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Impact of Monetary Policy on Bank Loans in India

E. Kasana^a, K. Chauhan^b, B.P. Sahoo^c

^{a, c} Amity University, Noida, Uttar Pradesh, India;

^b University of Delhi, New Delhi, India

ABSTRACT

This research paper **aims** to investigate the monetary transmission in India through bank lending channel, to know whether a change in monetary policy affects bank loans or not. A balanced panel data of 50 commercial banks covering a timeframe of 11 years from 2009 to 2020 has been undertaken for the **research methodology**. The outcomes of the dynamic panel have been considered by using the Generalized Method of Moment developed by Arellano Bond Blundell and Bover estimator. The **result** indicates that channel of bank lending has improved banks' resilience to monetary shocks. This paper finds the significance of bank characteristics like size, liquidity, and capital which have a substantial impact on bank lending. This research study **concludes** that repo rate, cash reserve ratio and weighted average call rate are imperative instrument of monetary policy transmission. Banks with small size, capital, and liquidity are more sensitive to any variation in monetary policy as compared to large banks.

Keywords: monetary policy; interest rate; monetary transmission; bank lending channel; dynamic panel; bank characteristics

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INTRODUCTION

Monetary transmission is a process by which policy action of the central bank gets transmitted to encounter the objectives of inflation and growth. The mechanisms of transmission of monetary policy differ from one economy to another economy based on their financial and legal structures. At the beginning of 1990s, analysis of the mechanism of monetary policy transmission has gained attention through structural and economic reforms as well as later changes to new policy regimes. The subject of monetary policy transmission has remained by and large imprecise. The mechanism of monetary transmission has been a topic of major interest to central bankers, policymakers, and economists. Monetary policy affects the price and gross domestic product by various channels like credit, interest rate, exchange rate, and asset price channels. The monetary transmission is a perplexing process. There is no agreement on the functioning and significance of these channels in the previous studies and a debate has been seen on which of these channels prevail in the economy. Therefore, the mechanism of monetary

transmission is usually referred to as "black box". From a traditional viewpoint, macroeconomic models stress the significance of banks in transmitting monetary policy actions to the real economy. However, bank lending channel (BLC) has been given special attention in empirical studies in exploring how policy impacts the economic activity by credit channel. A study by B. S. Bernanke, A. S. Blinder [1] worked on the notion of a BLC that examines how policy actions are transmitted into the real economy. The channel of bank lending emphasizes the influence of monetary policy on bank loans. It proclaims that monetary policy contractionary leads to a fall in bank deposits. Banks unable to substitute these diminutions without incurring any expenses cause them to decrease lending to their clients. The channel of bank lending is established on the idea of imperfect substitutes between bonds and bank lending, monetary policy affects the supply of bank credits [2]. A policy tightening enhances the opportunity cost of deposit holding, resulting in a reduction in bank credits in line with the decrease in funding resources. It has been examined in the US

and Europe in studies of A.K. Kashyap, J.C. Stein [3] and Gambacorta [4].

A vital assumption behind an effective monetary policy transmission is that bank balance sheet should be robust. This assumption enables the banks to respond faster and optimally to policy changes. If the assumption is violated, then policy action may be less effective and operated with variable lags [5]. The issue of weak monetary transmission has been highlighted in India and reason is ascribed to protect bank profitability in the wake of declining asset quality and maintaining high provision. The transmission mechanism is considered as long, indefinite, and variable lags which make it complex to forecast the specific impact of policy actions on the GDP and price level. The uncertainty and variable lags persist because the policy actions induced by reserve bank do not have instantly transmitted in economy. From February 2019 to January 2020, RBI decreased its repo rate by 135 basis points. Though, Indian banks have reduced lending rates by 61 basis points in response to the policy rate [6]. The present situation provides an opportunity to inspect whether monetary policy is transmitted by banking lending channel.

