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EMPIRICAL ANALYSIS OF CAPITAL, FUNDING LIQUIDITY AND BANK LENDING IN EMERGING MARKET ECONOMIES: AN APPLICATION OF SYSTEM GMM APPROACH

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Abstract

Funding Liquidity is the key component of loanable funds of the bank. Sufficient liquidity also boosts banks' ability to pay-off its dues timely but at the same time it has been proven to be a significant determinant of various historical banking sector crises all over the world. However, there exists very weak empirical evidence suggesting a clear relationship between funding liquidity and bank lending growth (BLG). We have attempted to address this gap by empirically testing the impact of bank capital, funding liquidity and their interaction variable on the BLG using a dataset of 59 commercial banks operating in India for the period 2006 to 2018 consisting of 21 public sector banks, 18 private sector banks and 20 foreign banks. An attempt has been made to examine the interactive impact of the bank capital and funding liquidity ratio on BLG rate using system GMM approach. Our model reveals a positive and significant impact of capital funding, indicating induction of capital in bank leads to higher growth in BLG rate. The results also suggest that the interaction impact of funding liquidity and bank capital on the bank lending growth is significantly negative. Further, a higher capital induction neutralises the overall impact of funding liquidity on the bank lending growth. The study provides implications for academicians and policy makers to comprehend the role of funding liquidity.

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I. Introduction

Banks play a pivotal role in fueling the economic development of a country by bridging the gap between funding surplus units and deficit units. Banks serve the essential function of mobilising savings of individuals and institutions and channelize them to those individuals and institutions willing to invest in economic activities or in other productive use. Both the existing theoretical and empirical literature suggest that bank lending is a fundamental process that fuels economic growth by creating jobs, fulfilling demands and thereby enhancing the living standard of people. Moreover, banks create liquidity during this transformation process by holding illiquid assets, financing long term bank assets (loans) with short term liabilities (bank deposits) and fulfill the liquidity requirements of an economy (Diamond & Dybvig, 1983). This transition at times may leave banks susceptible to funding liquidity risk when these long-term assets and short-term liabilities are misaligned. Nevertheless, this misalignment is termed as funding liquidity risk in the theory of banking, which is known to have played a key role in nearly all historical banking crises. Evidently, the global financial crisis 2007-2009 illustrated how Funding liquidity crisis leads to a severe inter-market collapse (Drehmann & Nikolaou, 2013).

In the upshot of the global financial crisis 2007-2009, bank liquidity became one of the prominently explored areas for setting up global financial regulatory reforms. The Basel III accord (2010) introduced a new liquidity coverage ratio, capital regulations and net stable funding ratio measures to ensure the stability and soundness of the banking system to do away with the dangers of liquidity crunches in the short run. However, it is uncertain whether the new funding liquidity requirements and other crucial capital

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regulatory reforms would ensure the stability of the banking sector in long run (Allen et al., 2012; Basten, 2020; Fidrmuc & Lind, 2020; Nguyen et al., 2019). Many academicians argued that the regulatory reforms may prove to be a costlier precaution than handling a financial crisis after it took place.

As far as the role of liquidity is concerned, the literature strongly supports that it plays a key role in the stability and soundness of the banking industry. However, the source of liquidity redefines its interrelations and magnitude of impact on its performance in different business cycle horizons. Brunnermeier and Pedersen (2008) in their study found a mutually reinforcing association between market liquidity and funding liquidity. That is, if banks face a phenomenon of tight funding liquidity, they become reluctant to take capital intensive positions even in high edge securities (Brunnermeier & Pedersen, 2008). This eventually cuts market liquidity and leads to even higher volatility (Sharma et al., 2008)which in turn increases the cost of lending given the Basel III regulatory norms in place.

Moreover, as far as the availability of funding liquidity and its impact on the lending behaviour of banks is concerned, very little is known till date. On one hand, there is a large agreement that it significantly moderates the commercial banks' lending (Dahir et al., 2018a) and on the other hand, a large literature exists that does not support the fact and states that funding liquidity exerts a moderate impact on bank lending. However, there are no established relationships has been identified between these variables till date. The impact of funding liquidity on lending growth rate in developed countries and BRICS countries taken together is significantly negative whereas the same is insignificant for many Emerging market economies including India.

