = + ½ * illiquid assets	+ 0 * semi-liquid assets	– ½ * liquid assets	
		+ ½ * liquid liabilities	+ 0 * semi-liquid liabilities	– ½ * illiquid liabilities
				– ½ * equity

Source : Berger and Bouwman (2009)

[a] includes category wise classification of assets, [b] includes maturity wise classification of assets

3. Data Description

The study used the quarterly dataset of balance sheet activities of all 36 banks operating in Pakistan as on June 30, 2016.[10] Almost all of the commercial banks are included in the sample for which quarterly data set is available. Only those banks are excluded from sample, which were merged in other banks. Data covers 36 quarters and ranges from June 2007 till June 2016.

4. Liquidity Creation by Banks in Pakistan

To examine the amount of liquidity, all banks are divided in three groups, i.e., large, medium and small. This division is based on size of gross total assets (GTA). Banks with GTA of more than Rs 600 billion are classified as "large banks", equal to or greater than Rs. 100 billion and less than or equal to Rs. 600 billion as "medium or middle sized banks" and those with GTA up to Rs100 billion are considered as "small bank". In this sample 6 banks are classified as large banks, 15 as middle banks and 13 are categorized as small banks.

Table 3: Share of Assets and Liabilities in Total Liquidity Creation by Particular Bank Groups
As on Jun 30, 2016

	Large Banks (GTA>Rs 600 billion) (No. of Banks:6)	**Middle Size Banks (600 ≥ GTA ≥ 100)** (No. of Banks:15)	**Small Banks (GTA<Rs 100 billion)** (No. of Banks:13)
Assets			
Illiquid Assets (weight:+1/2)	**116.5**	**89.9**	**11.6**
Fixed investment	38.9	28.2	3.5
Working Capital	31	22	5.3
Trade Financing	14.2	16.3	0.8
Other Assets	11.6	8.2	0.5
Property & Equipment	6.1	3.4	0.5
Other Loans	5.8	0.1	0
Agriculture Loans	4.2	6.8	0.6
Inv in Subsidiaries	1.4	0.2	0
Commodity financing	1.4	1.6	0.2
Deferred tax assets	1.1	1.5	0.2
Capital Work in Progress	0.5	0.3	0
Intangible Assets	0.2	1.3	0.1
liquid Assets (weight:-1/2)	**209.2**	**122.1**	**20.9**
Investment (Regardless of maturities)	183.4	103.8	16.7
Balance With Treasury Bank	15.1	8.4	1.8
Cash	5.9	4	0.4
Balances With Other Banks	3.9	2.8	0.4
Lending to Financial Inst.(Included only Repo and Call)	2.3	3.3	1.5
Liabilities			
Liquid Liabilities (weight:+1/2)	**155.3**	**89.4**	**8.2**
Current Deposits	111.9	58.8	5.9
Borrowing from Financial Inst.(Included only Repo and Call)	39.8	26.8	1.9
Bills Payable	3.6	3.8	0.4
Illiquid Liabilities (weight:-1/2)	**34.3**	**23.4**	**2.9**
Unappropriated Profit	11.9	0.4	-0.9
Other Liabilities	8.8	6.3	1.2
Reserves	7.4	-0.9	0.1
Share Capital	3.4	15.9	2.3
Deferred Taxes	2.1	0.6	0
Subordinated Debt	0.8	1.1	0.3
Off Balance Sheet Guarantees ***(weight:+1/2)***			
Commitments	59	35.9	40.5
Direct Credit Substitute	4.9	1.5	0.2

[10] Data is extracted from SBP's internal sources.

By analyzing outcome of each measure in detail, the dynamics of notational amount of liquidity creation for banking industry will be reported in next section. Besides, a more detailed segregation of banks according to their size of GTA can be seen in annexure, where the outcome of each measure is given for six banking groups.[11]

Furthermore, Table 3 analyzed the relative importance of different assets and liabilities for the selected sample of large, medium and small banking groups. The balance sheet composition of liquidity creation revealed that on asset side of banks' balance sheets, liquid assets (contributed negatively) added the largest amount in liquidity creation followed by illiquid assets (positive contribution). On the liability side, liquid liabilities show the largest fraction in liquidity creation chased by illiquid liabilities.

Further, as revealed in tables in following subsections, in almost all banking groups LIC-C1 measure reported the highest amount of liquidity created by the banking system and in contrast, LIC-T2 showed least liquidity creation during the period of analysis. The inclusion of off-balance sheet activities and segregation of advances on category basis explains the LIC-C1 dominance over other measures.

As expected, across different groups, the liquidity creation capacity in absolute rupee terms can be ranked in accordance with the size of GTA: the higher the GTA of banking group, the more the liquidity is created. The notion holds true for LIC-C1, LIC-C2, and LIC-T1 measures, however for LIC-T2 the group of middle-sized banks destroyed liquidity more as compared to small banks. This can be largely explained by the fact that four of middle-sized banks have very high exposures in off-balance sheet activities. As the LIC–T2 measure excludes the off-balance sheet activities, the liquidity creation capacity of the group declined mainly due to these four banks.

However, when normalized with gross total assets (GTA), these liquidity creation measures depict a different picture. For LIC-C1/GTA and LIC-C2/GTA, group of small banks outperformed the other two larger groups, whereas for LIC-C2/GTA middle-sized banking group lead the industry with highest value of liquidity created on average during June 2007 to June 2016. For LIC-T2 measure, almost all of the banking industry showed negative liquidity creation during the entire period, whereas the highest amounted of liquidity was destroyed by middle sized group.

As discussed earlier, the off-balance sheet activities contributed significantly in liquidity creation capacity of middle-sized banks, their exclusion and inclusion altered the ranking of the group for different measures. The more detailed discussion on the behavior of each banking group across different liquidity measures would be analyzed in the subsequent section.

[11] The more segregation of banks in smaller groups ruled out the possibility of biasness in favor of a leading bank. For instance in our existing classification a bank having GTA of Rs 600 billion is categorized as Middle sized bank, but it also include another bank having GTA of Rs 100 billion, and the average results may be biased towards any of these banks. More segregation of banks ruled out this biasness as small groups contain banks having comparable features and less diverse GTA. Banks are divided according to their Gross Total Assets (GTA) as on Jun 2016. The ranking is based on size of GTA, banks having highest GTA in overall industry are placed in 1-5 category, same method would be followed for other groups.

I) LIC-C1

Table 3.1: Liquidity Creation Over Time in Different Banking Groups (LIC-C1)

	Large Banks (GTA>Rs 600 bln)		Middle Size Banks (600≥GTA ≥100 bln)		Small Banks (GTA<Rs 100 bln)		All Scheduled Banks	
	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA
Jun-07	614.1	21.2	672.1	36.5	140.0	47.0	1426.2	28.3
Sep-07	531.6	18.8	579.4	29.7	134.9	67.5	1245.9	25.1
Dec-07	659.8	21.6	580.4	30.7	185.4	78.6	1425.7	27.5
Mar-08	867.7	28.2	819.9	39.9	289.0	116.1	1976.6	36.7
Jun-08	898.0	27.3	968.2	45.3	307.8	118.6	2174.0	38.2
Sep-08	1054.5	32.1	979.6	45.7	272.1	101.3	2306.2	40.5
Dec-08	1097.1	31.8	875.1	41.0	233.0	86.7	2205.2	37.7
Mar-09	949.8	27.5	769.7	34.5	212.8	77.2	1932.2	32.4
Jun-09	978.8	26.8	786.5	33.0	180.0	64.3	1945.4	30.8
Sep-09	841.7	23.4	712.1	28.7	157.9	58.8	1711.6	26.9
Dec-09	915.5	23.5	767.8	29.3	179.7	64.7	1863.1	27.4
Mar-10	909.3	24.0	703.6	26.7	185.9	64.4	1798.8	26.8
Jun-10	881.0	21.8	809.7	29.7	169.4	57.3	1860.1	26.3
Sep-10	861.1	21.9	803.1	29.8	191.3	64.0	1855.5	26.8
Dec-10	979.5	23.0	796.2	28.0	167.4	50.3	1943.1	26.1
Mar-11	961.4	22.5	840.0	29.1	182.1	51.7	1983.5	26.4
Jun-11	1048.8	22.8	756.6	24.8	148.1	38.3	1953.5	24.3
Sep-11	901.7	19.6	760.5	24.6	149.4	36.9	1811.6	22.4
Dec-11	952.9	19.6	695.7	21.4	166.5	39.9	1815.1	21.3
Mar-12	925.4	18.6	795.5	24.0	129.0	31.1	1849.8	21.2
Jun-12	1009.8	19.4	685.8	20.6	138.1	31.2	1833.7	20.4
Sep-12	897.3	16.5	656.7	18.5	105.7	23.2	1659.7	17.6
Dec-12	965.0	16.4	673.1	18.3	122.9	23.6	1760.9	17.4
Mar-13	1038.0	17.7	732.1	19.8	179.1	35.6	1949.2	19.3
Jun-13	797.8	12.9	679.3	18.0	116.8	23.2	1593.9	15.3
Sep-13	1106.0	18.7	691.1	18.7	272.7	52.9	2069.8	20.4
Dec-13	1240.9	19.4	845.3	21.4	425.0	76.3	2511.2	23.0
Mar-14	1047.8	16.3	824.3	20.2	583.6	97.2	2455.6	22.1
Jun-14	1139.3	17.0	899.4	21.6	371.1	62.5	2409.8	21.0
Sep-14	958.6	14.4	827.4	19.6	414.7	69.5	2200.7	19.1
Dec-14	1087.2	15.0	802.8	17.5	351.9	54.0	2241.9	17.9
Mar-15	1020.3	13.6	843.1	17.7	388.1	57.0	2251.5	17.4
Jun-15	1158.4	14.7	874.1	17.3	324.9	44.4	2357.5	17.3
Sep-15	1020.5	12.9	764.9	14.5	335.4	44.1	2120.8	15.2
Dec-15	958.1	11.4	853.1	16.0	413.8	50.8	2225.0	15.3
Mar-16	1047.0	12.5	797.7	14.5	399.8	49.9	2244.5	15.3
Jun-16	1177.7	13.1	908.0	15.4	467.8	52.4	2553.5	16.2

