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Monetary Policy, Interbank Liquidity and Lending Behaviour of Banks in India

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Abstract

In this paper we investigate the role of interbank liquidity in monetary policy transmission in India. We employ standard and dynamic panel regression methods to analyze data for 40 commercial banks during the period 1999-2018. We find a significant role of interbank liquidity in easing the negative impact of monetary policy tightening on bank lending. We also find heterogenous role of interbank liquidity in monetary policy transmission across public sector and private sector banks. The policy implication for the monetary authority in India is that managing net liquidity positions of banks is necessary to realize the desired effects of monetary policy.

JEL Classification

C23, E52, E58, G21

Key Words

Monetary policy transmission, Interbank Liquidity, Bank Lending.

1. Introduction

The interbank market is an important source of liquidity for banks in the short-term as it enables the redistribution or transfer of liquidity from banks with surplus funds to banks with a deficit. Several studies have analyzed the role of interbank liquidity in monetary policy transmission (e.g., Lucchetta, 2007; Merkl and Stolz, 2009). Monetary policy affects banks differently through the interbank market in two scenarios (Freixas and Jorge 2008). First, under asymmetric information, where the interbank market is unable to channel liquidity to illiquid

but solvent banks, such banks may ration their credit and cut lending. On the other hand, in a symmetric information scenario, there is flow of liquidity from banks with surplus to banks with deficit and therefore monetary tightening may not have as much effect on bank lending as in the asymmetric information scenario. The lending view of monetary transmission (Kashyap et al. 2002) gets reinforced in the presence of an interbank market with asymmetric information. In this study we analyze the role of interbank liquidity in monetary transmission in India - an emerging economy with a large interbank market. Since the introduction of the liquidity adjustment facility in 2005, the monetary authority viz. the Reserve Bank of India (RBI) has been using its policy rates to influence the interbank rate (call rate) as the target rate of its liquidity operations. Therefore, the interbank liquidity position of individual banks can play a critical role in the effective transmission of monetary policy signals in India. This is the first study to examine the role of interbank liquidity in monetary transmission for the case of India.

Ehrmann et al (2001) examine monetary policy, net interbank position, and lending behavior in the Euro area. They find that smaller banks manage their funds better which helps them to keep their loan portfolio relatively unaffected after a monetary contraction. Gambacorta (2005) studies the monetary policy and lending behaviour in the presence of interbank market in Italy and finds that the presence of internal capital markets in bank holding companies helps to insulate banks from monetary shocks. Lucchetta (2007) investigates the linkage between banks' investments and interbank lending decisions in response to policy rate changes in Europe. She finds that while monetary policy rate negatively affects the liquidity position of banks, there is a positive relationship between lending decisions and interbank interest rates.

Merkl and Stolz (2009) study the impact of monetary policy on lending by German banks and find that banks holding less interbank liquidity are impacted more than others due to monetary tightening. While the above papers study developed markets to show evidence for the

importance of the interbank market in monetary transmission, the case of developing countries has been hardly studied. Chen et al (2013) study the response of interbank lending rate and retail lending in China to changes in monetary policy instruments. They find that the interbank lending rate does not play any role in monetary policy transmission in China. Therefore, it is not clear whether other developing countries such as India would exhibit the role of interbank liquidity as found in case of the developed countries.

The interbank liquidity conditions in India may play an important role in influencing monetary policy transmission. Banks have strict limits on how much they can borrow from the RBI, but they can borrow higher amounts of money from the interbank call money market. Consequently, the interbank market plays an important role in meeting short-term liquidity needs of banks and saving them from liquidity crunch at times of financial distress (Goyal and Agarwal, 2020). Interbank borrowing is attractive also because it is exempt from being included in NDTL (Net Demand and Time Liabilities, on which required reserves are calculated by the RBI), provided the borrowing is for more than 14 days, hence keeping it out of reserve requirements ambit. Public sector banks held around 58 per cent share in the interbank market in 2018, while private sector banks had around 30 per cent share while the remaining share was with foreign banks (RBI, 2019a). Some banks— mostly in the private sector— have incremental credit-deposit ratio greater than one i.e., they give more loans than the money they generate through deposits, while on the other hand, there are banks— mostly public sector— that lend less than they collect in the form of deposits[1]. Thus, the latter are left with surplus liquidity compared to the former, creating the scope for interbank lending and borrowing.