To fill this existing gap in literature we have undertaken this study to develop a better understanding of the potential relation between banks

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funding liquidity, capital funds and bankers' lending behaviour especially in reference to emerging market economies like India.

In this context, funding liquidity is considered to be the ability of an individual bank to arrange funds as and when the agreed-upon payments become due with no extra cost incurred (Drehmann & Nikolaou, 2013).

Overview of lending practices of Indian Commercial Banks

The Indian economy is engrossed by the unprecedented economic slowdown and financial fragility in the recent past which has caused a sharp decline in real fixed investments induced by a sluggish growth of real consumption in the country. Deceleration in bank lending growth (BLG hereafter) rate is witnessed across all major non-food credit segments, mostly in the service sector. The credit growth rate to the MSME sector has eventually turned negative (Economic Survey, 2020). Apart from the repercussions of other empirically tested explanatory factors, such decline can also be attributed to growing risk aversion of banks and built up NPAs despite the admission of more than 2000 industry insolvency resolutions since 2017. Moreover, monetary transmission remained weak during this period on all three accounts viz. Rate structure, Term structure and Credit growth.

Recent improvements in asset quality and profitability of the banking sector are at an amorphous stage. RBI in the year 2017-18 has put forward a revised framework with the Insolvency and Bankruptcy Code (IBC) as a focal point in pursuit of declogging of banks' balance sheet from an overhang of stressed assets. The capital ratios of public sector banks have witnessed an improvement due to recapitalisation. To summarise, it can be said that the Indian banking sector is supposed to be stronger due to extra capital cushions for shock absorption, more stable liquidity status and streamlining of stressed assets. Surprisingly, on the other hand, banks seem to be reluctant to lend (RBI, 2020). This possible waning of

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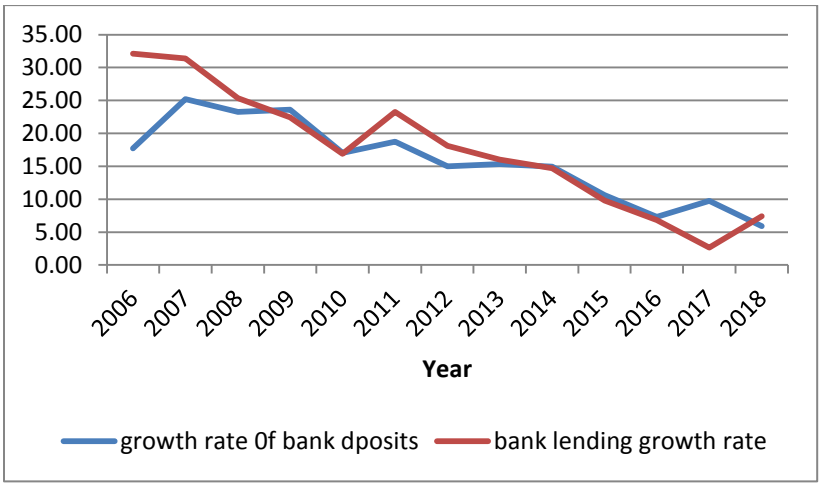
confidence and reluctance to infuse lending can be a heavy toll on overall economic activities.

Figure 1 shows the bank lending growth rate and the growth of deposits in scheduled commercial banks in India over the years. The lending growth has constantly been falling and has been the lowest in 2017 when the deposit growth rates showed a strictly converse trends, which can be associated with the fact that demonetisation in country-led a huge collection of peoples cash holdings to the bank savings account due to the panic of losing its value. The lowest growth during this period could be explained by the reduced demand for consumption of durables and other luxury goods combined with a fall in demands for institutional loans by producers and industries. Also, the Basel committee post-global financial crisis made stringent regulations for maintaining the minimum capital and the liquidity coverage ratio which led to a huge induction of capital and liquidity to the banking system all over the world including the Indian banking sector since 2012. However, it did not seem to have a positive impact on the BLG rate. Now the question is when literature strongly suggests that capital and liquidity are expected to increase the BLG than why the actual results are varying from the bank theory.