This measure of liquidity creation involves category wise classification of loans and includes off-balance sheet activities. Most of the literature found this measure of liquidity creation as more comprehensive and preferred it over other three measures. By using this measure, it is found that banking industry created Rs 2.55 trillion at the quarter ended on Jun 2016, showing an average increase of 9.8 percent in last nine years. The quarterly analyses revealed that the pace remained slow during September 2009 till June 2013, this trend somewhat reversed at September 2013 when the liquidity creation by the banking industry improved once again and reached at the peak in June 2016. Liquidity creation as a ratio of GTA depleted continuously during this period which shows that LIC grew at a slower pace than of GTA of the banking industry. In particular, large banks created liquidity of Rs 1.17 trillion at June 2016 much higher than Rs 0.61 trillion at the end of June 2007. On average, share of large banks in overall liquidity creation remained at 48.4 percent during the entire period. Middle size banking group lost its share from 47.1 percent in June 2007 to 35.6 percent in June 2016. On average, LIC of this group increased by a mere 1.5 percent during the period under analysis. Liquidity as a fraction to GTA for middle-sized banks substantially reduced by 57.9 percent implying

that the GTA increased faster than LIC during June 2007-June 2006. Small banks on the other hand experienced a sharp rise of 234.1 percent in absolute rupee terms from June 2007 to June 2016. As a result, their share rose to 18.3 percent in June 2016 from 9.8 percent in June 2007. However when normalized with GTA, it recorded a rise of 11.6 percent during the period under review (Table 3.1).

II) LIC-C2

This measure involves category wise classification of loans but off-balance sheet activities are excluded from the measure. As per LIC-C2 measure, banking industry created liquidity of Rs 0.74 trillion at the end of the June 2016, which is almost one third of the amount recorded by LIC-C1 measure in the corresponding period. An overall rise of Rs 0.14 trillion is seen in the rupee amount of liquidity creation under LIC-C2 measure during June 2007-June 2016, LIC as fraction of GTA declined to 4.7 percent in June 2016 as compared to 11.8 percent recorded in June 2007, suggesting that the pace of liquidity creation in terms of LIC was lower than that of GTA. This rise in liquidity creation in absolute rupee term, during June 2007- June 2016 is mainly due to large and middle size banks, whereas the group of small banks shows negative liquidity creation during this period. In contrast to LIC-C1 measure, the liquidity creation by middle-sized banks in terms of LIC-C2, increased at a substantial pace but its fraction over GTA reduced during the period under discussion (Table 3.2).

Table 3.2: Liquidity Creation Over Time in Different Banking Groups (LIC-C2)

	Large Banks (GTA>Rs 600 bln)		Middle Size Banks (600≥GTA ≥100 bln)		Small Banks (GTA<Rs 100 bln)		All Scheduled Banks	
	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA
Jun-07	352.4	12.2	235.6	12.8	6.1	2.0	594.1	11.8
Sep-07	341.3	12.1	227.8	11.7	6.1	3.1	575.3	11.6
Dec-07	464.7	15.2	267.7	14.2	9.8	4.1	742.2	14.3
Mar-08	531.0	17.2	327.4	15.9	22.4	9.0	880.8	16.4
Jun-08	494.0	15.0	402.9	18.9	28.1	10.8	925.0	16.3
Sep-08	617.0	18.8	457.3	21.3	26.0	9.7	1100.3	19.3
Dec-08	703.9	20.4	440.0	20.6	24.3	9.0	1168.2	20.0
Mar-09	581.2	16.8	389.2	17.5	18.8	6.8	989.2	16.6
Jun-09	601.8	16.4	388.1	16.3	8.9	3.2	998.9	15.8
Sep-09	528.5	14.7	335.3	13.5	-1.2	-0.5	862.6	13.6
Dec-09	595.7	15.3	365.6	14.0	4.1	1.5	965.5	14.2
Mar-10	540.6	14.3	354.8	13.5	0.9	0.3	896.3	13.4
Jun-10	531.0	13.1	355.6	13.1	0.4	0.1	887.0	12.6
Sep-10	502.2	12.8	357.7	13.3	-2.9	-1.0	857.0	12.4
Dec-10	557.2	13.1	378.4	13.3	-18.4	-5.5	917.2	12.3
Mar-11	539.1	12.6	373.6	13.0	-24.6	-7.0	888.1	11.8
Jun-11	573.6	12.5	319.3	10.5	-30.0	-7.8	862.8	10.7
Sep-11	438.4	9.5	295.7	9.6	-39.8	-9.8	694.3	8.6
Dec-11	394.3	8.1	291.3	9.0	-29.3	-7.0	656.3	7.7
Mar-12	376.3	7.5	332.0	10.0	-24.0	-5.8	684.2	7.8
Jun-12	437.0	8.4	307.9	9.2	-22.6	-5.1	722.3	8.0
Sep-12	369.2	6.8	288.7	8.1	-24.6	-5.4	633.3	6.7
Dec-12	425.3	7.2	305.4	8.3	-22.8	-4.4	707.9	7.0
Mar-13	353.2	6.0	291.1	7.9	-25.8	-5.1	618.5	6.1
Jun-13	277.3	4.5	283.8	7.5	-12.9	-2.6	548.2	5.2
Sep-13	255.6	4.3	284.3	7.7	-20.8	-4.0	519.1	5.1
Dec-13	343.5	5.4	376.6	9.6	-9.5	-1.7	710.7	6.5
Mar-14	301.3	4.7	350.9	8.6	-0.9	-0.1	651.4	5.9
Jun-14	468.5	7.0	437.2	10.5	28.1	4.7	933.8	8.1
Sep-14	298.1	4.5	382.9	9.1	-2.9	-0.5	678.1	5.9
Dec-14	325.9	4.5	391.8	8.5	30.2	4.6	748.0	6.0
Mar-15	204.7	2.7	333.4	7.0	6.4	0.9	544.5	4.2
Jun-15	341.0	4.3	353.4	7.0	4.1	0.6	698.5	5.1
Sep-15	189.9	2.4	274.7	5.2	-18.4	-2.4	446.3	3.2
Dec-15	275.8	3.3	350.0	6.6	-7.0	-0.9	618.8	4.3
Mar-16	101.9	1.2	320.0	5.8	-30.1	-3.8	391.8	2.7
Jun-16	359.6	4.0	431.6	7.3	-51.3	-5.8	739.9	4.7

III) LIC-T1

LIC-T1 measure included the maturity wise classification of advances along with the off-balance sheet activities. In this category, all advances having maturity of more than 1 year are treated as illiquid, and having maturity of less than 1 year as semi-liquid. Using this measure, liquidity creation increased by 40.6 percent during June 2007-June 2016. Most of the liquidity is created by the group of large banks, and reached to a level of Rs 0.53 trillion in June 2016, followed by small banks which contributed an amount of Rs 0.40 trillion during the period. On the other hand, liquidity is destroyed in group of middle size banks; it fell by Rs 0.27 trillion during the period under review. For LIC/GTA, both large and middle sized bank groups could not show any improvement over this period, the ratio only increased for small banks during this period by 4.4 percent (Table 3.3).