Analyzing the role of interbank liquidity in monetary transmission and the heterogeneity across bank groups has important implications. During monetary tightening, the volume and direction

[1] https://www.livemint.com/Opinion/7o9uPPDqoHGCwuBql3bzIL/The-need-for-a-term-money-market.html

of interbank money can change the course of monetary policy transmission. It would help the central bank to understand how different banks may react differently to monetary policy changes, depending on their liquidity positions in the interbank market. As this issue has been widely studied for other countries but remains under-investigated for India, this paper attempts to uncover the role of interbank liquidity for monetary transmission in India.

The remainder of the paper is organized as follows. In section 2 we discuss the nature and recent trends of the interbank market in India. Section 3 describes the data and the methodology applied in the study. In section 4, we report the results and provide a discussion of our findings. Section 5 presents the robustness checks. Finally, we conclude in section 6.

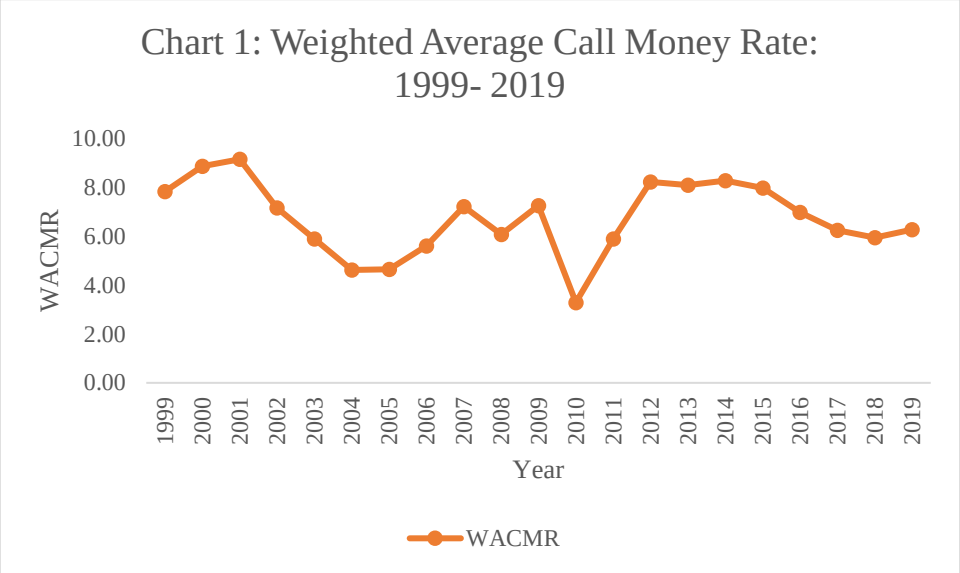
2. Interbank Market in India

The money market in India consists of three segments which are interbank money market, market repo and collateralized borrowing and lending obligation (CBLO). Interbank market is a short-term unsecured market where banks lend and borrow money at the interbank rate, viz. the call money rate. The primary reason for lending and borrowing in interbank market by participants is to meet their statutory reserve requirements. The relationship between credit-deposit ratio of banks and the interbank market may be very much related to liquidity because some banks can access much needed liquidity from this market, while others will park their surplus funds here and earn higher return compared to what they get from buying government securities. Banks can manage their short-term liquidity through interbank lending and borrowing so as to keep up with their lending commitment at the time of monetary contraction by the central bank.

Since the determination of policy rate by the Monetary Policy Committee (MPC) and the process which governs liquidity management operation are different, it is important for the RBI to align the former with the latter. It means that the policy rate set by MPC should be aligned