Figure 1: Growth in bank lending and bank total deposits



Source: RBI database and author's calculations

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At this juncture, it becomes very important to analyse why recapitalisation, insolvency and bankruptcy code and even regulatory reforms to improve the bank liquidity status could not solve the problem of reluctance of bankers to lend more. In our study, we have tried to contribute to the ongoing debate by bridging the gap between the existing literature and banks' lending behaviour in the real world.

The primary objectives of our study are to establish a relation between funding liquidity and BLG in the context of India and how the relationship is being reiterated in the presence of bank capital. We have also established a relationship between bank capital and lending growth. The paper contributes to the literature in the following ways. Firstly, checks the validity of existing literature on the effect of funding liquidity, bank liquidity and bank capital on BLG and their implications in the context of India. We have also explored the iterations made by recapitalisation on the association between funding liquidity and BLG in the context of India.

Our study bridges this gap by empirically testing the interrelation hypothesis among funding liquidity, banks capital and bank lending behaviour of scheduled commercials banks in India. The remaining paper is organised as follows: Section II describes a review of relevant literature. Section III and Section IV present research methodology and discussion of empirical results respectively. Section V reports the conclusion and policy implications.

II. Review of relevant Literature

The global financial crisis 2007-2009 unveiled the phenomenon of regulatory and institutional shortcomings in liquidity risk management at individual institutions (IMF, 2010). The slowdown in global growth and domestic growth impulses in the recent past has also affected bank credit growth. The effects can clearly be viewed on many Emerging Markets Economies too. Consequently, the global regulatory environment has

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undergone directive improvements in banks' liability side items to strengthen the bank credit growth and thereby strengthen the overall economy. Bank regulators committee recognised the importance of bank capital and the availability of sufficient funding liquidity. Inline, the Basel Committee introduced regulations to maintain appropriate liquidity and capital. Basel III framework can be understood as an evolution, largely drawn from existing Basel II framework with the objective to build a strong capital base for banks and ensure comprehensive liquidity and leverage ratios to avoid the deepening of ongoing slowdown or early development of any financial fragility which can lead to a stressful financial crisis in future. The underlined objective of Basel III accords is to ensure the safety and stability of the global banking system.

There is a growing literature on factors affecting the bank credit growth in Emerging Market Economies (EMEs), particularly after the recent global financial crisis. The association among bank-specific variables, macroeconomic variables and bank lending behaviour has been immensely explored by many academicians(Gupta, 2015b). Matousek and Solomon (2018) empirically tested the dynamic effects of monetary shocks over the loans by large banks, highly liquid banks and highly capitalised banks. They found that large banks and higher capitalised banks are comparatively less affected by monetary shocks whereas the loan disbursement by highly liquid banks is not affected (Matousek & Solomon, 2018). King et. al. (1993) cites a significant association between the size of the financial system of the country and the level of the country's economic development emphasizing the increasing role of financial intermediation, banks in particular (King & Levine, 1993).

Many studies have explored bank liquidity and the consequences of bank liquidity risk but very few have talked about the funding liquidity so far. The IMF Financial Stability Report 2010 has defined funding liquidity as "the ability of a solvent institution to make agreed-upon payments in a timely fashion". In other words, funding liquidity can be defined as the degree of

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freedom and economic efficiency in the borrowing of financial assets by financial institutions.

Acharya and Naqvi (2012) studied how macroeconomic risk alters the availability of funding liquidity with banks and thereby encourage them to invest in more risky assets. They argue that when there is high macroeconomic risk in the economy, investors avoid direct investments in the financial assets market rather they perceive bank demandable deposits to be a safer outlay to invest with. Therefore, excessive liquidity induces more risk-taking behaviour on part of the bank (Acharya & Naqvi, 2012; Gatev & Strahan, 2006; Myers & Rajan, 1998).

Hugonnier and Morellec (2017) explored the relationship between the bank capital, liquid reserves and insolvency risk and found that the choice of bank policy for imposing liquidity requirements lower the bank losses in default by increasing the likelihood of default. Whereas combining requirements of liquidity with leverage, is found to reduce both the likelihood of default and the total bank losses in default (Hugonnier & Morellec, 2017).