Table 3.3: Liquidity Creation Over Time in Different Banking Groups (LIC-T1)

	Large Banks (GTA>Rs 600 bln)		Middle Size Banks (600≥GTA ≥100 bln)		Small Banks (GTA<Rs 100 bln)		All Scheduled Banks	
	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA
Jun-07	340.4	11.8	400.2	21.7	121.0	40.6	861.6	17.1
Sep-07	255.6	9.1	278.1	14.3	120.2	60.2	653.9	13.1
Dec-07	268.7	8.8	291.7	15.4	172.7	73.2	733.1	14.1
Mar-08	475.9	15.5	473.3	23.0	271.2	108.9	1220.3	22.7
Jun-08	516.8	15.7	586.7	27.4	282.9	109.0	1386.4	24.4
Sep-08	577.1	17.6	574.1	26.8	245.4	91.4	1396.6	24.5
Dec-08	605.3	17.6	462.6	21.7	201.7	75.0	1269.6	21.7
Mar-09	467.6	13.5	366.9	16.5	185.5	67.3	1019.9	17.1
Jun-09	584.9	16.0	363.8	15.3	153.6	54.9	1102.4	17.4
Sep-09	371.0	10.3	303.8	12.2	134.1	49.9	808.8	12.7
Dec-09	390.0	10.0	341.6	13.1	150.3	54.1	881.9	13.0
Mar-10	391.7	10.4	263.0	10.0	156.0	54.0	810.8	12.1
Jun-10	403.4	10.0	382.7	14.1	141.6	47.9	927.7	13.1
Sep-10	385.0	9.8	358.6	13.3	161.8	54.1	905.4	13.1
Dec-10	440.0	10.3	324.4	11.4	135.7	40.8	900.1	12.1
Mar-11	400.9	9.4	370.6	12.9	146.9	41.7	918.4	12.2
Jun-11	526.0	11.4	309.6	10.2	113.3	29.3	949.0	11.8
Sep-11	531.8	11.6	321.5	10.4	114.0	28.2	967.3	12.0
Dec-11	532.0	10.9	237.8	7.3	124.7	29.9	894.5	10.5
Mar-12	459.1	9.2	340.7	10.3	88.3	21.3	888.1	10.2
Jun-12	483.7	9.3	250.2	7.5	97.0	21.9	830.9	9.2
Sep-12	490.0	9.0	208.0	5.9	68.5	15.0	766.5	8.1
Dec-12	449.5	7.6	207.0	5.6	76.3	14.6	732.9	7.3
Mar-13	677.2	11.5	252.0	6.8	130.2	25.9	1059.5	10.5
Jun-13	344.0	5.6	217.2	5.7	66.4	13.2	627.7	6.0
Sep-13	658.4	11.1	220.5	6.0	224.9	43.6	1103.9	10.9
Dec-13	717.4	11.2	341.0	8.7	370.2	66.5	1428.7	13.1
Mar-14	453.9	7.1	298.5	7.3	520.1	86.6	1272.5	11.4
Jun-14	591.3	8.8	379.6	9.1	308.9	52.0	1279.8	11.1
Sep-14	415.9	6.2	308.9	7.3	356.0	59.7	1080.9	9.4
Dec-14	499.9	6.9	246.2	5.4	276.6	42.4	1022.7	8.2
Mar-15	455.4	6.1	290.4	6.1	318.2	46.7	1064.1	8.2
Jun-15	617.4	7.8	317.6	6.3	259.4	35.5	1194.4	8.7
Sep-15	495.5	6.3	213.5	4.1	273.9	36.0	982.9	7.1
Dec-15	410.2	4.9	266.0	5.0	338.7	41.6	1014.9	7.0
Mar-16	473.7	5.7	172.4	3.1	335.5	41.8	981.7	6.7
Jun-16	521.8	5.8	288.8	4.9	401.2	45.0	1211.8	7.7

IV) LIC-T2

The LIC-T2 measure incorporates the maturity wise profile of advances but excludes off-balance sheet activities. This measure records the least level of liquidity creation in the banking industry for entire period of June 2007-June 2016. On average, the measure recorded a negative liquidity of Rs 0.2 trillion during the period. Neither of the banking group showed any amount of liquidity creation while

measuring by LIC-T2. Most of the liquidity is destroyed by middle-sized group followed by large banks. The negative rupee value recorded by this measure is mainly due to concentration of advances in short term tenure (Table 3.4).

Table 3.4: Liquidity Creation Over Time in Different Banking Groups (LIC-T2)

	Large Banks (GTA>Rs 600 bln)		Middle Size Banks (600≥GTA ≥100 bln)		Small Banks (GTA<Rs 100 bln)		All Scheduled Banks	
	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA	billion Rs	Liq./GTA
Jun-07	79.8	2.8	-33.9	-1.8	-12.9	-4.3	32.9	0.7
Sep-07	65.9	2.3	-70.0	-3.6	-12.4	-6.2	-16.5	-0.3
Dec-07	73.6	2.4	-19.8	-1.0	-7.0	-3.0	46.9	0.9
Mar-08	147.0	4.8	-11.0	-0.5	4.6	1.9	140.7	2.6
Jun-08	113.3	3.4	28.7	1.3	3.6	1.4	145.6	2.6
Sep-08	140.0	4.3	53.9	2.5	-0.4	-0.1	193.5	3.4
Dec-08	212.1	6.2	28.7	1.3	-7.0	-2.6	233.8	4.0
Mar-09	99.3	2.9	-12.9	-0.6	-8.5	-3.1	77.9	1.3
Jun-09	209.0	5.7	-34.2	-1.4	-17.5	-6.2	157.3	2.5
Sep-09	58.5	1.6	-71.4	-2.9	-25.1	-9.3	-38.0	-0.6
Dec-09	70.3	1.8	-60.2	-2.3	-25.3	-9.1	-15.2	-0.2
Mar-10	23.1	0.6	-84.4	-3.2	-28.9	-10.0	-90.2	-1.3
Jun-10	53.4	1.3	-70.4	-2.6	-27.4	-9.3	-44.4	-0.6
Sep-10	26.1	0.7	-85.3	-3.2	-32.4	-10.8	-91.6	-1.3
Dec-10	18.0	0.4	-93.2	-3.3	-50.0	-15.0	-125.3	-1.7
Mar-11	-19.7	-0.5	-95.6	-3.3	-59.8	-17.0	-175.1	-2.3
Jun-11	53.6	1.2	-127.7	-4.2	-64.8	-16.8	-138.9	-1.7
Sep-11	68.5	1.5	-142.9	-4.6	-75.1	-18.6	-149.5	-1.8
Dec-11	-26.6	-0.5	-166.2	-5.1	-71.1	-17.1	-263.9	-3.1
Mar-12	-89.9	-1.8	-122.6	-3.7	-64.7	-15.6	-277.2	-3.2
Jun-12	-87.7	-1.7	-127.8	-3.8	-63.7	-14.4	-279.1	-3.1
Sep-12	-37.2	-0.7	-160.0	-4.5	-61.8	-13.6	-259.0	-2.7
Dec-12	-90.2	-1.5	-160.7	-4.4	-69.3	-13.3	-320.1	-3.2
Mar-13	-6.7	-0.1	-188.8	-5.1	-74.7	-14.8	-270.3	-2.7
Jun-13	-173.7	-2.8	-177.8	-4.7	-63.0	-12.5	-414.6	-4.0
Sep-13	-191.6	-3.2	-185.4	-5.0	-68.6	-13.3	-445.6	-4.4
Dec-13	-176.7	-2.8	-126.7	-3.2	-64.3	-11.5	-367.7	-3.4
Mar-14	-290.0	-4.5	-174.0	-4.3	-64.4	-10.7	-528.4	-4.8
Jun-14	-79.4	-1.2	-80.3	-1.9	-33.9	-5.7	-193.6	-1.7
Sep-14	-243.9	-3.7	-135.0	-3.2	-61.6	-10.3	-440.5	-3.8
Dec-14	-261.0	-3.6	-164.4	-3.6	-44.9	-6.9	-470.3	-3.8
Mar-15	-359.9	-4.8	-218.9	-4.6	-63.5	-9.3	-642.3	-5.0
Jun-15	-200.0	-2.5	-202.0	-4.0	-61.3	-8.4	-463.3	-3.4
Sep-15	-335.1	-4.2	-276.6	-5.3	-79.8	-10.5	-691.5	-5.0
Dec-15	-272.0	-3.2	-236.7	-4.4	-82.1	-10.1	-590.8	-4.1
Mar-16	-471.0	-5.6	-305.3	-5.6	-94.4	-11.8	-870.7	-5.9
Jun-16	-293.3	-3.3	-187.6	-3.2	-117.9	-13.2	-598.9	-3.8