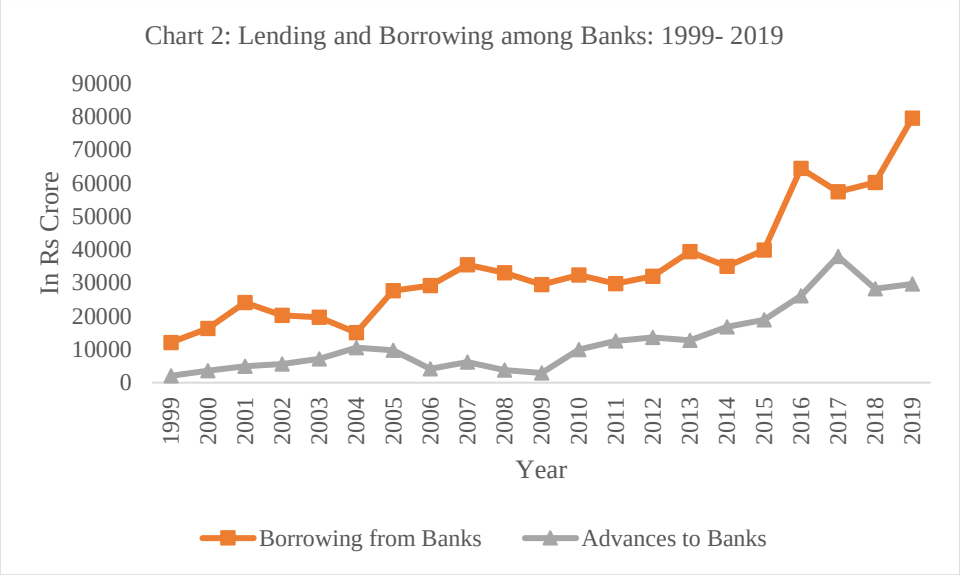
to the target rate or the first leg of monetary policy transmission, i.e., the call money rate. The RBI follows the corridor system of monetary policy whereby the repo rate acts as a policy rate. This system of monetary policy requires the system liquidity to be in deficit because in surplus liquidity conditions the interbank money market tends to gravitate away from the repo rate and towards the reverse repo rate (for parking funds at the reverse repo window). For this reason, the RBI's internal working group to review the liquidity management framework (RBI, 2019b) recommended system liquidity to be kept in deficit with a range of 0.25 per cent – 0.50 per cent of Net Demand and Time Liabilities (NDTL).

Chart 1 shows the fluctuation in the Weighted Average Call Money Rate (WACMR) over 20 years. We observe that since 2012 it has been on a declining path indicating improving liquidity conditions in the interbank market.



Source: RBI website

Chart 2 shows the lending and borrowing by all scheduled commercial banks in the interbank market. We observe that there is increasing trends in both lending and borrowings among scheduled commercial banks implying banks relying upon interbank market for their short-term liquidity requirements.



Source: RBI website

3. Data and Methodology

3.1 Data

Our data source is the RBI website from where all data related to the Indian banking sector is obtained. We use bank yearly data for all variables which spans the period from 1999 to 2018. We have included 40 banks in our study comprising of 26 public sector banks and 14 private sector banks. Table A1 in Appendix A shows the bank-wise count of the number of yearly observations (the total number of bank-year observations is 587). We examine the response of the two bank groups (viz. public sector banks and private sector banks) separately because these bank groups operate on different motives, e.g., private sector banks are mostly run on the motive of profit maximization while public sector banks are not so oriented towards commercial motive due to significant shareholding by the government. Besides, loan disbursal by public sector banks is often influenced by the government while private sector banks are immune to such persuasions. These varying operating motives of banks and government influences on loan disbursal may play an important role in their response to monetary policy rate change. There are several studies which have shown different behavior of separate bank groups in India (e.g., Sensarma 2006 and Bhaumik and Piesse 2008).

For our analysis of the impact of monetary policy and interbank liquidity on bank lending the variables used are as follow. The dependent variable is lending by banks that is proxied by change in log of total loans. We employ Weighted Average Call Money Rate (WACMR) as the monetary policy variable (following Aleem, 2010). Following Lucchetta (2007), the net interbank liability of individual banks has been used to create an indicator for interbank liquidity position (IL Dummy). First, we measure the net interbank liability of a bank as the difference between advances to other banks and borrowings from other banks. Then, we assign the value 1 for positive net interbank liquidity and 0 for negative net interbank liquidity of a bank. This dummy variable intends to capture the role of surplus interbank liquidity (with 0 value for the banks which have deficit interbank liquidity). Capital, size (proxied by total assets) and profit (return on assets) have been used as bank level controls while inflation (proxied by change in log of Wholesale Price Index) and GDP growth rate have been used as macro controls. We report descriptive statistics for all the variables in Table 1.

