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Email. [noorullahkhalid26@gmail.com](mailto:noorullahkhalid26@gmail.com)**ABSTRACT**

*The banks centric-view of monetary policy works through the response of credit supply to the indicators of monetary policy such as interest rates and other policy instruments. The importance of the banks' credit supply channel came to the forefront since the 2007 world-wide depression affected badly the stability of banking sector. Yet, we know less about the relative role of banks in monetary policy transmission mechanism, especially, these impacts are observed on the basis of size of banks. This paper therefore empirically examines the impact of monetary policy on banks' lending channel of monetary policy. The robust two-step system-the Generalize Method of Moments (GMM) estimator is applied on an unbalanced panel dataset over the period 2005-2016. While estimating the effects of three alternative measures of monetary policy on banks' credit supply, several bank-specific variables are included in the specification as control variables. We provide strong evidence on the existence of banks' lending channel in baseline model and differential impact of monetary policy measures on small versus large banks in extended model. Our findings suggest that there is a vital need to take into account the size of banks while designing the instruments of an effective monetary to manage credit supply in the economy.*

**KEYWORDS:** Banks' Lending Channel, Loan Supply, Monetary Policy, Credit Supply Channel. Transmission Mechanism,

**JEL CLASSIFICATIONS:** G15, E52, E42, G21,

**1. INTRODUCTION**

Monetary policy actions are transmitted to the real economy through a variety of channels that are collectively known as the monetary transmission mechanism. The importance of the banks' lending channel came to the forefront since the 2007 world-wide depression affected badly the stability of the banking sector. Mishkin (1996) dissatisfied with conventional interest rate channel and introduced impact of asymmetric information in financial market what led to credit channel by two ways in credit markets: the balance sheet channel and the bank lending channel. Reviewing the empirical literature we observe that Bernanke (1993), Kashyap and Stein (1994), Bernanke and Gertler (1995), Cecchetti (1995), Bernanke, Gertler, and Gilchrist (1999), Evans, Fisher, Gourio, and Kran (2015), Jermann, and Schmid (2016), Ekimova, Kolmakov and Polyakova (2017), Erdogdu (2017), Ippolito, and Ozdagli, Perez-Orive (2017), and Shah and Rashid (2015), have documented that the monetary transmission mechanism through these channels has been confirmed for different economies. In the bank-centric view, it is assumed that there are three important asset types: money, bonds, and bank loans. In this context, the special response of banks to changes in monetary policy is their lending response. This paper is mainly related to the credit channel of monetary policy transmission mechanism because it highlighted the role of banks in monetary policy transmission mechanism by focusing on the bank lending channel and the balance sheet channel in line with Bernanke and Gertler (1995).

The large banks are more able to absorb the effects of tightening monetary policy, whereas, the small banks are likely to be affected more due to monetary policy actions. Further, small banks reduce their financing more than large banks in response to tight monetary policy. Small banks are not able to find out an external source of financing because of heavy cost of external financing. Alper, Hulagu and Keles (2012) have concluded that the negative coefficient suggests that small banks lend more under tight monetary policy. These empirical results are consistent with the centric view

of monetary policy (Kashyab and Stein, 1994; Sharpe, 1995; Hasin and Majid, 2012; Shah and Rashid, 2019). Several studies such as, Bernanke and Blinder (1995), Gertler and Gilchrist (1993), Kashyab and Stein (1995), and Aikman, Lehnert, Liang and Modugno (2017) have noted the differential impact of monetary policy on banks' credit supply across small and large banks. However, the focus of these studies was on consolidated macroeconomic data of commercial banks, rather than the bank-level data.

Overall, these studies have documented that there is a potential gap to explore the responses of microeconomic data of banks to monetary policy of a central bank. Indeed, if both small and large banks are the part of financial system, then any instrument of monetary policy should have to affect the economy by affecting both types of banking. Thus, it is worth exploring whether small banks hinder or intensify the monetary policy mechanism. Yet, until now we know less about the relative role of banks in monetary policy transmission mechanism of Pakistan. However, one should note that none has explored the relative role of small *versus* large banks in the transmission mechanism of monetary policy in Pakistan: which is the core theme of this study. Therefore, this paper aims to find out the existence of credit supply channel of monetary policy transmission in Pakistan. Further, this study also intends to explore the role of the credit channel of monetary policy through small *versus* large banks. To do so, we use microeconomic data of individual 27 banks. Our analytical framework enables us to examine the centric-view of credit supply channel of monetary policy transmission mechanism in Pakistan by comparing the role of small and large banks. Specifically, we examine whether tight monetary policy affects more small or large banks' credit supply.

The rest of the paper is structured as follows. Section 2 reviews the empirical literature on monetary policy transmission mechanism. Section 3 describes data and presents the empirical framework. Section 4 presents the empirical findings. Finally, Section 5 presents some conclusions and policy recommendations.