4.1. Liquidity Creation and Banks' Own Liquidity

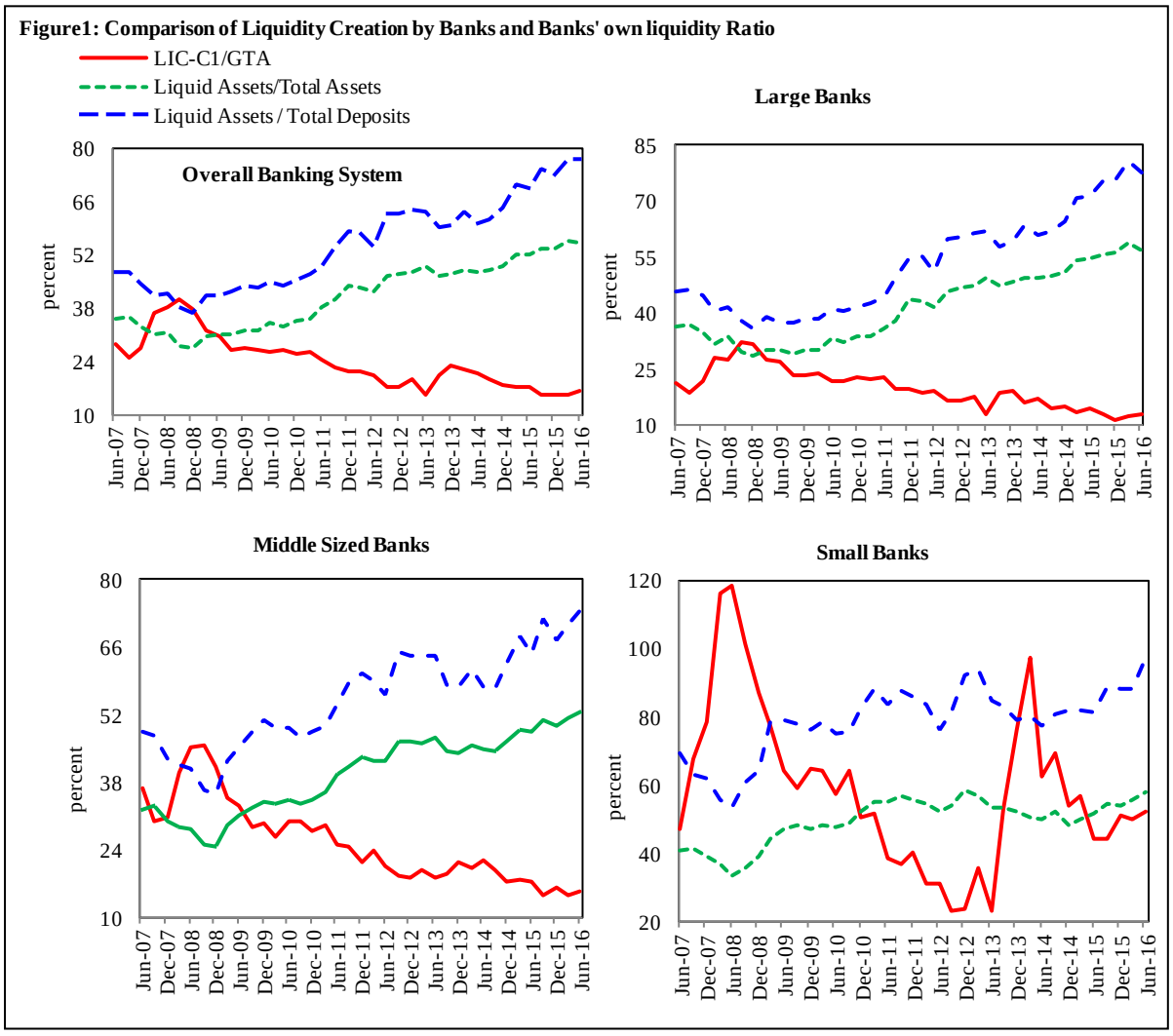
As stated earlier, the descriptive analysis is used to show the link between liquidity creation and banks' own liquidity. For this analysis, liquidity creation in the market (Liquidity /GTA) is captured by the most preferred measure of liquidity creation "LIC-C1" [12] whereas two commonly used indicators, Liquid Asset/Total Assets and Liquid Assets/ Total Deposits[13] are taken into account for the bank's own liquidity. All these three variables are analyzed for the period of June 2007-June 2016 for three specified groups of large, medium and small banking groups and for the whole banking system.

[12] The LIC-C1 has been characterized as the most preferred measure of liquidity creation in relevant studies; authors preferred it over other measures due to its comprehensive segregation of assets and liabilities and inclusion of off balance sheet activities

[13] Higher values of these liquidity ratios are associated with higher degree of banks' balance sheet liquidity.

The graphical analysis illustrates a negative association between liquidity creation and banks' "own liquidity". Figure 1 shows that for entire banking industry, banks' own liquidity improved remarkably well during the period of analysis, however, the liquidity creation continued to decline barring the most recent period. It shows that the higher liquid the banks became, lower the amount of liquidity they pump in the market. The theoretical underpinning suggests that banks' balance sheets are mainly constituted of liquid assets having negative weights in terms of liquidity measure. Whenever banks' exposure in liquid assets, for instance in investments or in balances with banks, increases liquidity creation deteriorates. On the other hand, banks' own balance sheet becomes more liquid with increase in liquid assets[14].

Figure1: Comparison of Liquidity Creation by Banks and Banks' own liquidity Ratio



The above Figure also demonstrate that over time solvency of Pakistan's banking system improved but at the same time they have compromised their function of liquidity creation. The verity can also be confirmed from the recent estimates of ratio of LIC to nominal GDP (30.7 percent in June 2016) compared to almost a decade earlier (78.6 percent in September 2008)[15]. The situation might suggest that banks have substituted their exposure in illiquid assets with riskless and liquid government securities. As stated earlier, banks' liquidity creation can be termed as total bank output, a lower level

[14] The relationship between liquidity creation and banks own liquidity may not hold true for other banking system when instead of liquid assets, another balance sheet component drives the liquidity creation.
[15] See Figure A1 in annexure.

of this measure indicates reduced bank intermediation in the economy. In fact it shows that banks are losing their basic role of intermediation in the economy which might hurt the economic activities as lack of advances in private sector may impede further investment in the economy.

4.2. Significance of Estimating Liquidity Creation by Banks

The economic literature is still at nascent stage and could not explore the potential significance of liquidity creation measures, however number of studies found them as useful indicators of output of banking system. In addition, these measures have been linked with variables of economic activity such as GDP growth, and indicators of banking sector performance such as financial crises, adequacy of banking capital, and banking failures.

Berger and Sedunov (2016) recognized the significance of liquidity creation measure to the economic growth and found positive and significant relationship between per capita liquidity creation (LC per capita) and per capita growth in case of US economy. The study highlighted the importance of different components of liquidity creation such as advances, deposits and investments to the economy and claimed that these measures were superior in determining per capita GDP as compared to other measures of banking output such as gross total assets, total assets and total liabilities etc. Fidrmuc et. al (2015) also observed a similar relationship between liquidity creation measure and GDP for Russian economy. This empirical study found that in Russia, bank liquidity creation fosters economic growth in both normal circumstances as well as in crisis.[16]

Though the literature has established a positive link of liquidity creation with overall economic growth, excess liquidity creations have been associated with financial crises. A very high level of liquidity means banks are pumping too many liquidity while accepting short term deposits and issuing longer term loans which may pose serious concerns over solvency of financial system. The issue was highlighted by Berger and Bouwman (2011) while discussing the financial crisis in US economy; they reported that aggregated level of liquidity creation rose before the financial crisis. The study claimed that liquidity creation level has a high explanatory power in predicting financial crises.

The measures have been used as predictor of bank failure as well: Fungacova et al. (2015) ascertained a "High Liquidity Creation Hypothesis" (HLCH) which linked high liquidity creation with bank failure. The study defined the high liquidity creators as banks having liquidity creation in excess of 90th percentile of the overall distribution of banks and argued that if a bank becomes high liquidity creator its probability of failure increases compared to other banks. The study proposed a screening procedure, relying on ranking of banks according to their level of liquidity creation in a given quarter.

In addition to a good measure of banking output, a proposed predictor of financial crisis and bank failure, the liquidity creation measures might also be useful in determining the size of banking activity in national income accounts of a country. So far no study explores this aspect and it would be interesting if future research will develop this concept further. For the sake of economic significance this study tried to figure out if any link exists in value addition of banking & finance sector in national income accounts and banking liquidity creation measure in case of Pakistan over the period of analysis. The graphical illustration depicts a close association between LIC measures (LIC-C1 and LIC-C2) and (nominal) value addition of finance & insurance sector and found that both of these

[16] Further research is needed to empirically investigate the impact of liquidity creation on economic growth in case of Pakistan.

move together[17,18]. The short sample (2007-2016) restricted this study to further explore these empirical observations.

LIC measure might be associated with inflation. A graphical view of CPI inflation and YoY growth in LIC-C1 measure shows close association during the period of June 2007 to June 2016. The causality has been checked via Granger non-causality test [19]and results showed LIC causing inflation in Pakistan, and not the other way round. At this moment, no study is available to support this link, however a simple rationale could be that higher liquidity creation is generally associated with more long term investment and lower savings in long term deposits. The higher investment and low savings are generally suggestive of higher domestic demand in the economy which may cause inflationary pressures[20]. The link between liquidity creation and inflation is yet to be refined; however limited number of observation restricted this study to explore meaningful relationship between these two important macro variables

As stated earlier, the literature is still at nascent stage to explore the meaningful significance of liquidity creation for the whole economic system. However, measuring the level of liquidity creation might assist in intuiting different links among liquidity creation and variables of policy interests such as inflation, monetary policy, banks distress etc.