Table 1
Descriptive Statistics for All Banks, Public Sector Banks, and Private Sector Banks (1999-2018)

	ΔlnTotal Loans	WACMR	lnCap	lnTotal Assets	LnRoA	Net IL	lnWPI	GDP
All Banks								
Mean	0.174	6.695	8.049	13.488	0.859	-2685.408	-0.012	6.776
Median	0.177	6.980	8.276	13.510	0.845	-5.000	0.046	7.660
Minimum	-2.149	3.290	4.673	9.460	-2.310	-111829.000	-0.584	3.090
Maximum	2.484	9.150	11.444	17.110	21.890	131367.300	0.091	8.850
S.D.	0.190	1.458	1.225	1.299	1.457	17447.380	0.185	1.665
Public Sector Banks								
Mean	0.158	6.744	8.230	13.656	0.742	-430.506	-0.004	6.712
Median	0.168	6.980	8.404	13.690	0.750	7.450	0.046	7.660
Minimum	-2.149	3.290	5.150	11.140	-2.800	-111829.000	-0.584	3.090
Maximum	2.484	9.150	11.444	17.110	21.890	131367.300	0.091	8.850
S.D.	0.199	1.489	1.222	1.166	1.537	18289.19	0.173	1.734
Private Sector Banks								
Mean	0.214	6.573	6.604	13.076	1.044	-8262.621	-0.033	6.935
Median	0.202	6.250	7.943	12.987	1.240	-2070.000	0.058	7.410
Minimum	-0.217	3.290	4.673	9.460	-2.070	-87631.000	-0.584	3.090
Maximum	1.152	8.280	9.591	16.180	2.130	20359.000	0.091	8.500
S.D.	0.162	1.375	1.119	1.506	0.833	13697.080	0.212	1.471

We report descriptive statistics of all the bank groups as well as all banks put together. WACMR, Cap, ROA, Net IL, and WPI stand for weighted average call money rate, capital, return on assets, net interbank liquidity, and wholesale price index, respectively.

3.2 Unit Root Test

To verify the stationarity of the variables, we apply four Panel unit root tests, i.e., Levin, Lin, and Chu (LLC), Im, Pesaran and Shin (IPS), Fisher Augmented Dickey–Fuller (Fisher ADF) and Fisher Phillips–Perron (Fisher PP). Following Levin et al. (2002) and Im et al. (2003), we apply the following equation for the panel unit root tests.

$$\Delta y_{it} = \alpha_1 + \delta_{it} + \rho_i . Y_{i,\,t-1} + \sum_{l=1}^{\rho i} \Phi_{il} \Delta y_{i,t-1} + \varepsilon it$$

i= 1, ……, N; t= I, …., T

where y_{it} is the variable value for panel member i in period t, ϵ_{it} is assumed to be independent and identically distributed IID (0, σ^2_{ε}) across and Δ denotes the first-difference operator. The

null hypothesis (non-stationarity) is based on zero value of the ρ parameter for the LLC and IPS tests (Levin et al. 2002; Im et al. 2003) while the Fisher ADF and Fisher PP tests are based on combining the p-values of the underlying ADF and PP statistics (Madalla and Wu, 1999; Choi, 2001).

3.3 Panel Regression

Adopting from Lucchetta (2007), we estimate the following equation.

$$\Delta lnLoan_{it} = \beta_0 + \beta_1 \Delta MP_t + \beta_2 \Delta MP_t * IL\ Dummy_{it} + \beta_3 Capital_{it} + \beta_4 Profit_{it} + \beta_5 Size_{it} + \beta_6 Inflation_t + \beta_7 GDP_t + u_{it} \qquad (1)$$

Equation *1* measures the response of bank lending to monetary policy change and the role interbank liquidity therein. The dependent variable measures incremental loan supply of banks. *MP* refers to the monetary policy variable (WAMCR). Interbank liquidity dummy (IL Dummy) represents the net interbank liquidity position of each bank in each year that is interacted with the monetary policy variable. The rest of the variables are the bank-specific and macroeconomic controls. The regression model is estimated using fixed effects or random effects model as found appropriate by Hausman tests.

4. Results and Discussion

4.1 Panel Unit Root Test

Before we proceed to the panel regression analysis, we tested our variables for stationarity applying the Fisher ADF and Fisher PP tests. The results of the tests are reported in Table 2. We observe that all the variables are stationary at level with the only exception being return on assets in case of public sector banks. However, based on the overall nature of the results we proceeded with the panel regression using all the variables at levels.