This research investigates how monetary policy rates influence the bank balance sheet, specifically bank lending in India. We examine the response of credit supply to policy actions by using the research methodology [7]. The presence of a bank lending channel is recognized when banks react differently to changes in policy actions based on dissimilarities in size, liquidity, or capital as these determinants influence access to external finance that in turn affects their capacity to supply credit. This methodology is framed in the previous work on the bank lending channel. We examine the reaction of credit supply to policy actions by using panel data methodology. This paper contributes to existing literature, it provides empirical evidence on how adjustments in different monetary policies such as repo rate, cash reserve ratio, and call rate affect bank lending channel in India. The results propose that loan supply is inversely influenced by a variation in repo rate, cash reserve ratio, and call rate. Therefore, we support the perspective that these are effective monetary policy tools.

This research study is constructed as follows. Section II represents the literature review allied to monetary policy transmission of the bank lending channel. Section III is associated with the data and methodology used in the

present study. Section IV presents the finding of dynamic panel data and Section V finally concludes.

LITERATURE REVIEW

The channel of bank lending is based on the perspective that banks play an exclusive and central role in the financial sector as banks are appropriate to resolve asymmetric information glitches in credit markets. This channel assumes that besides the marginal costs as well as earning considerations, the accessibility of funds is a significant factor in funding and investment decisions. The question about the importance of the lending channel has been highlighted in the previous study [8]. Though, in the developing period of globalization, the significance of lending channels has been increasing multitude. In particular, S. Ben Bernanke [9] and others put stress on the bank credit market as a part of the transmission process. To which extent policy shocks impact loan supply independent of impacting loan demand, theoretical concerns make it important for economist and monetary policymakers to give emphasize the channel of bank lending [1]. In another study by B. Bernanke, A. Blinder [10] investigate the mechanism of monetary transmission in the US. They revealed that monetary policy operates partly by affecting the structure of bank assets. We present some selected evidence on several aspects of bank lending discovered by previous studies.

The BLC mainly depends on two conditions. Firstly, the central bank manages bank credits by using monetary instruments. Secondly, no other substitutes to bank advance, at least for a few segments of borrowers [11]. A study by S. Ghosh, A. Prasad [12] analyzed the relationship between policy actions and corporate behavior in India, they establish that channel of interest rate has strengthened after 1988. Similarly, K. Singh, K. Kalirajan [13] shows that interest rate plays an imperative role in Indian monetary transmission in the post reform period. The empirical research investigates diverse channels of monetary transmission in Pakistan and showed the significance of interest rate channels and bank lending channels [14]. A. Aleem [15] investigates the monetary transmission channel in India by using a vector autoregression model. He found that the credit channel will be more significant out of three channels (credit, exchange rate, and asset price). The author infers

that banks play an imperative role in the transmission mechanism of policy shocks to the real economy. B.L. Padit, P. Vashisht [16] explore the policy rate of monetary transmission from viewpoint of demand for bank loans in India. This study used seven emerging economies including India by using monthly data. They find out that variation in interest rate is a significant factor of firms' demand for loans. Therefore, the research infers that monetary policy is a vital countercyclical instrument for controlling the pace of economic activities in India. A study [17] examines the significance of BLC in Malaysia by considering bank level disaggregated data. This study used a dynamic panel approach, namely GMM method to know the supply of dynamic banks' loan functions. The finding shows that monetary policy has negative significant influence on the supply of bank loans. A study by N. Sengupta [18] demonstrates that the bank lending channel remains a significant means of transmission mechanism of monetary authority actions in India by using VAR framework, but it has weakened during post LAF 2000 period. The interest rate and asset price become more effective, and the exchange rate, although feeble, shows a slight improvement in post LAF. An analysis by SN. Bhaduri, T. Goyal [19] shows the pragmatic evidence for the channel of bank lending by separating banks by liquidity and asset size. They found that small and less liquid banks are largely affected by policy changes, and the effect is more prominent in the zone of nonpriority sector lending. Lastly, domestic banks are sensitive to policy changes as compared to foreign banks. A. Simpasa, B. Nandwa, T. Nabassaga [20] also explore the influence of monetary policy on the BLC in Zambia by taking bank data. The econometric analysis of dynamic panel data is used to check the monetary transmission in Zambia. The results disclose that bank lending channels operate through big banks. The influence of monetary policy on medium bank size is moderate whereas nonexistence for smaller banks. Another study by BM. Tabak, TB. Moreira, DM. Fazio, AL. Cavalcanti, GH. Cunha [21] explores how policy changes influence the behavior of banks' loan supply. This study works in the five countries by taking 1254 banks for the period of 13 years from 2000 to 2012. The study demonstrates that the effect of money supply on the loan is not linear and inverted U shaped. The results exhibit that easing monetary policies do not rise the tendency of economic agents to take high risks on the market. A rise in money supply does not increase