5. Conclusion

Well-functioned banking system is an essential element in promoting the economic growth attained by channelizing the saving into the productive investments. This saving investment facilitation results in fundamental task of liquidity creation by the banking industry. Despite the importance of this fundamental task in the economy, a comprehensive measure of liquidity creation specifically did not exist in case of our country. This paper attempted to estimate such measures, which may gauge the liquidity creation by the banking industry better than traditional indicators. The construction is based on methods employed by Berger and Bouwman (2009) on the US banking data set. For Pakistan four different measures of liquidity creation, LIC-C1, LIC-C2, LIC-T1, and LIC-T2 have been constructed by using different classification of banking balance sheet items across the period of June 2007-June 2016. This paper also analyzes the liquidity creation by the different measures and across different groups within the banking industry. For this purpose, the banking industry is divided into three groups, large, medium and small size according to their average size of GTA.

Analysis of the liquidity creation measures indicated that the banks created the highest liquidity while calculating from LIC-C1 measures. By using this measure, liquidity of Rs 2.53 trillion was created at the end of June 2016, up from Rs 1.4 trillion at the end of June 2007. The role of off-balance sheet activities cannot be ruled out in the liquidity creation function, as both of the measures having off-balance sheet activities showed higher liquidity than those measures, which excluded them. On average, for LIC-C1, LIC-C2 and LIC-T1,the liquidity creation in absolute rupee term is directly related to the size of GTA: the groups having higher GTA contributed the most in liquidity creation and vice versa. The notion did not hold true for LIC-T2, the group of middle –sized banks destroyed

[17] For this purpose we normalized the LIC-C1 measure by multiplying it with 1/4 and LIC-C2 measure by 2/3.
[18] See Figure A2 and A3 in Annexure.
[19] The result have been presented in Annexure Table 1.
[20] A graphical illustration has been presented in Figure A4 and A5 in Annexure. A co-movement between LIC and nominal GDP in Pakistan is suggestive of liquidity creation - domestic demand nexus in the economy. For Quarterly GDP estimates, the paper used Hanif et al (2013). For extending these quarterly GDP estimates till FY2016 this study used Hayat and Nadim (2016) approach.

more liquidity as compared to small banks, the exclusion of off-balance sheet activities remained as a main reason for this difference.

The paper also analyzed descriptively, the link between liquidity ratios of banks and liquidity created by them in the market and revealed a negative association between liquidity creation and banks' 'own liquidity'. The link creates some interest regarding the optimal point up to which the bank can create liquidity without generating too much illiquidity (insolvency) on its own balance sheet.

In the end, the paper highlighted economic significance of liquidity creation measures for GDP growth, inflation and banking soundness. Based on the graphical analysis, the study found interesting relationship between liquidity creation and inflation. At the same time, liquidity creation measures (LIC-C1 and LIC-C2), are found to be closely associated with the value addition in 'Finance & Insurance' sector of Pakistan economy. Data limitations restricted this study to dig these linkages deep.

After constructing the liquidity creation measures, it is now possible to explore different issues pertaining to our banking industry such as, observe the optimal point up to which the banks should create liquidity without worsening own balance sheet liquidity, explore the relationship between liquidity and variables on balance sheet of the banking industry? And more importantly, establish different channels through which liquidity affects inflation and economic growth especially in case of Pakistan? Along with all these, exploring the determinants of overall liquidly created by the banks in the market is also important. It will shed light on how the liquidity creation in banking industry is effected by the monetary authority's decisions?

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Appendix

Figure A1: Ratio of LIC/ GDP (Nominal)

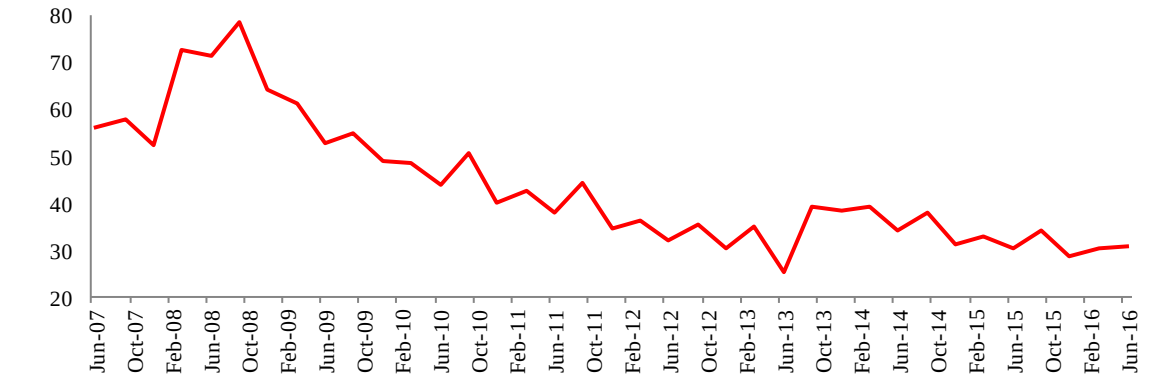

Figure A2: Vlaue Addition by Finance & Insurance and Liquidty Creation Measures

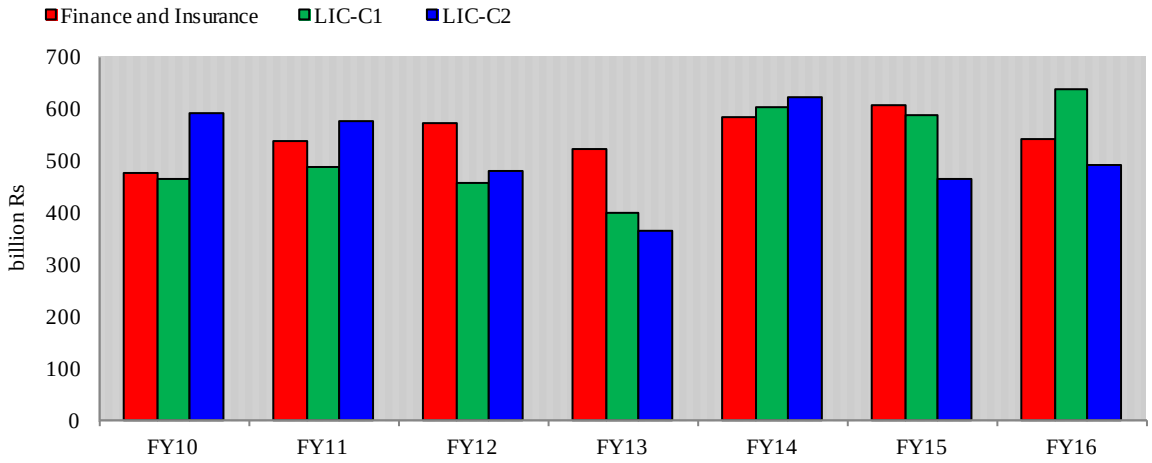

Figure A3: Trend in Value Addition (Nominal) in Finance & Insurance and Liquidity Creation Measure of LIC-C2 (YoY Growth)

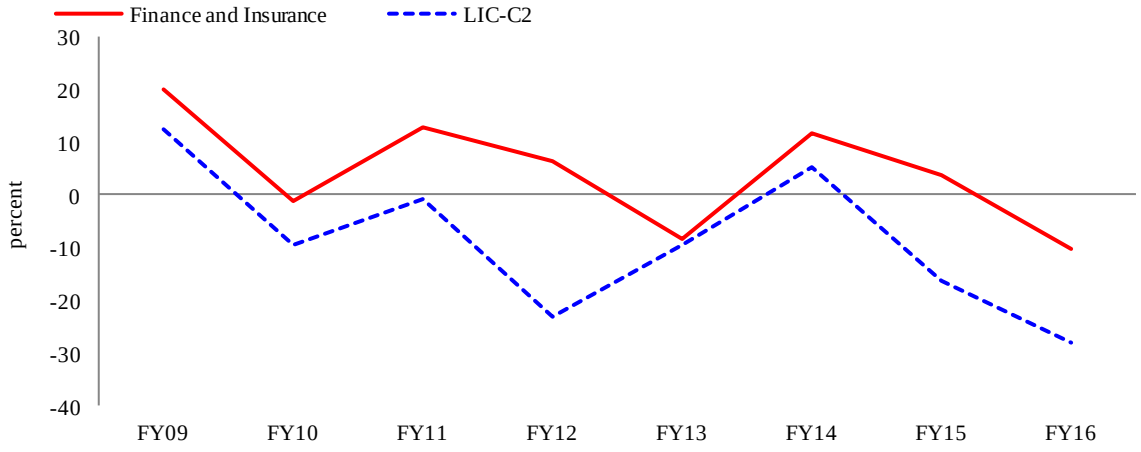

Table 1: Pair wise Granger Causality Tests

Sample 36, Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LIC does not Granger Cause CPI	34	7.08	0.01
CPI does not Granger Cause LIC		0.06	0.81

Table 1a: Liquidity Creation Over Time in Different Banking Groups (LIC-C1)