As far as Emerging economies are concerned, studies conducted on the analysis and implications of funding liquidity lack empirical pieces of evidence. Several of the recent studies talk about the funding liquidity risk and its effects on bank lending behaviour and its performance (A. M. Dahir et al., 2019; Drehmann & Nikolaou, 2013; Gupta, 2015a; Khan et al., 2017; Umar & Sun, 2016) but most of the propositions and hypotheses drawn have mostly been empirically tested over the banking system of developed countries. a few which has empirically tested such propositions on BRICS countries or other Emerging Market Economies (EMEs) like Vietnam and others, have broadly ignored the fact that some such EMEs (like India) which were slightly resilient to the recent global crisis are likely to exhibit different behaviour (Ahmed Mohamed Dahir et al., 2018).

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Moreover, the joint effect of capital levels and funding liquidity on loan growth and the interaction effect of these two vital factors have been raised lately. Dahir et al., (2018) have explored such relation on data pertaining to BRICS countries (Brazil, Russia, India, China and South Africa) and paved the way for further exploration in the area. However, based on our empirical results, we found the conclusions are quite contradictory if tested on Indian commercial banks' lending behaviour. Averaging out of variables from various BRICS countries seems to have occurred such implications.

To sum up, broadly the theories of empirical implications of funding liquidity on bank lendings are based on developed economies and BRICS countries. These implications seem to vary when tested for India. Based on these existing propositions we have tested the following hypothesis :

H1: Funding liquidity and banks' lending behaviour has a positive association in the context of India

Plenty of literature supports the hypothesis suggesting the availability of sufficient deposits leads to an increase in the BLG(Acharya & Naqvi, 2012). In addition, pieces of evidence show adequate funding liquidity saves banks from possible exposure to liquidity crises which may further lead to bank crises (Acharya & Merrouche, 2013). However, regulatory liquidity seems to have a contradictory impact on bank lending as it's a compulsory reserve that banks need to maintain which in turn leads to reducing the lending(Mittal, 2015). Thus, funding liquidity exerts a negative impact on the growth rate of bank lending.

H2: Banks with higher capital tends to increase their loan growth rate

Kosak et al., (2015), studied the impact of tier 1 capital and tier 2 capital on bank lending growth and reported a very interesting set of findings. The authors concluded that tier 1 capital had a significantly positive impact on the bank lending during the recent financial crisis whereas tier 2 capital did

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not show any such associations (Košak et al., 2015). In the same line, Ibrahim and Rizvi (2018) found no such significant impact of bank capital on their lending behaviour during the 2007-2009 global financial crisis under both the banking systems vis. the conventional banking system as well as the Islamic banking system (Ibrahim & Rizvi, 2018). Therefore, Conventional literature on the linkage between bank capital and BLG does seem conclusive.

However, Basten (2019) claimed that higher bank capital requirements may cause a fall in the BLG rate as it evidently calls for a higher mortgage price. Also, a high capital requirement may affect the economy adversely as it prevents the extend more lending (Basten, 2020; Fidrmuc & Lind, 2020).

H3: The impact of funding liquidity on BLG is positively associated with different levels of bank capital

Literature suggests that adding an interaction term to the analytical model greatly expands the understanding of the relationships among the variables in the model. The inclusion of an interaction term (i.e. capital) in an analytical model provides a better representation and understanding of the existing relationship between the funding liquidity and BLG. We have attempted to analyse how the induction of more capital has affected the positive association between funding liquidity and BLG during the period 2006- 2018 in India.

Not much work has been done so far on the interaction effect of bank capital and funding liquidity. However, Dahir et al (2018a) empirically tested the association between the effect of funding liquidity on lending practices of banks and the level of bank capital in BRICS countries and claimed that a fall in funding liquidity is positively associated with the bank capital.

III. Methodology and data specification

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In this section, we will present the econometric model and empirical estimations to examine the lending behaviour of commercial banks in India. Moreover, we will also discuss the data specifications and variable measures.