the negotiated loan after a level of money stock. A study by A. Mishra, K. Burns [22] runs a short run model to estimate interactions between monetary policy, liquidity, and bank lending in India by taking a unique liquidity index and structural VAR model. The finding of the research shows that monetary authority shocks have a robust and persistent impact on bank lending whereas bank liquidity shocks influence bank loans after a lag of 9 months. It also provides evidence of indirect feedback channel among monetary policy and bank loans operating by changes in bank liquidity.

Earlier research used VAR model, emphasize the interest rate channel of monetary transmission, and considered the whole banking sector as one, and majority of studies ignored the developing role of bank characteristics on the BLC of monetary transmission in India. The previous studies on bank lending channel established on the bank aggregate data suffer from identification problems because of their inefficiency in demonstrating whether changes in the behaviour of bank loans following policy changes are induced by the supply or demand of bank credit. Thus, the bank level data is imperative to know the monetary policy transmission across banks [2]. Pertinent to this discussion, we find one research S. Reddy, D. Bhardwaj [23] that uses the approach of A.K. Kashyap, J.C. Stein [7] on bank lending channel in India. S. Reddy, D. Bhardwaj [23] explored the impact of financial market innovation and bank characteristics on the BLC of monetary transmission in India by using dynamic panel data. This research includes 73 commercial banks from 2005 to 2015 for the analysis purpose. The study finds that liquidity, size, and capitalization are vital bank characteristics that have a substantial influence on bank loans. The research also discovers that with the financial innovation, bank lending channel of transmission mechanism has become weaker.

METHODOLOGY AND DATA

The empirical investigation of bank lending channel is based on A.K. Kashyap, J.C. Stein [3], A.K. Kashyap, J.C. Stein [7] and M. Zulkhibri [24] investigates the reaction of changes in bank loans due to bank size, liquidity as well as capitalization. The empirical model is defined as follows:

$$\Delta Loan_{it} = \alpha_i + \beta_1 loan_{i,t-1} + \beta_2 \Delta MP_t + \beta_3 X_{i,t-1} + \\ + \beta_4 X_{i,t-1} \Delta MP_t + \varepsilon_{it}$$

Here, Δloan_{it} denotes the changes in total advances by bank i at time t . In the model, α_i denotes a bank specific fixed effect, β is slope coefficient of variables and ε_{it} is an error term. ΔMP_t is a change in the policy rate calculated for every year by considering the difference between the rate of beginning and end of the financial year. The bank characteristics (size, liquidity, and capital) are indicated by X_{it} where Size is measured as the logarithm of total assets, liquidity is calculated as a share of liquid assets to total assets, while capital represents the equity to total asset ratio. These factors affect a banks' access to outside funding which influences the bank's capacity to provide loans.

These bank factors are considered based on the postulation that supply of credits for a given category of the bank is highly responsive to any monetary policy shocks. Usually, small banks are enforced to decrease their lending during tight monetary policy due to inefficiency to raise money as they have tiny bargaining power. Thus, when the Central Bank decreased the policy rates, small banks are affected by policy rate changes immediately by modifying their lending rates. And as size rises, transmission of monetary policy rate takes time [23]. Therefore, we expect a negative sign of bank size. Liquidity is calculated by liquid assets to total assets. Banks having low liquid balance sheets are comparatively less ready to protect their credit supply in the event of unpredicted deposit shocks and as a result, more likely to reduce their lending in case of monetary contractionary phase [4]. Thus, we expect negative sign of liquidity coefficient. In case of monetary tightening, there is a sharp contraction in loan supply by undercapitalized banks, but in monetary expansionary there is no such expansion in the loan supply [25].