In billion Rs

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	565.96	406.33	262.34	30.50	155.86	5.23	1426.22
Sep-07	490.04	409.59	167.58	28.20	142.85	7.62	1245.88
Dec-07	603.89	410.14	176.34	33.97	194.17	7.15	1425.66
Mar-08	808.56	502.13	316.23	44.62	287.63	17.48	1976.64
Jun-08	829.41	585.38	357.71	71.04	310.88	19.54	2173.97
Sep-08	982.04	609.46	340.95	78.84	274.92	19.99	2306.20
Dec-08	1015.71	530.98	327.02	73.68	236.76	20.99	2205.15
Mar-09	872.52	417.98	333.96	67.22	223.01	17.55	1932.24
Jun-09	895.67	418.16	349.67	73.19	190.71	17.98	1945.38
Sep-09	773.32	355.18	318.82	77.61	167.73	18.94	1711.60
Dec-09	830.34	386.23	357.01	75.82	195.51	18.17	1863.08
Mar-10	826.30	300.89	360.65	93.86	199.35	17.72	1798.76
Jun-10	774.83	406.66	383.45	93.20	184.46	17.53	1860.14
Sep-10	747.22	408.14	376.92	98.56	207.85	16.84	1855.51
Dec-10	866.69	412.06	378.34	84.29	185.23	16.49	1943.10
Mar-11	846.17	421.26	406.21	91.92	202.00	15.95	1983.50
Jun-11	939.25	366.96	385.33	80.65	166.51	14.81	1953.51
Sep-11	796.08	391.39	363.07	76.99	167.59	16.49	1811.60
Dec-11	863.50	325.03	344.32	79.14	188.86	14.21	1815.06
Mar-12	835.86	355.48	347.66	141.69	152.32	16.80	1849.81
Jun-12	917.38	328.27	304.97	105.23	162.12	15.76	1833.74
Sep-12	799.44	330.10	288.14	96.75	129.58	15.70	1659.70
Dec-12	868.35	309.77	308.85	110.34	147.50	16.11	1760.93
Mar-13	936.07	372.20	330.38	89.83	203.39	17.30	1949.18
Jun-13	704.85	314.01	340.11	81.49	137.14	16.34	1593.93
Sep-13	986.91	387.08	318.34	67.75	294.08	15.67	2069.82
Dec-13	1108.04	452.89	404.87	79.47	451.24	14.67	2511.18
Mar-14	893.13	431.20	420.54	84.87	609.81	16.09	2455.63
Jun-14	968.36	462.75	459.54	104.56	398.62	15.98	2409.81
Sep-14	825.89	370.90	454.06	91.41	441.09	17.33	2200.68
Dec-14	926.67	376.80	464.83	75.22	382.11	16.27	2241.89
Mar-15	850.55	416.15	476.69	78.83	414.68	14.61	2251.50
Jun-15	962.05	460.79	484.32	79.41	356.67	14.24	2357.47
Sep-15	813.71	427.09	434.86	69.17	362.38	13.59	2120.80
Dec-15	687.31	519.67	452.60	109.42	442.54	13.42	2224.97
Mar-16	824.53	454.65	409.90	113.40	428.22	13.77	2244.46
Jun-16	920.21	534.85	479.31	101.49	503.41	14.27	2553.53

Table 1b: Liquidity Creation Over Time in Different Banking Groups (LIC-C1) As Fraction of GTA

In percent

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	0.22	0.36	0.39	0.11	0.49	0.10	0.28
Sep-07	0.20	0.36	0.21	0.10	0.61	0.28	0.25
Dec-07	0.22	0.42	0.19	0.12	0.76	0.19	0.28
Mar-08	0.29	0.43	0.38	0.15	1.07	0.50	0.37
Jun-08	0.28	0.48	0.42	0.21	1.11	0.52	0.38
Sep-08	0.33	0.50	0.40	0.23	0.94	0.53	0.40
Dec-08	0.33	0.43	0.38	0.22	0.81	0.56	0.38
Mar-09	0.28	0.33	0.38	0.19	0.72	0.50	0.32
Jun-09	0.27	0.31	0.38	0.19	0.60	0.53	0.31
Sep-09	0.24	0.25	0.33	0.20	0.54	0.57	0.27
Dec-09	0.24	0.26	0.35	0.19	0.61	0.53	0.27
Mar-10	0.24	0.20	0.35	0.23	0.60	0.54	0.27
Jun-10	0.21	0.26	0.37	0.22	0.54	0.52	0.26
Sep-10	0.21	0.26	0.38	0.24	0.60	0.51	0.27
Dec-10	0.23	0.25	0.36	0.19	0.49	0.47	0.26
Mar-11	0.22	0.25	0.39	0.20	0.50	0.46	0.26
Jun-11	0.23	0.20	0.34	0.17	0.38	0.41	0.24
Sep-11	0.19	0.22	0.32	0.16	0.37	0.44	0.22
Dec-11	0.20	0.17	0.29	0.15	0.40	0.38	0.21
Mar-12	0.19	0.18	0.29	0.25	0.32	0.47	0.21
Jun-12	0.19	0.16	0.26	0.19	0.32	0.43	0.20
Sep-12	0.16	0.16	0.23	0.17	0.25	0.45	0.18
Dec-12	0.16	0.14	0.23	0.18	0.26	0.42	0.17
Mar-13	0.18	0.17	0.25	0.15	0.36	0.44	0.19
Jun-13	0.13	0.14	0.24	0.13	0.24	0.44	0.15
Sep-13	0.18	0.17	0.24	0.11	0.51	0.45	0.20
Dec-13	0.19	0.19	0.28	0.12	0.73	0.38	0.23
Mar-14	0.15	0.18	0.27	0.13	0.92	0.42	0.22
Jun-14	0.16	0.19	0.30	0.15	0.61	0.38	0.21
Sep-14	0.14	0.15	0.29	0.13	0.67	0.44	0.19
Dec-14	0.14	0.14	0.27	0.09	0.53	0.44	0.18
Mar-15	0.13	0.15	0.27	0.10	0.55	0.39	0.17
Jun-15	0.14	0.16	0.25	0.09	0.44	0.33	0.17
Sep-15	0.11	0.14	0.21	0.08	0.43	0.34	0.15
Dec-15	0.09	0.17	0.22	0.11	0.49	0.31	0.15
Mar-16	0.11	0.14	0.20	0.12	0.47	0.34	0.15
Jun-16	0.11	0.16	0.21	0.10	0.50	0.34	0.16

Table 2a: Liquidity Creation Over Time in Different Banking Groups (LIC-C2)

In billion Rs

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	326.85	155.62	71.41	22.52	13.60	4.07	594.07
Sep-07	324.24	130.47	81.81	20.26	12.08	6.39	575.25
Dec-07	426.22	148.50	117.09	27.73	16.51	6.16	742.21
Mar-08	488.98	212.63	112.29	30.88	21.51	14.51	880.80
Jun-08	447.75	252.02	136.52	41.89	30.37	16.49	925.04
Sep-08	559.53	287.32	154.53	54.10	28.03	16.77	1100.28
Dec-08	642.83	284.74	145.36	51.61	26.98	16.69	1168.22
Mar-09	527.29	248.80	129.06	44.21	25.02	14.84	989.22
Jun-09	543.37	241.37	138.48	44.81	15.59	15.26	998.89
Sep-09	481.68	197.35	113.79	49.06	4.64	16.04	862.56
Dec-09	541.63	207.32	134.00	53.61	13.41	15.49	965.45
Mar-10	485.06	198.44	120.84	66.74	9.98	15.19	896.26
Jun-10	458.95	221.24	117.35	63.30	11.60	14.55	886.98
Sep-10	423.73	218.64	119.59	71.60	8.95	14.54	857.05
Dec-10	477.08	228.98	137.09	63.79	-3.62	13.89	917.21
Mar-11	465.92	211.51	135.54	70.57	-8.65	13.19	888.09
Jun-11	502.73	185.89	115.78	59.10	-12.29	11.63	862.83
Sep-11	380.50	168.67	100.43	53.84	-21.54	12.43	694.34
Dec-11	338.94	146.79	112.47	55.14	-8.58	11.54	656.30
Mar-12	326.04	161.59	124.74	63.32	-4.93	13.48	684.24
Jun-12	374.76	163.90	107.97	64.83	-1.60	12.49	722.35
Sep-12	315.86	156.55	101.46	51.28	-5.10	13.22	633.26
Dec-12	358.19	177.99	113.87	48.26	-2.41	12.03	707.93
Mar-13	294.83	153.75	110.32	53.33	-6.51	12.75	618.46
Jun-13	218.38	153.13	110.13	47.58	6.17	12.77	548.16
Sep-13	200.09	144.22	113.25	50.06	-1.53	13.01	519.11
Dec-13	271.69	203.48	158.44	52.03	13.64	11.41	710.68
Mar-14	238.42	190.88	134.27	55.04	19.88	12.90	651.39
Jun-14	363.37	259.67	177.52	67.55	54.06	11.62	933.78
Sep-14	234.33	170.10	177.51	60.56	22.30	13.26	678.06
Dec-14	251.96	173.91	212.86	40.41	55.32	13.49	747.95
Mar-15	147.52	151.16	159.63	44.60	28.21	13.37	544.50
Jun-15	253.53	204.56	155.28	42.39	30.58	12.14	698.48
Sep-15	120.33	150.06	126.00	31.94	5.66	12.26	446.25
Dec-15	178.35	200.80	155.45	56.20	16.16	11.79	618.76
Mar-16	30.74	163.60	128.97	63.54	-7.35	12.26	391.76
Jun-16	250.76	258.01	179.72	63.52	-24.88	12.74	739.88