Existing literature on identifying factors that determine an individual bank's lending behaviour suggests a dynamic panel model. It is believed that the current year's lending decisions are normally dynamic in nature as the previous year's lending decisions along with other explanatory variables, may affect their current year's lending behaviour. Hence, to explore the bank lending behaviour, we employed the dynamic panel data approach which is represented by the following equation:

$$blg_{it} = \alpha_0 + \rho_1 * blg_{it-1} + \beta_1 * ful_{it} + \beta_2 * pcap_{it} + \beta_3 * (ful_{it} * pcap_{it}) + \beta_4 * liq_{it} + \beta_5 * size_{it} + \phi_i Y_t + \varepsilon_{it}$$

Where blg_{it} is BLG as a proxy for bank lending behaviour, blg_{it-1} is lagged BLG of commercial banks chosen to study. ful_{it} and $pcap_{it}$ represent the funding liquidity and proxy for bank capital respectively. $ful_{it} * pcap_{it}$ is an interaction variable, which intends to capture the effect of funding liquidity when banks are recapitalised and bank capital increases suddenly due to an external force. Liquidity and Bank size are measured by liq_{it} and $size_{it}$ respectively. We also control the time effect in our model. Y_t is the vector of the time effect for the years 2006 to 2018.

We have studied the impact of funding liquidity, bank capital and the interaction effect of bank capital and funding liquidity on the BLG rate of banks in India. We have controlled the other bank-specific variables like liquidity, bank size and other exogenous macroeconomic variables in our model.

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Estimation method

Inclusion of lagged dependent variable as the explanatory variable allows dynamic adjustments in an econometric model. However, it gives rise to the problem of endogeneity as the lagged variable is correlated with the dependent variable. To take care of the endogeneity issue Das (2019) suggested two alternative methods viz. Instrumental Variable (IV) methods and the Generalised Method of Moments (GMM) to be very useful (Das, 2019). Also, the GMM estimator has become very popular in the area of finance as it provides asymptotically efficient inference by using a minimal set of statistical assumptions.

The Generalised Method of Moments (GMM) to estimate the dynamic panel data and solve the endogeneity, heteroskedasticity and serial correlation problem turns to be a handy and useful instrument in the area of banking and finance. The estimator is also known as the Arellano-Bond estimator, is used to estimate the dynamic panel models. It contains both the levels and the first difference GMM estimator. But when the variance of fixed effect term across observations is high or in cases when the stochastic process (Mittal, 2017) is approaching random walk, this estimator may produce biased results in finite samples. To address this problem Blundell and Bond (1998) derived a condition in which the estimator allows an additional set of moment conditions. This configuration helps to improve the performance of estimators (Blundell & Bond, 1998).

Moreover, by removing the bias generated by panel models, system GMM is known for generating efficient and consistent estimates (Dahir et al., 2018a). It also allows using multiple instruments, which is one of the biggest advantages that help in a comprehensive analysis of the problem. The consistency of System Generalised Method of Moments estimator depends on two specification tests viz. Hansen/Sargan test for over-identification restrictions and a serial correlation test of the error terms.

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Furthermore, our paper covers a panel of 59 scheduled commercial banks comprising of 21 public sector banks (PSUs), 18 private sector banks and 20 foreign sector banks. Although, the dataset is small but it has a balanced ownership representation.

Data measurement and estimation

In this section, definitions, abbreviations, variable estimations and their expected signs have been discussed. Our sample consists of 59 scheduled commercial banks in India for the period 2006-2015. The data has been collected from the RBI databank. The final dataset is a strongly balanced panel. Moreover, the original dataset included nearly 90 commercial banks including 26 public sector banks (6 SBI and associates which were merged and converted to 1 bank in the year 2018), 21 private sector banks and 47 foreign banks for which database was available for the year 2005 to 2018. However, we dropped banks that were closed during the study period or established in between to avoid the omitted and unnecessary data outliers. In doing so, data became a strongly balanced panel of 59 banks having 13 years of observations for each subunit.

We used BLG rate (a proxy for bank lending behaviour) as the dependent variable, following the previous studies (Ibrahim & Rizvi, 2018; Kim & Sohn, 2017; Vo, 2018). The BLG rate can be defined as a variation of banks gross loans from year t to t-1.