The empirical framework also contains interaction terms of monetary policy along with bank specific determinants (size, liquidity, and capital). Small banks with less liquid and poorly capitalized react more strongly to any variation in interest rates. Therefore, we expect positive coefficient for the interaction terms. M. Zulhibri [24] demonstrates that banks pose these characteristics would decline their credit growth rate more strongly to a restrictive monetary shock as compared to large, liquid, and adequate capitalized banks.

The dependent variables and error term is correlated because of the presence of lagged dependent variable as an explanatory variable. To deal with this correlation, one

of the standard methods is to use an instrument variable technique. Thus, we use the Generalized Method of Moment (GMM) developed by Arellano Bond Blundell and Bover (ABB) estimator, GMM includes two step estimation. The estimation method is consistent with the earlier work of R. Matousek, H. Solomon [26] to investigate the reaction of bank credits to monetary policy by using a dynamic panel model. This technique is useful to control weak instrument issues. One of the limitations with Arellano Bond estimator is the probability of first order autocorrelation in the residuals because instrument that deals with endogeneity are weakly exogenous. Hence, we use ABB estimator to control the weak instrument issues by taking instruments with differences and instruments in levels. The consistency of ABB estimator model is based on the assumption of no second order autocorrelation. We applied the autocorrelation test to know the absence of autocorrelation with an error term. Another test is Sargan test which checked the overall validity of the instruments.

DATA

The monetary policy and bank level data employed in the present study for scheduled commercial banks in India have been extracted from the reserve bank of India database. We consider data of 50 commercial banks covering a time frame of 12 years from 2008 to 2020 which provide us an unbalanced panel data comprising of 397 observations. The Central Bank used an extensive palette of monetary instruments such as repo rate, reverse repo rate, CRR, marginal standing facility, and the marginal cost of lending rate. We used changes in repo, CRR, and call rate as key monetary policy tools for transmission. The repo rate is one of the imperative conventional instruments in reserve banks' toolkit. The CRR is a ratio of bank deposits that banks are required to keep with the central bank in form of reserves. The interbank call rate is a short-term loan that banks offer to agents who in turn give money to investors. These monetary policy instruments have been formerly used as monetary policy indicators for India [2, 23].

DESCRIPTIVE STATISTICS

The summary statistics of specified variables have been represented in *Table 1*. This table presents the mean, standard deviation, maximum and minimum

Table 1

Summery Statistics

Variable	Description	Mean	Standard Deviation	Minimum	Maximum
Loan	Loan	111546.9	230911.6	148.47	2325290
Policy rate (%)	Repo rate	6.720833	.9551849	4.92	7.94
Policy rate (%)	Call Rate	6.625902	1.406918	3.281667	8.34
Reserve ratio (%)	Cash Reserve ratio	4.659367	1.072216	3.5	7.33
Size	Total Asset	187972.6	382572.9	42.27	3951394
Liquidity (%)	Liquid asset to total asset	.8568021	14.61915	.0014625	358.2289
Capital (%)	Equity to Total Asset	.6127833	11.21118	0.001	274.5

Source: Author's calculation.

to give insights into the distribution of the stated variable. The mean value can be observed from *Table 1* that scheduled commercial banks on an average disbursed a loan of Rs. 111546.9 crore; have Rs. 187972.6 crore assets; 0.8568021 percent of liquidity; and 0.6127833 percent of capital. The average value of repo rate, call rate, and cash reserve ratio is around 6.72%, 6.62%, 4.65%. The standard deviation indicates a slight variation in the dataset. A higher standard deviation can be seen in case of loans as well as size of banks, signifying few large and small banks run along with each other.