Table 2b: Liquidity Creation Over Time in Different Banking Groups (LIC-C2) As Fraction of GTA

In percent

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	0.13	0.14	0.11	0.08	0.04	0.08	0.12
Sep-07	0.13	0.12	0.10	0.07	0.05	0.24	0.12
Dec-07	0.16	0.15	0.13	0.10	0.06	0.16	0.14
Mar-08	0.18	0.18	0.13	0.10	0.08	0.42	0.16
Jun-08	0.15	0.21	0.16	0.12	0.11	0.44	0.16
Sep-08	0.19	0.23	0.18	0.16	0.10	0.44	0.19
Dec-08	0.21	0.23	0.17	0.16	0.09	0.45	0.20
Mar-09	0.17	0.20	0.15	0.13	0.08	0.42	0.17
Jun-09	0.16	0.18	0.15	0.12	0.05	0.45	0.16
Sep-09	0.15	0.14	0.12	0.13	0.02	0.49	0.14
Dec-09	0.15	0.14	0.13	0.13	0.04	0.45	0.14
Mar-10	0.14	0.13	0.12	0.17	0.03	0.47	0.13
Jun-10	0.13	0.14	0.11	0.15	0.03	0.43	0.13
Sep-10	0.12	0.14	0.12	0.17	0.03	0.44	0.12
Dec-10	0.12	0.14	0.13	0.14	-0.01	0.40	0.12
Mar-11	0.12	0.12	0.13	0.15	-0.02	0.38	0.12
Jun-11	0.12	0.10	0.10	0.13	-0.03	0.32	0.11
Sep-11	0.09	0.09	0.09	0.11	-0.05	0.33	0.09
Dec-11	0.08	0.08	0.10	0.11	-0.02	0.31	0.08
Mar-12	0.07	0.08	0.10	0.11	-0.01	0.38	0.08
Jun-12	0.08	0.08	0.09	0.12	0.00	0.34	0.08
Sep-12	0.06	0.07	0.08	0.09	-0.01	0.38	0.07
Dec-12	0.07	0.08	0.08	0.08	0.00	0.32	0.07
Mar-13	0.06	0.07	0.08	0.09	-0.01	0.33	0.06
Jun-13	0.04	0.07	0.08	0.08	0.01	0.34	0.05
Sep-13	0.04	0.06	0.08	0.08	0.00	0.37	0.05
Dec-13	0.05	0.09	0.11	0.08	0.02	0.30	0.07
Mar-14	0.04	0.08	0.09	0.08	0.03	0.34	0.06
Jun-14	0.06	0.10	0.11	0.09	0.08	0.28	0.08
Sep-14	0.04	0.07	0.11	0.08	0.03	0.34	0.06
Dec-14	0.04	0.06	0.12	0.05	0.08	0.37	0.06
Mar-15	0.02	0.05	0.09	0.05	0.04	0.36	0.04
Jun-15	0.04	0.07	0.08	0.05	0.04	0.28	0.05
Sep-15	0.02	0.05	0.06	0.03	0.01	0.31	0.03
Dec-15	0.02	0.06	0.08	0.06	0.02	0.27	0.04
Mar-16	0.00	0.05	0.06	0.06	-0.01	0.30	0.03
Jun-16	0.03	0.08	0.08	0.06	-0.02	0.30	0.05

Table 3a: Liquidity Creation Over Time in Different Banking Groups (LIC-T1)

In billion Rs

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	314.66	266.81	160.88	-13.93	135.65	-2.43	861.64
Sep-07	232.39	268.05	45.73	-19.41	125.49	1.65	653.91
Dec-07	244.36	286.78	37.91	-15.36	177.95	1.49	733.13
Mar-08	449.73	325.76	176.77	-10.51	263.18	15.37	1220.31
Jun-08	482.06	391.53	211.37	7.77	276.44	17.21	1386.38
Sep-08	546.65	398.61	190.67	4.92	238.96	16.83	1396.63
Dec-08	571.54	305.66	173.68	4.97	196.73	17.02	1269.59
Mar-09	432.34	207.17	185.12	-4.72	185.16	14.87	1019.95
Jun-09	550.23	191.43	196.36	-4.47	153.94	14.86	1102.35
Sep-09	345.25	145.70	167.41	0.75	134.40	15.34	808.85
Dec-09	357.57	157.94	198.44	-3.29	156.34	14.87	881.87
Mar-10	361.11	70.10	199.91	6.96	158.56	14.13	810.76
Jun-10	354.14	168.20	231.21	15.19	144.70	14.21	927.66
Sep-10	327.78	165.55	221.45	10.72	167.47	12.46	905.43
Dec-10	391.89	154.69	200.91	-2.63	143.06	12.16	900.08
Mar-11	348.65	175.68	226.55	-0.12	155.26	12.38	918.40
Jun-11	477.84	129.80	214.20	-6.18	121.63	11.67	948.96
Sep-11	483.64	159.20	199.43	-10.95	122.61	13.33	967.25
Dec-11	505.33	83.73	170.91	-14.81	138.00	11.35	894.51
Mar-12	427.82	118.58	176.99	47.65	104.10	12.98	888.13
Jun-12	452.55	95.33	136.38	20.97	113.93	11.70	830.86
Sep-12	450.93	92.47	115.87	9.74	85.79	11.70	766.50
Dec-12	423.44	49.10	131.06	22.33	94.54	12.43	732.89
Mar-13	645.85	112.56	147.50	-7.19	147.41	13.31	1059.45
Jun-13	316.56	63.40	164.87	-9.56	79.62	12.80	627.68
Sep-13	605.82	139.30	140.61	-32.77	239.05	11.89	1103.89
Dec-13	653.11	177.90	209.05	-11.86	388.88	11.58	1428.67
Mar-14	374.46	145.69	220.06	-19.70	539.95	12.05	1272.51
Jun-14	504.03	172.52	262.88	-1.72	330.15	11.91	1279.76
Sep-14	361.50	94.57	260.08	-24.24	375.75	13.19	1080.86
Dec-14	421.62	83.89	242.75	-38.56	300.60	12.41	1022.71
Mar-15	368.19	117.53	266.98	-38.30	339.14	10.58	1064.11
Jun-15	486.26	191.30	263.86	-42.40	285.15	10.25	1194.43
Sep-15	376.07	132.04	227.99	-59.30	296.27	9.82	982.88
Dec-15	235.09	214.70	218.10	-23.74	361.36	9.42	1014.93
Mar-16	343.26	137.78	156.94	-25.83	359.80	9.75	981.69
Jun-16	366.01	198.71	238.33	-32.76	431.24	10.29	1211.81

Table 3b: Liquidity Creation Over Time in Different Banking Groups (LIC-T1) As Fraction of GTA

In percent

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	0.12	0.23	0.24	-0.05	0.43	-0.05	0.17
Sep-07	0.09	0.24	0.06	-0.07	0.53	0.06	0.13
Dec-07	0.09	0.29	0.04	-0.06	0.69	0.04	0.14
Mar-08	0.16	0.28	0.21	-0.03	0.98	0.44	0.23
Jun-08	0.16	0.32	0.25	0.02	0.99	0.46	0.24
Sep-08	0.19	0.33	0.22	0.01	0.82	0.45	0.25
Dec-08	0.18	0.25	0.20	0.02	0.67	0.46	0.22
Mar-09	0.14	0.16	0.21	-0.01	0.60	0.42	0.17
Jun-09	0.17	0.14	0.21	-0.01	0.49	0.44	0.17
Sep-09	0.11	0.10	0.17	0.00	0.44	0.46	0.13
Dec-09	0.10	0.10	0.19	-0.01	0.49	0.43	0.13
Mar-10	0.11	0.05	0.20	0.02	0.48	0.43	0.12
Jun-10	0.10	0.11	0.22	0.04	0.42	0.42	0.13
Sep-10	0.09	0.10	0.22	0.03	0.48	0.38	0.13
Dec-10	0.10	0.09	0.19	-0.01	0.38	0.35	0.12
Mar-11	0.09	0.10	0.22	0.00	0.38	0.36	0.12
Jun-11	0.11	0.07	0.19	-0.01	0.28	0.32	0.12
Sep-11	0.12	0.09	0.17	-0.02	0.27	0.36	0.12
Dec-11	0.12	0.04	0.15	-0.03	0.29	0.30	0.10
Mar-12	0.09	0.06	0.15	0.09	0.22	0.36	0.10
Jun-12	0.10	0.05	0.11	0.04	0.23	0.32	0.09
Sep-12	0.09	0.04	0.09	0.02	0.17	0.33	0.08
Dec-12	0.08	0.02	0.10	0.04	0.16	0.33	0.07
Mar-13	0.12	0.05	0.11	-0.01	0.26	0.34	0.11
Jun-13	0.06	0.03	0.12	-0.02	0.14	0.34	0.06
Sep-13	0.11	0.06	0.10	-0.05	0.41	0.34	0.11
Dec-13	0.11	0.08	0.14	-0.02	0.63	0.30	0.13
Mar-14	0.06	0.06	0.14	-0.03	0.81	0.32	0.11
Jun-14	0.08	0.07	0.17	0.00	0.50	0.29	0.11
Sep-14	0.06	0.04	0.17	-0.03	0.57	0.33	0.09
Dec-14	0.06	0.03	0.14	-0.05	0.42	0.34	0.08
Mar-15	0.05	0.04	0.15	-0.05	0.45	0.28	0.08
Jun-15	0.07	0.07	0.14	-0.05	0.35	0.24	0.09
Sep-15	0.05	0.04	0.11	-0.06	0.35	0.25	0.07
Dec-15	0.03	0.07	0.11	-0.02	0.40	0.22	0.07
Mar-16	0.05	0.04	0.08	-0.03	0.40	0.24	0.07
Jun-16	0.05	0.06	0.10	-0.03	0.43	0.25	0.08