The explanatory variables used in the model are Funding liquidity and bank capital. Funding liquidity has been defined in the literature as the degree of freedom and economic efficiency in the borrowing of financial assets by financial institutions. It is related to the ability of a bank to pay off the liability as and when they become due in a timely manner. To study its impact, we have taken the ratio of total bank deposits and total assets as the proxy for funding liquidity (A. M. Dahir et al., 2019; Khan et al., 2017). Dahir et al

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suggest a negative and significant impact of funding liquidity on the lending behaviour of banks in BRICS countries.

The ratio of total bank capital divided by total assets is used as the proxy for capital (A. M. Dahir et al., 2019). Theoretical literature suggests a significant and positive impact of capital ratio on the BLG rate of commercial banks.

Moreover, bank size is expected to exhibit a significant association with bank lending behaviour, funding liquidity and bank capital. And hence, to analyse the partial effect of our explanatory variables we took bank size as well as the liquidity ratio as the control variables. Literature suggests bank size is likely to have a positive impact on BLG (A. M. Dahir et al., 2019). The natural log value of total assets of the bank has been taken as the proxy for bank size. The liquidity ratio is calculated by dividing the liquid assets of the bank by banks' total assets (Ahmed Mohamed Dahir et al., 2018; Diamond & Dybvig, 1983).

The liquidity has been defined by the RBI as the sum total of cash with bank, balances with RBI, balance in current account with other banks, money at call and short notice, interbank placements (within 30 days), and security held under the head "held for trading and available for sale". Bank liquidity is expected to exhibit a positive impact on the BLG rate.

Considering the macroeconomic variables like GDP growth rate, inflation level over the years and other time-related disturbances, a time effect model has been employed. The time effect model captures the long run cross-section invariant disturbances and produces unbiased results.

Further interaction effect between the funding liquidity and bank capital has been studied. Dahir et al. (2018) examined such an effect on BRICS countries in their study using the LSDVC approach and found that the effect

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of a decrease in funding liquidity on BLG has a positive relationship with the bank capital.

IV. Analysis of Results

In this section, the descriptive statistics and correlation matrix analysis of variables of interest are discussed. A detailed system of GMM estimation results and robustness check estimators are also reported.

Table 1 represents the descriptive statistics of bank lending behaviour (BLG ratio) and the independent variables used in dynamic panel data analysis. The table describes the independent variable with a short description in column 1. These values of 767 observations are in ratio except the natural log of total bank assets which is in crore.

It shows that the BLG has a mean value of 0.22% which is ranging from -0.76 to 9.56% with a standard deviation score of 0.48, suggesting that bank lending in India roughly grows at a 0.22% rate annually. The average funding liquidity is 71% with a variability 18.89% which is ranging between 6% and 92%. It suggests that there is a high degree of variation among the funding liquidity content in various banks. The capital has 5.5% mean value ranging from no capital to 57.05% and variability of 9.92%. The liquidity ratio having an average value of 13.35% with the variability of 13.73% ranges from 1.56% to as high as 79.9%. Moreover, the size of the commercial banks in Indian seems to be quite stable as mean and median values are very close to each other with a variability of 2.41 units. However, it ranges from 3.40 to 15.055 depicting a significant size difference among the public, private and foreign bank holdings.

Table 1: Summary Statistics

Variable	Description	Mean	Median	Std Dev	Minimum	Maximum	observations
$\mathbf{blg}_{it}$	BLG (%)	0.2268	0.1816	0.4802	-0.7607	9.5651	767
$\mathbf{ful}_{it}$	Funding Liquidity	0.7174	0.8066	0.1888	0.0692	0.9257	767

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	(ratio)						
$pcap_{it}$	Capital (ratio)	0.0550	0.0073	0.0992	0.0000	0.5705	767
liq_{it}	Liquidity (ratio)	0.1335	0.0843	0.1373	0.0156	0.7994	767
$size_{it}$	Natural log Bank assets (in crore)	10.1840	10.7548	2.4132	3.4037	15.0553	767

Table 2 reports the correlation matrix of the dependent and the independent variables. It describes that the dependent variable is negatively correlated with most of the variables of our study except the bank capital, suggesting the BLG is expecting to have upward trends when the funding liquidity, bank liquidity and size are reducing. Similarly, funding liquidity seems to have a negative correlation with bank capital and bank liquidity. Bank capital shows a positive association with BLG and bank liquidity, suggesting an increase in bank capital supports the BLG and bank liquidity to absorb the shocks.