REGRESSION ANALYSIS

Table 2 represents the results of our estimations. By using the application of ABB estimator, we accept null hypothesis that instruments are valid according to the Sargan test. The result of second order autocorrelation shows that we do not reject null hypothesis. This proposes that our empirical model is appropriately specified. First, we investigate the impact of cash reserve ratio of the monetary policy transmission through bank lending channel. Then, we represent the estimations with other monetary indicators repo rate and weighted average call rate to know the effectiveness of monetary instruments through bank lending channel.

The regression estimation provides evidence that credit growth is inversely affected by a cash reserve ratio

(CRR) tightening. The coefficient of CRR has negative significant influence on loan supply. A rise in CRR requires banks to keep high reserves with the central bank, which would reduce the growth of loans or vice versa. Therefore, we support the view that CRR is an effective instrument of monetary policy. The result is consistent with the study of Z. Fungáčová, R. Nuutilainen, L. Weill [2] who also reveals significant negative impact of reserve ratio on loan growth. Moreover, the interaction term of CRR with bank characteristics, the coefficient of specified variables have the same signs. The interaction term of CRR with specified bank characteristics (size and liquidity) has a positive significant influence on the growth of loans. Our empirical finding indicates that the interaction term of monetary policy supports the presence of BLC in India through CRR. This is consistent with previous work that small banks with less liquid react more sturdily to monetary policy tightening by decreasing their loan growth as compared to large and liquid banks.

The result discloses the significance of bank specific characteristics in respect to bank lending channels. The coefficient of lagged size shows significant negative impact on loan growth. It means bank with small size are forced to decrease their loan supply at the time of monetary contractionary due to their incapability to increase funds from other sources as they have small bargaining power. Small banks translate the policy rate immediately by modifying their lending rates when policy rates are decreased and as size increases, monetary policy

Table 2

Regression Result of Bank Lending Channel Using Different Parameters of Monetary Policy

	CRR			REPO			WACR		
	Coef.	Z	Std. error	Coef.	Z	Std. error	Coef.	Z	Std. error
Loan _{t-1}	.6917*	25.30	.0273	.6755*	17.97	.0375	.7454*	21.31	.0349
Change in MP	-1.186*	-6.31	.1878	-.4129*	-2.52	.1639	-.4518*	-5.07	.0891
Asset _{t-1}	-.1250*	-2.04	.0612	-.1146	-1.16	.0989	-.2072*	-3.38	.0613
Liquidity _{t-1}	-.4591*	-19.12	.0240	-.3754*	-13.74	.0273	-.3286*	-14.95	.0219
Capital _{t-1}	-.0008*	-2.24	.0003	-.0056	-1.95	.0028	-.0032*	-2.52	.0012
Change in MP* Asset _{t-1}	.1610*	5.12	.0314	.0484*	1.99	.0243	.0659*	4.46	.0147
Change in MP* Liquidity _{t-1}	.4598*	18.61	.0247	.2028*	13.75	.0147	.2849*	14.99	.0190
Change in MP* Capital _{t-1}	.0021	0.57	.0036	.0077*	2.10	.0036	.0068*	2.81	.0024
Intercept	3.292	.3190	10.32	3.453*	8.55	.4039	3.217*	13.29	.2421
Wald chi square	3620.32			1010.46			1771.11		
Prob > chi2	0.0000			0.0000			0.0000		
AR(2)	0.2542			0.1415			0.1427		
Sargan Test	0.2446			0.0667			0.1698		
No. of bank	50			50			50		
No. of Instruments	45			37			45		

Source: Author's calculation (STATA 14.0).

Note: GMM two step estimator suggested by Arellano Bond Blundell and Bover (ABB). MP stands for monetary policy, CRR denotes cash reserve ratio, and WACR is weighted average call rate, and * indicates significant at 5 per cent significance level.

transmission takes some time [23]. The coefficient of lagged liquidity is also significant negative impact on loan growth. It implies that banks having low liquidity are less prepared to protect their loan supply at the time of unexpected deposit shock, as a consequence, reduction in lending during contractionary monetary policy [4]. The result of capital shows significant negative influence on loan growth. It contrasts with the previous studies where capital adequacy is positively associated with bank lending.