## **2. REVIEW OF EMPIRICAL LITERATURE**

Money plays a vital role in macroeconomics and monetary theory due a sound link of the nominal stock of money with the aggregate price level of an economy (Shah et al., 2018). However, the association of real and nominal sector does not depend on the stock of money which plays a key role to make policymakers understand the general level of prices and average inflation rates (Shah et al., 2021). Many economists have explored the direct impact of monetary policy on aggregate spending which do not operate through traditional channels of interest rate or exchange rate only, rather a variety of excellent surveys and overviews has been developed on credit markets that are playing a critical role in the monetary policy transmission to the real economy. The bank-lending channel of monetary policy works through the response of credit supply to the indicators of monetary policy such as interest rates and other policy instruments. Therefore, the credit channel of monetary policy transmission can also be said an enhancement mechanism to the interest rate channel.

Bernanke and Blinder (1988) are the first who laid down the foundation for the roles of banks in monetary policy transmission. Bernanke and Blinder (1992), Kashyab and Stein (2000), and Kishan and Opiela (2000) have confirmed the presence of lending channel in the United States. Most of the studies deal with the responses of credit supplies of the banks from distinct characteristics, like banks' size, the level of liquidity and banks' capital. Bernanke, Gertler, and Gilchrist (1999) extend the New Keynesian model to account for the balance sheet channel of monetary transmission. Kashyab and Stein (1997) have concluded that small banks reduce their lending more than large banks in response of tightening monetary policy in the USA. Similarly, Kashyab and Stein (1997), Cecchetti (1999), Ehrmann et al. (2011) and Santis and Surico (2013) have explored some descriptive evidence on credit supply channel for the EU countries. In line with them, Aysun and Hepp (2013), Wong (2000), Kashyab and Stein (1995), Bernanke and Lown (1991), Evans, Fisher, Gourio, and Kran (2015), Jermann, and Schmid (2016), Auclert (2017), Erdogdu (2017), and Anwar and Nguyend (2018) have documented the credit view of monetary transmission mechanism.

Kashyab and Stein (1995 and 2000) have examined the impact of monetary policy tightening on banks on the basis of size and liquidity. They have developed a new approach by studying the impact of monetary transmission mechanism in terms of size and liquidity of banks. In their panel data analysis, they have collected microeconomic quarterly data of individual bank balance sheets against every insured U.S. commercial bank from 1976 to 1993. They have developed the proxies for the informational asymmetries of a bank; the liquidity of its balance sheet and its size measured in total assets. They have found that the impact of monetary policy is stronger on smaller and less liquid balance sheets of banks. Gertler and Gilchrist (1994) have found that debt of small sized firms along with other variables are more responsive to changes in monetary policy than that of large firms. However, Ashcraft and Campello (2007) and Ciccarelli, Maddaloni, and Peydró (2015) have noted that these results might be appeared due to a contraction of banks' credit supply and they have verified the existence of the balance sheet channel. Further, Ippolito, Ozdagli, and Perez-Orive (2017) have shown that a quantitatively significant balance sheet channel transmission channel of monetary policy is found for the firm's that avail credit of bank to finance their business activities. In their analysis, size and liquidity are found significant variables explaining the credit decision of financial firms. Likewise, Kishan and Opiela (2000), and Aikman, Lehnert, Liang, and Modugno (2017) have also explored the same view of

monetary policy in term of size and liquidity of banks. Futher, Kashyap and Stein (2000) have suggested to include the interaction terms between the monetary policy measures and bank individual characteristics to identify the bank lending channel.

Yet, we know less about the relative role of banks in monetary policy transmission mechanism of Pakistan. Therefore, this paper contributes into the literature on the monetary policy transmission mechanism by exploring the centric-view of credit supply channel for small *versus* large banks as a first-time comparison of banks on basis of size in Pakistan with respect to their responses to monetary tightening.

**3. DATA AND METHODOLOGY**

This paper uses a sample of 27 commercial banks of Pakistan. Annual data for the period 2005-2016 are taken subject to availability of data. The data on bank-specific and macro-economic variables are collected from financial statements of the banks, available on their web-sites for public. Further, we have completed the data of State Bank of Pakistan (SBP), International Financial Statistics, and Orbis Bank Focus (Bankscope). Some data of the banks are taken from Thomson Reuters Datastream.

We estimate several empirical models with several different specifications to achieve the objectives of this paper. In line with Kashyab and Stein (1994), these models explore the impact of monetary policy on credit supply of banks with some additional specifications. The baseline model is developed to examine the responses of credit supply to monetary policy indicators, along with bank specific variables and macroeconomic conditions in Eq.1. The model adopts the following forms.

$$Y_{it} = \beta_i + X_{it}\alpha + Z_t\theta + \rho M_t + \mu_t + \varepsilon_{it} \quad (Eq. 1)$$

- $Y_{it}$ = Banks’ credit supply
- $\beta_i$ = Individual-specific effect
- $\mu_t$ = Year-specific effect
- $\varepsilon_{it}$ = Error term
- $X_{it}$ = A vector of banking characteristics that include size, liquidity, capital, coverage ratio, credit risk, profitability and debt to equity ratio.
- $Z_t$ = A vector of macroeconomic variables that include GDP growth and inflation
- $M_t$ = Monetary policy indicators; the lending interest rate, the deposit interest rate, and the interest rate spread.