Table 2
Panel Unit Root Test for All Banks, Public Sector Banks, and Private Sector Banks (1999- 2018)

	ΔlnTotal Loans	WACMR	LnCap	LnTotal Assets	RoA	Net IL	ΔlnWPI	GDP GR
All Banks								
Intercept Only in the regression								
LLC	-2.772***	-7.862***	-1.362*	-7.174***	-2.192**	-6.777***	-14.390***	-15.082***
IPS	-1.243*	-6.232***	4.827	1.904	-0.937	-5.528***	-11.039***	-11.239***
ADF	112.183***	164.118***	73.584	78.074	102.381**	178.748***	274.441***	282.018***
PP	154.444***	148.004***	73.594	102.558**	101.223**	197.998***	278.998***	350.542***
Intercept and trend in the regression								
LLC	-5.087***	-5.699***	-1.286*	-16.937***	-3.016***	43.992	-16.064***	-0.996
IPS	-0.270	-1.587*	0.198	-4.196***	1.377	-2.512***	-5.591***	-6.531***
ADF	89.179	95.891*	107.073**	153.621***	65.462	139.840***	192.814***	226.553***
PP	136.707***	98.484*	109.764***	170.714***	72.884	161.403***	816.793***	313.962***
Public Sector Banks								
Intercept Only in the regression								
LLC	-0.857	-4.987***	7.748	-5.406***	5.667	-6.323***	-12.732***	-12.238***
IPS	1.260	-5.338***	8.266	2.204	3.938	-5.854***	-10.107***	-9.737***
ADF	49.184	108.585***	19.999	32.422	43.236	140.191***	197.028***	190.911***
PP	55.356	89.249***	29.017	30.232	44.951	156.915***	199.921***	232.581***
Intercept and trend in the regression								
LLC	9.322	-3.634***	2.025	-12.502***	2.308	-5.146***	-14.656	-12.189***
IPS	0.574	-1.935**	1.513	-1.898**	4.023	-3.699***	-5.401***	-6.951***
ADF	46.767	67.802**	64.139*	73.126**	32.376	109.944***	131.294***	163.428***
PP	67.795**	61.163	60.427	61.452	36.530	126.770***	136.152***	218.632***
Private Sector Banks								
Intercept Only in the regression								
LLC	-5.777***	-5.701***	-8.342***	-4.535***	-2.108**	-2.787***	-6.422***	-9.163***
IPS	-3.394***	-3.311***	-2.261**	0.355	-0.829	-1.526	-5.111***	-5.910***
ADF	62.999***	55.533***	53.585***	45.651**	36.069	38.557*	77.413***	91.106***
PP	99.088***	58.755***	44.577**	72.326***	29.410	41.082*	79.076***	117.961***
Intercept and trend in the regression								
LLC	-4.326***	-4.320***	-5.345***	-10.534***	-0.682	-3.336***	-12.739***	-9.428***
IPS	-0.864	-0.328	-1.189	-3.534***	1.721	0.181	-2.657***	-2.413***
ADF	42.412**	28.089	42.934**	80.495***	20.099	29.896	61.519***	63.125***
PP	68.912***	37.321	49.338***	109.261***	25.371	34.633	50.641***	95.330***

This table reports panel unit root test for all banks together, public sector banks and private sector banks.

4.2 Panel Regression Estimation

We report the results of panel regression in Table 3 for all banks put together, and separately for the groups of public sector banks and private sector banks. We find that, for the full sample with all banks put together, impact of monetary policy on bank lending is negative (the coefficient of the monetary policy variable is -0.006) and significant at 5% level. It means that as monetary policy tightens there is a decline in loans disbursed by banks. The negative

relationship between monetary policy and bank lending is in consonance with the literature (Kashyap and Stein 2000 and Aleem 2010). For the interaction term (WACMR*IL Dummy), the coefficient turns out to be positive (0.004) and significant at 1% level, which means that there is a moderating effect of interbank liquidity on monetary policy transmission to bank lending in India. The result suggests that banks with positive interbank liquidity react with less severe cuts in bank lending (the net effect of monetary tightening is still negative) to an increase in monetary policy rates. This result is similar to the existing literature which shows the moderating role played by interbank liquidity in transmission of monetary policy to bank lending in developed countries (Gambacorta 2005 and Merkl and Stolz 2010).