Table 2: correlation Matrix Analysis

Variable	blg_{it}	ful_{it}	$pcap_{it}$	liq_{it}	$size_{it}$
blg_{it}	1				
ful_{it}	-0.14	1			
$pcap_{it}$	0.08	-0.65	1		
liq_{it}	-0.02	-0.2	0.4	1	
$size_{it}$	-0.1	0.47	-0.7	-0.65	1

Empirical linear Regression Analysis

Table 3 reports the results of our estimation model using the system GMM estimations. We have fitted the 2-step model with step 1 f (b) value 0.003340 and step 2 f (b) 0.00334041. We had 708 observations (excluding the missing values) with 59 groups (banks) having 12 observations per group, indicating a strong panel. The model reports WC- robust standard error to ensure the robustness of estimators.

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The results indicate that the lagged dependent variable (BLGt-1) is positive and statistically significant at 1% significance level, suggesting the bank lending in Indian banks are sustained for the next year. It indicates the commercial banks in India are persistent as far as their lending decisions are concerned. As far as explanatory variables are concerned, the bank capital and its interaction effect on the relation of funding liquidity with bank lending are significant at a 10% significance level. It shows that bank capital has a positive impact on bank lending and is also significantly associated with the relationship between the funding liquidity and banks' lending decision.

Hence, we reject the H1, which hypothesised a significant positive relationship between funding liquidity and BLG. However, we do not reject the H2 that postulates a positive and significant impact of bank capital on bank lending, suggesting an increase in bank capital significantly contributes to the further growth of bank lending. We also reject H3 that hypothesises that the effect of funding liquidity on BLG is positively associated with the level of bank capital. An interaction effect of funding liquidity and bank capital on BLG is considerably greater than their individual effects. A significant r-value of the interaction term coefficient depicts that the linear relationship between funding liquidity and BLG changes with the change of level of capital. Our results show that the high capital level reduces the effects of funding liquidity on BLG. This impact can be associated with the fact that the recent recapitalisation of under-performing public sector banks could not increase their lending performance much. The capital so induced (given the resulting increase in funding liquidity in 2017 due to demonetisation) was sufficient to meet the minimum capital maintenance regulations and has no significant positive impact on the correlation between funding liquidity and BLG.

Moreover, the liquidity seems to exert a positive and highly significant impact with a 0 p-value indicates the increase in bank liquidity leads to an increase in BLG rate.

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Table 3: System GMM Estimation Results

blg	Coeff.	WC-Robust Std. Error	t value	p> |t|	[95% confidence. Interval]	
Blg_{it-1}	0.9885	0.2879	3.43	0.001***	0.4121	1.5649
Ful_{it-1}	0.2297	0.2353	0.98	0.333	-0.2412	0.7008
$Pcap_{it-1}$	5.1419	2.8270	1.82	0.074*	-0.5170	10.8010
Liq_{it-1}	0.9622	0.2548	3.78	0.000***	0.4529	1.4724
Ful_{it-1} *$pcap_{it-1}$	-12.6430	6.6451	-1.90	0.062**	-25.9448	0.6587
$Size_{it-1}$	0.001853	0.0207	0.09	0.929	-0.0397	0.0434
Year						
2008	-0.1273	0.1382	-0.92	0.361	-0.4041	0.1494
2009	-0.2201	0.0978	-2.25	0.028**	-0.4159	-0.0243
2010	-0.0016	0.1101	-0.02	0.988	-0.2221	0.2187
2011	0.1068	0.1166	0.92	0.364	-0.1266	0.3403
2012	-0.1810	0.1087	-1.66	0.101	-0.3987	0.0366
2013	-0.0745	0.1000	-0.75	0.459	-0.2748	0.1256
2014	-0.0658	0.1049	-0.63	0.533	-0.2759	0.1443
2015	-0.0395	0.1112	-0.36	0.724	-0.2622	0.1832
2016	-0.1081	0.1059	-1.02	0.312	-0.3202	0.1039
2017	-0.0293	0.1500	-0.20	0.846	-0.3297	0.2710
2018	0.0239	0.1463	0.16	0.871	-0.2690	0.3168
_cons	-0.2067	0.3481	-0.59	0.555	-0.9036	0.4901

Note: * p<0.1, ** p< 0.05, ***p< 0.01

Robustness check

To check the robustness of the results we have employed the WC- robust S.E, which ensures the estimation is producing unbiased and robust results. To check the consistency of results given by system GMM

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estimations, the Sargan test of over-identification of instrument variables and serial correlation test is performed.