Other instruments of monetary policy are repo rate and call rate. The coefficient of both monetary policies shows significant and negative impact, which captures

the adverse influence of monetary policies on loan growth of scheduled commercial banks. The loan growth is negatively influenced when central bank tightens its monetary policy. These estimations indicate that interest rates are significant instrument of monetary policy in India. The results are similar to the study of Z. Fungáčová, R. Nuutilainen, L. Weill [2] and S. Reddy, D. Bhardwaj [23]. Moreover, the interaction term of monetary policy with bank specific characteristics shows the same sign for respective variable. The interaction term of monetary policy with three bank specific characteristics has a positive significant impact on loan growth rate. The regression estimation again provides the evidence of

BLC in the view that banks with low access to outside funding (proxies by less size, liquidity, and capital) are expected to react more quickly to any variation in monetary policy. The earlier work of AK. Kashyap, JC. Stein [7] and R.P. Kishan, T.P. Opiela [27] show that small banks with less liquid and capitalization are expected to increase their supply of loans at the time of the relaxed monetary policy. In some recent studies of Z. Fungáčová, R. Nuutilainen, L. Weill [2], S. Reddy, D. Bhardwaj [23], M. Zulkhibri [24], S. Sarkar [28] also reveal the significant positive impact of interaction terms of monetary policy with specified bank characteristics on loan supply of banks.

CONCLUSION

This research paper investigates the monetary transmission in India, where the execution of monetary policy varies from other economies in terms of regular adjustment to the policy rate, cash reserve ratio, and call rate. Therefore, it provides an important framework to examine the impact of monetary policy on bank loans. The results support the perspective that cash reserve ratio, repo rate, and call rate are significant instruments of monetary policy transmission. The result also shows that bank specific characteristics are significant with respect to the bank lending channel.

The research finding has imperative policy implications for monetary and banking policies in India.

The changes in cash reserve ratio directly impact loan growth. The study finds that a contraction in cash reserve ratio negatively impacts loan growth. Therefore, the results of this study support the usefulness of monetary policy through the cash reserve ratio in India. This study also finds the same results for other monetary policy tools such as repo rate and weighted average call rate. Policymakers and economists can use cash reserve ratio, repo rate, and weighted average call rate for monetary transmission. The monetary policy authorities have to check the stability of these tools to stabilize the supply of banks' loans. This is due to any variations in monetary policy instrument influences the bank loans and further will impact the firm investment as well as economic activity.

In respect to transmission channel, bank lending channel plays a crucial role in monetary transmission in India, a tightening in monetary policy by decreasing the accessibility of funds with the banks may force them to modify their portfolio by decreasing the loan supply. The bank lending channel should be considered for the smooth transmission of monetary policy. Bank size, capital, and liquidity are noteworthy characteristics that affect bank loans. Small bank with less liquid and capital reacts more quickly to monetary policy tightening as compared to large banks. Further, research studies can work on the bank groupwise data, to know the bankwise effectiveness of monetary transmission through the bank lending channel.

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ABOUT THE AUTHORS



Ekta Kasana — PhD in commerce, Research Scholar at the Amity College of Commerce and Finance, Amity University, Noida, Uttar Pradesh, India

<https://orcid.org/0000-0002-4429-1677>

Corresponding author:

ektakasana47@gmail.com



Kshamta Chauhan — PhD, Prof., Amity International Business School, Amity University, Noida, Uttar Pradesh, India

<https://orcid.org/0000-0002-9465-9273>

kchauhan@amity.edu



Bibhu Prasad Sahoo — PhD, Head, Department of Business Economics, SGTB Khalsa College, University of Delhi, Delhi, India

<https://orcid.org/0000-0002-4466-412X>

bibhusahoodu@gmail.com

Authors' declared contribution:

E. Kasana — identify the topic, literature review, data collection, analysis and conclude the results.

K. Chauhan — Bibhu Prasad Sahoo- reviewed the paper and conclusion of the study.

B.P. Sahoo — discussed variables, research methodology and research findings.

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