We also report bank group-wise results in the table. Public sector banks' lending response to monetary policy is negative (the coefficient is -0.006) and significant at 10% level while for the interaction term (WACMR*IL Dummy) the coefficient is positive (0.005) and at 1% level. This suggests that there is moderating effect of interbank liquidity on monetary transmission to bank lending in the case of public sector banks. Private sector banks do not seem to respond significantly to monetary policy changes and even the interaction term is statistically insignificant; however, the coefficients are negative for the former and positive for the latter in line with the full sample. This result could possibly arise because of low participation of private sector banks in the interbank market (RBI, 2019a).

Table 3
Estimated Coefficients of Panel Regression of All Banks, Public Sector Banks, and Private Sector Banks (1999- 2018)

	All banks		Public Sector Banks		Private Sector Banks	
	Fixed Effect†	Random Effect	Fixed Effect†	Random Effect	Fixed Effect	Random Effect†
$WACMR_{t-1}$	-0.006**	-0.008**	-0.006*	-0.009***	-0.008	-0.010
$WACMR_{t-1}$*IL Dummy	0.004***	0.0003	0.005***	0.003**	0.0017	0.0013
$LogCapital_{t-1}$	-0.015	0.005	-0.032***	-0.003	0.107***	0.056***
$LogTotal\ Assets_{t-1}$	-0.036***	-0.023***	-0.039***	-0.022***	-0.083***	-0.055***
$Return\ on\ Assets_{t-1}$	0.022***	0.271***	0.018***	0.019***	0.090***	0.090***
LogΔWPI	-0.040*	-0.045*	-0.047*	0.038	-0.082*	-0.075*
GDP Growth Rate	-0.006**	-0.007***	-0.004	-0.008***	-0.009	-0.008
Intercept	0.845***	0.523***	0.986***	0.569***	0.501***	0.536***
Number of Observations	551	551	395	395	156	156
R Squared	0.129	0.204	0.172	0.227	0.317	0.363

Dependent Variable: ΔlnTotal Loans. IL Dummy: Net interbank liquidity dummy 1 if positive 0 if negative. † Appropriate model suggested by Hausman Test.

5. Robustness Check

5.1 Dynamic Panel Regression Estimation

As a robustness check of our panel regression results, we apply dynamic panel regression to study the same research question. The dynamic panel regression using Generalized Method of Moments (GMM) was introduced by Arellano and Bond (1991) suggesting the use of appropriate instruments for lagged dependent variables, resolving the problem of endogeneity. For the dynamic panel regression analysis, we employ the framework of Ehrmann and Worms (2004) and Merkl and Stolz (2009) to examine the impact of monetary policy on lending behaviour of banks with interbank liquidity dummy forming an interaction variable with monetary policy. Accordingly, we estimate the following equation:

$$\Delta lnLoan_{it} = \beta_1 \Delta lnLoan_{it-2} + \beta_2 \Delta MP_t + \beta_3 \Delta MP_t * IL\ Dummy_{it} + \beta_4 Capital_{it} + \beta_5 Profit_{it} + \beta_6 Size_{it} + \beta_7 Inflation_t + \beta_8 GDP_t + u_{it} \qquad (2)$$

In equation 2, we estimate the impact of monetary policy and interbank liquidity on banks' lending while allowing for bank lending to depend on its past levels. As before, interbank

liquidity is proxied by a dummy variable (IL Dummy) for net interbank liabilities, i.e., 1 in case of positive net interbank liabilities and 0 in case of negative interbank liabilities. We apply two lags for the lagged dependent variable term as suggested by AR test of residuals (Arellano and Bond, 1991). In yet another robustness check, we replace the IL Dummy with the net interbank liability of banks and re-estimate the GMM regressions.

5.2 Results and Discussion

Table 4 reports the dynamic panel estimation results of the impact of monetary policy on bank lending and the role of interbank liquidity on the monetary policy transmission process, for the full sample of all banks put together. We report both one-step and two-step GMM estimation results. As in the previous estimation, we find that there is a negative and significant response of bank lending to monetary policy changes. In both one-step and two-step estimations, the coefficient of the monetary policy variable is -0.009. However, the result from two- step estimation is stronger (i.e., the coefficient is significant at 1% level) than the one step estimation (where the coefficient is significant at 5% level). The positive coefficient of the interaction term (WACMR*IL Dummy) shows the moderating role that interbank liquidity plays in monetary policy transmission to bank lending. It means that banks with positive net interbank liquidity react less restrictively (in terms of reducing lending) to monetary policy tightening. The results are similar across one-step and two-step estimations. Again, the coefficient of the interaction term from two-step estimation (0.004) is significant at 1% level while the coefficient from one-step estimation (0.005) is significant at 5% level. Hence, we observe that there is consistency in our findings across the alternative estimation methods.