Hansen/Sargan test for over-identification restrictions has been used to detect whether the model is well specified, by analysing the overall validity of instruments used that shall not be correlated with the error term. The null hypothesis for Sargan/Hansen test is that over-identifying restrictions are valid. We do not reject the null hypothesis with chi2 (2) value 0.7203 (with p-value 0.72) and chi2 (2) value 2.3502 (p-value 0.30) at 2 step weighting matrix and 3-step weighting matrix respectively. It implies that the model is appropriately specified.

Serial correlation test of the error terms, we reject the null hypothesis which states that there is no first-order serial correlation (AR (1)) with p-value 0.0000 for order 1 whereas do not reject the Null hypothesis stating that the second-order serial correlation does not exist in disturbances (AR (2)) with p-value 0.2045.

V. Conclusion

Commercial banks are the most important financial intermediaries because of their size and role in the financial markets. Hence, lending practices of commercial banks have a crucial and significant impact on the growth and development of industries and production units and thereby growth and development of the country. Keeping in mind India's experiences with BLG and various key policy measures taken by the policymakers in the recent past, we have analysed how the bank's lending policy reacts to various levels of capital and Funding Liquidity. To investigate this relationship, we have taken the relevant data for 59 commercial banks operating in India for the period 2006 to 2018.

To serve the purpose, we investigated the linkages between explanatory variables (funding liquidity, bank capital and the interaction effect of these

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two key predictors) and bank lending in India by using a dynamic model. To deal with the inherent endogeneity problem with the dynamic modeling, the System Generalised Method of Moments (System GMM) has been employed.

The findings revealed that funding liquidity in the context of India does not have any significant impact on the banks' lending behaviour. Conversely, bank capital has a significant positive impact on bank lending, which suggests that an increase in capital increases the bank lending growth rate. Besides, the bank liquidity also has a significant positive impact on the BLG rate suggesting the banks' lending rates improve with the increase in bank liquidity funds.

Further, the presence of interaction effects in our model explains how funding liquidity and different levels of capital works together to determine the BLG of commercial banks in India. A significant value of b3 represents a strong positive impact of capital levels on the association of funding liquidity on BLG. It can be interpreted as the effect of funding liquidity on the lending behaviour of banks is different depending on different levels of bank capital. Further, we discovered that the impact of funding liquidity on such lending reduces at high capital levels. In other words, the impact of funding liquidity is significantly conditioned over the different levels of bank capital. This can be an important piece of information to the policymakers in taking the accurate decisions to induce the BLG in presence of interactive association of funding liquidity and the lending growth rate at different capital levels.

Moreover, the inclusion of lagged BLG rate as an explanatory variable allows us to check the impact of past lending practices of banks on the current year's lending rate under the dynamic settings of the econometrics model. We found that banks' lending growth rate is significantly influenced by their past values with a significant p-value of less than 1%.

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The findings imply that capital funds and liquidity funds support the BLG rate in the country by strengthening and neutralising the risk involved and absorbing the losses generated by stressed assets.

Furthermore, our study contributes to the existing literature in the following ways. The theories revealed by earlier studies conducted on developed economies, other emerging market economies and BRICS countries to check the impact of funding liquidity on bank lending do not go in line with the Indian banking system. For example, (Ahmed Mohamed Dahir et al., 2018) found a significant and negative impact of funding liquidity on BLG however we found it to be insignificant (p value= 0.3330) and positive. Our study bridges this gap by empirically testing the interrelation hypothesis among banks capital, funding liquidity and bank lending behaviour of scheduled commercials banks of India. This way, our study provides important implications for academicians and policymakers to appreciate the role of funding liquidity.

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