Table 4a: Liquidity Creation Over Time in Different Banking Groups (LIC-T2)

In billion Rs

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	76.55	18.16	-29.75	-21.81	-6.61	-3.59	32.95
Sep-07	67.14	-8.49	-39.03	-27.34	-9.18	0.42	-16.49
Dec-07	66.74	25.15	-20.20	-21.60	-3.72	0.50	46.87
Mar-08	138.07	43.72	-26.44	-24.13	-2.94	12.40	140.68
Jun-08	100.87	63.50	-9.65	-20.71	-2.62	14.16	145.56
Sep-08	124.54	76.60	4.25	-18.50	-6.97	13.61	193.53
Dec-08	198.65	60.52	-7.98	-17.01	-13.05	12.73	233.85
Mar-09	87.44	38.52	-19.78	-27.59	-12.83	12.16	77.92
Jun-09	198.97	14.64	-14.48	-32.84	-21.13	12.13	157.30
Sep-09	54.24	-11.88	-36.32	-27.80	-28.70	12.44	-38.02
Dec-09	69.06	-20.97	-24.24	-25.49	-25.74	12.19	-15.20
Mar-10	20.02	-31.77	-39.56	-19.70	-30.81	11.60	-90.22
Jun-10	38.26	-16.67	-34.56	-14.50	-28.16	11.23	-44.40
Sep-10	4.29	-23.25	-35.40	-15.95	-31.42	10.16	-91.57
Dec-10	2.58	-28.30	-40.20	-23.09	-45.79	9.56	-125.25
Mar-11	-29.90	-33.88	-44.12	-21.47	-55.39	9.62	-175.13
Jun-11	44.08	-51.27	-55.34	-27.73	-57.15	8.49	-138.93
Sep-11	68.14	-63.19	-63.20	-34.11	-66.42	9.27	-149.52
Dec-11	-19.23	-94.27	-60.94	-38.80	-59.34	8.68	-263.91
Mar-12	-81.87	-75.30	-45.79	-30.72	-53.15	9.67	-277.16
Jun-12	-88.66	-69.04	-60.63	-19.43	-49.79	8.42	-279.14
Sep-12	-32.43	-80.37	-70.82	-35.72	-48.90	9.22	-259.02
Dec-12	-86.73	-82.68	-63.92	-39.75	-55.38	8.35	-320.10
Mar-13	4.78	-105.20	-72.51	-43.69	-62.40	8.77	-270.25
Jun-13	-167.16	-97.48	-64.64	-43.47	-51.04	9.23	-414.56
Sep-13	-180.58	-103.56	-63.77	-50.42	-56.48	9.23	-445.58
Dec-13	-180.40	-70.82	-36.85	-39.19	-48.72	8.31	-367.66
Mar-14	-277.76	-94.62	-65.38	-49.53	-49.99	8.87	-528.41
Jun-14	-100.96	-30.41	-17.71	-37.80	-14.34	7.66	-193.55
Sep-14	-229.57	-106.03	-16.00	-55.00	-43.04	9.12	-440.53
Dec-14	-253.04	-118.77	-8.79	-73.37	-25.94	9.64	-470.27
Mar-15	-334.83	-147.23	-49.70	-72.53	-47.33	9.34	-642.27
Jun-15	-222.26	-64.92	-64.09	-79.37	-40.94	8.28	-463.31
Sep-15	-317.30	-144.99	-80.75	-96.53	-60.45	8.48	-691.55
Dec-15	-273.86	-104.17	-78.89	-76.95	-64.73	7.79	-590.82
Mar-16	-450.25	-153.27	-123.98	-75.63	-75.78	8.24	-870.68
Jun-16	-303.44	-75.16	-61.26	-70.73	-97.05	8.77	-598.87

Table 4b: Liquidity Creation Over Time in Different Banking Groups (LIC-T2) As Fraction of GTA

In percent

	1--5	6--10	11--15	16-20	20-30	30-40	Overall
Jun-07	0.03	0.02	-0.04	-0.08	-0.02	-0.07	0.01
Sep-07	0.03	-0.01	-0.05	-0.10	-0.04	0.02	0.00
Dec-07	0.02	0.03	-0.02	-0.08	-0.01	0.01	0.01
Mar-08	0.05	0.04	-0.03	-0.08	-0.01	0.36	0.03
Jun-08	0.03	0.05	-0.01	-0.06	-0.01	0.38	0.03
Sep-08	0.04	0.06	0.00	-0.05	-0.02	0.36	0.03
Dec-08	0.06	0.05	-0.01	-0.05	-0.04	0.34	0.04
Mar-09	0.03	0.03	-0.02	-0.08	-0.04	0.35	0.01
Jun-09	0.06	0.01	-0.02	-0.09	-0.07	0.36	0.02
Sep-09	0.02	-0.01	-0.04	-0.07	-0.09	0.38	-0.01
Dec-09	0.02	-0.01	-0.02	-0.06	-0.08	0.35	0.00
Mar-10	0.01	-0.02	-0.04	-0.05	-0.09	0.36	-0.01
Jun-10	0.01	-0.01	-0.03	-0.03	-0.08	0.33	-0.01
Sep-10	0.00	-0.01	-0.04	-0.04	-0.09	0.31	-0.01
Dec-10	0.00	-0.02	-0.04	-0.05	-0.12	0.27	-0.02
Mar-11	-0.01	-0.02	-0.04	-0.05	-0.14	0.28	-0.02
Jun-11	0.01	-0.03	-0.05	-0.06	-0.13	0.23	-0.02
Sep-11	0.02	-0.03	-0.06	-0.07	-0.15	0.25	-0.02
Dec-11	0.00	-0.05	-0.05	-0.07	-0.12	0.23	-0.03
Mar-12	-0.02	-0.04	-0.04	-0.06	-0.11	0.27	-0.03
Jun-12	-0.02	-0.03	-0.05	-0.03	-0.10	0.23	-0.03
Sep-12	-0.01	-0.04	-0.06	-0.06	-0.10	0.26	-0.03
Dec-12	-0.02	-0.04	-0.05	-0.06	-0.10	0.22	-0.03
Mar-13	0.00	-0.05	-0.05	-0.07	-0.11	0.22	-0.03
Jun-13	-0.03	-0.04	-0.05	-0.07	-0.09	0.25	-0.04
Sep-13	-0.03	-0.05	-0.05	-0.08	-0.10	0.26	-0.04
Dec-13	-0.03	-0.03	-0.03	-0.06	-0.08	0.22	-0.03
Mar-14	-0.05	-0.04	-0.04	-0.07	-0.08	0.23	-0.05
Jun-14	-0.02	-0.01	-0.01	-0.05	-0.02	0.18	-0.02
Sep-14	-0.04	-0.04	-0.01	-0.08	-0.07	0.23	-0.04
Dec-14	-0.04	-0.04	-0.01	-0.09	-0.04	0.26	-0.04
Mar-15	-0.05	-0.05	-0.03	-0.09	-0.06	0.25	-0.05
Jun-15	-0.03	-0.02	-0.03	-0.09	-0.05	0.19	-0.03
Sep-15	-0.04	-0.05	-0.04	-0.11	-0.07	0.21	-0.05
Dec-15	-0.04	-0.03	-0.04	-0.08	-0.07	0.18	-0.04
Mar-16	-0.06	-0.05	-0.06	-0.08	-0.08	0.20	-0.06
Jun-16	-0.04	-0.02	-0.03	-0.07	-0.10	0.21	-0.04