Table 4
Estimated coefficients of Dynamic Panel Regression of All Banks (1999- 2018)

	One- step Estimation		Two- step Estimation	
	Coefficient	P-value	Coefficient	P-value
ΔlnTotal Loans$_{t-1}$	0.428	0.000***	0.481	0.000***
ΔlnTotal Loans$_{t-2}$	0.022	0.807	0.068	0.131
WACMR$_{t-1}$	-0.009	0.026**	-0.009	0.000***
WACMR$_{t-1}$*IL Dummy	0.005	0.017**	0.004	0.000***
LogCapital$_{t-1}$	0.001	0.950	0.004	0.631
LogTotal Assets$_{t-1}$	-0.006	0.641	-0.007	0.564
Return on Assets$_{t-1}$	0.024	0.153	0.028	000***
LogΔWPI	-0.074	0.031**	-0.057	0.044**
GDP Growth Rate	-0.003	0.360	-0.002	0.150
Intercept	0.195	0.325	0.163	0.396
Number of Instruments	160		160	
Number of Observations	354		354	
Number of Groups	37		37	
AR (1, 2) P- value	0.000, 0.558		0.0001, 0.3293	
Sargan Test P- value	0.001		1.000	

ΔlnTotal Loans

Table 5 reports the estimation results separately for the two bank groups, i.e., public sector banks and private sector banks— both from one-step estimation and two-step estimation. Here too, we observe that the results for both groups of banks are similar to the results from the standard panel estimation. For public sector banks, the response of bank lending to monetary policy changes is negative. However, the coefficient (-0.005) is significant in two-step estimation only at 10% level. The coefficient of the interaction term, i.e., denoting the role of interbank liquidity in monetary transmission, is positive. In one-step estimation, the coefficient of the interaction term (0.004) is positive and significant at 5% level and in two-step estimation the coefficient (0.003) is positive and significant at 5% level. It suggests that positive interbank liquidity for public sector banks moderates the negative impact of monetary policy tightening on bank lending. Similar to standard panel estimation, here too the private sector banks do not appear to respond significantly to monetary policy changes.

In Table 6, we show the results from re-estimating the GMM regressions for the full sample with the IL Dummy replaced with the net interbank liquidity (NIL) of banks. We find that, as before, the coefficient of the monetary policy variable is negative while the interaction term of monetary policy with interbank liquidity has a positive coefficient.

Table 5
Estimated coefficients of Dynamic Panel Regression of Public Sector Banks and Private Sector Banks (1999- 2018)

	Public Sector Banks				Private Sector Banks			
	One- step Estimation		Two- step Estimation		One- step Estimation		Two- step Estimation	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ΔlnTotal Loans$_{t-1}$	0.495	0.000***	0.520	0.000***	0.076	0.492	0.629	0.023**
ΔlnTotal Loans$_{t-2}$	0.121	0.090*	0.212	0.012***	-0.336	0.000***	-0.917	0.006***
WACMR$_{t-1}$	-0.005	0.171	-0.005	0.053*	-0.009	0.332	0.006	0.448
WACMR$_{t-1}$*IL Dummy	0.004	0.031**	0.003	0.021**	-0.0007	0.824	-0.009	0.120
LogCapital$_{t-1}$	-0.012	0.484	-0.001	0.935	0.236	0.000***	0.148	0.068*
LogTotal Assets$_{t-1}$	-0.023	0.031**	-0.023	0.088*	-0.122	0.001***	-0.154	0.014**
Return on Assets$_{t-1}$	0.015	0.168	0.005	0.604	0.078	0.000***	0.110	0.000***
LogΔWPI	-0.077	0.057*	-0.067	0.024**	-0.166	0.001***	-0.548	0.015**
GDP Growth Rate	-0.001	0.765	0.0004	0.833	-0.010	0.054*	0.005	0.556
Intercept	0.486	0.017	0.367	0.095*	0.096	0.816	1.018	0.066*
Number of Instruments	157		157		69		69	
Number of Observations	262		262		92		92	
Number of Groups	24		24		13		13	
AR (1, 2) P- value	0.0001, 0.0398		0.001, 0.083		0.008, 0.275		0.034, 0.147	
Sargan Test P- value	0.023		1.000		0.284		1.000	

Dependent Variable: ΔlnTotal Loans

Table 6
Estimated coefficients of Dynamic Panel Regression of All Banks (1999- 2018) with interbank liability position in place of the interbank liability dummy

	One- step Estimation		Two- step Estimation$^{\Phi}$	
	Coefficient	P-value	Coefficient	P-value
ΔlnTotal Loans$_{t-1}$	0.483	0.000***	0.513	0.000***
ΔlnTotal Loans$_{t-2}$	0.024	0.783		
WACMR$_{t-1}$	-0.006	0.083*	-0.002	0.069*
WACMR$_{t-1}$*NIL	6.970	0.066*	7.490	0.000***
LogCapital$_{t-1}$	0.003	0.831	0.008	0.455
LogTotal Assets$_{t-1}$	-0.007	0.578	-0.005	0.529
Return on Assets$_{t-1}$	0.023	0.150	0.021	000***
LogΔWPI	-0.078	0.021**	-0.064	0.000***
GDP Growth Rate	-0.003	0.355	-0.0002	0.856
Intercept	0.192	0.339	0.074	0.685
Number of Instruments	160		161	
Number of Observations	354		412	
Number of Groups	37		40	
AR (1, 2) P- value	0.000, 0.596		0.000, 0.621	
Sargan Test P- value	0.001		1.000	

Dependent Variable: ΔlnTotal Loans

$^{\Phi}$For two- step estimation, we have included only one lag of the dependent variable in accordance with the AR test of residuals.

6. Conclusion

In this study, we analyze the role of interbank liquidity in bank lending channel of monetary policy transmission in India. We find positive and statistically significant role of interbank liquidity in moderating the negative effect of monetary policy tightening on bank lending. The role of interbank liquidity in monetary transmission to bank lending is found to be heterogenous across bank groups, i.e., public sector banks and private sector banks, being significant only in case of the former.

Our findings provide important policy implications for the monetary authority of India— the RBI. For effective transmission of monetary policy, the net liquidity position of banks needs to be taken into consideration while crafting the monetary policy decisions. The RBI should monitor and regulate interbank liquidity as well as the liquidity with banks which implies managing both system level liquidity and bank level liquidity. Hence, managing liquidity redistribution among banks in interbank money market should be a prime focus for efficient monetary policy design.

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Appendix A

Table A 1
Summary of Bank- level Data

Serial No.	Name of Bank	Ownership	No. of observation (in years)
1	Allahabad Bank	Public	8
2	Andhra Bank	Public	14
3	Axis Bank	Private	14
4	Bank of Baroda	Public	20
5	Bank of India	Public	20
6	Bank of Maharashtra	Public	16
7	Canara Bank	Public	17
8	Catholic Syrian Bank	Private	8
9	Central Bank of India	Public	20
10	Corporation Bank	Public	19
11	DCB Bank Limited	Private	13
12	Dena Bank	Public	14
13	Dhanlaxmi Bank	Private	9
14	Federal Bank	Private	11
15	HDFC Bank	Private	14
16	ICICI Bank	Private	14
17	Indian Bank	Public	13
18	Indian Overseas Bank	Public	17
19	IndusInd Bank	Private	14
20	Jammu and Kashmir Bank	Private	14
21	Karnataka Bank	Private	10
22	Karur Vysya Bank	Private	8
23	Kotak Mahindra Bank	Private	14
24	Lakshmi Vilas Bank	Private	12
25	Oriental Bank of Commerce	Public	20
26	Punjab National Bank	Public	20
27	Punjab and Sind Bank	Public	20
28	State Bank of Bikaner	Public	18
29	State Bank of Hyderabad	Public	15
30	State Bank of India	Public	17
31	State Bank of Indore	Public	3
32	State Bank of Mysore	Public	13
33	State Bank of Patiala	Public	13
34	State Bank of Saurashtra	Public	8
35	Syndicate Bank	Public	20
36	UCO Bank	Public	19
37	Union Bank of India	Public	17
38	United Bank of India	Public	19
39	Vijaya Bank	Public	18
40	Yes Bank	Private	14
Total Observations			587

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