Further, we try to trace comparative difference in responses of small *versus* large banks to tight monetary policy in case of Pakistan. Therefore, we have extended the baseline model (1) by introducing two dummy variables for small and large banks to detect impacts of monetary policy on credit supply of small *versus* large banks. Thus, an extended model (2) is specified as follow where  $D_i^{small}$  is a dummy variable for small banks and  $D_i^{large}$  is a dummy variable for large banks.

$$Y_{it} = \beta_i + X_{it}\alpha + Z_t\theta + \rho_1 M_t \times D_i^{small} + \rho_2 M_t \times D_i^{large} + \mu_t + \varepsilon_{it} \quad (Eq. 2)$$

We have selected the bank-specific, the macroeconomic and the monetary policy variables to examine the existence credit view of monetary policy and different responses of small versus large banks’ credit supply. The rationale of selection of these specific variables is discussed in detail. First, we begin with bank credit supply as dependent variable; the ratio of gross loans to total assets. This study intends to investigate the effects of monetary policy indicators on credit supply decision of banks. As credit supply of banks decreases due to an increase in policy interest rate, it employs the existence of centric view of credit supply channel (Alper, Hulagu and Keles, 2012; Jermann, and Schmid, 2016; Erdogdu, 2017). The bank-specific independent variables are there described in Table 1. In line with Kashyab and Stein (1995), the lending rate, the deposit rate, and the interest rate spread (lending interest rate – deposit rate) are taken as measures of monetary policy.

<b>Table 1. Bank-Specific Variables</b>	
<b>Variables</b>	<b>Description</b>
<b>Bank credit supply</b>	Ratio of Gross Loans to Total Assets
<b>Bank size</b>	Log of Total Assets
<b>Liquidity</b>	Cash and cash equivalent divided by total assets
<b>Capital</b>	Total Shareholder Equity/total assets

<b>Coverage ratio</b>	EBIT/Interest Expense
<b>Credit risk</b>	Ratio of classified loans to total loans
<b>Profitability</b>	Profit after Tax/Total Assets
<b>Debt to equity ratio</b>	Debt/Equity Ratio

We use the robust two-step system-the Generalize Method of Moments (GMM) estimator. This is proposed by Arellano and Bover (1995) and then it was fully developed by Blundell and Bond (1998). There is also applied the Arellano and Bond (1991) test for AR (2) to test the existence of serial correlation in the residuals. Further, the J-test of Hansen (1982) is employed to test the null hypothesis of the instruments are orthogonal to the residuals for the validity of the instruments.

**4. EMPIRICAL FINDINGS**

**4.1 FINDINGS OF THE BASELINE MODEL**

The results of the baseline model are presented in Table 2. Panel A and Panel B present the empirical results of variables and diagnostic tests, respectively. In the Panel A of Table 2, the monetary policy indicators; the lending interest, the interest rate-spread and the deposit rate have indicated the negative and statistically significant coefficients that support the presence of centric view of monetary policy.

**Table 2: Impact of Monetary Policy Indicators on Banks’ Credit Supply**

<b>Panel A. Estimation Results</b>						
	<b>Model 1a</b>		<b>Model 1b</b>		<b>Model 1c</b>	
<b>Variables</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>Coefficient</b>	<b>Std. Error</b>
Lagged Debt Ratio	0.617***	0.118	0.729***	0.047	0.739***	0.050
Banks size	0.047***	0.016	0.026***	0.021	0.027**	0.017
Banks Liquidity	-0.287	0.332	-0.160	0.144	-0.238	0.112
Banks Capital	0.015***	0.002	0.016***	0.006	0.015***	0.003
Coverage ratio	0.008**	0.004	0.011**	0.003	0.002***	0.001
Credit risk	-0.167**	0.145	-0.432***	0.166	-0.516***	0.174
Banks Profitability	0.017***	0.076	0.021***	0.004	0.026***	0.008
Debt to equity ratio	0.014**	0.004	0.014***	0.006	0.012***	0.014
Lending rate	-0.022***	0.008				
Interest rate spread			-0.024***	0.004		
Deposit rate					-0.022***	0.004
GDP Growth	0.126**	0.765	0.712***	0.243	0.354***	0.165
Inflation	0.059***	0.024	0.026***	0.008	0.012**	0.007
Constants	45.439**	16.473	27.819***	8.865	15.788***	5.773
<b>Panel B. Diagnostic Tests</b>						
Observations	248		248		248	
Banks	27		27		27	
AR (2)	0.60		1.16		-0.50	
p-value	0.550		0.244		0.621	
J- statistic	14.15		15.69		15.04	
p-value	0.023		0.043		0.010	

**Notes:** The J-statistics test observes overidentified restrictions to ensure the validity of the instruments and distributed as chi-squared under the null of instrument validity and the Arellano-Bond AR (2) test is to observe the second-order serial correlation in the residuals.

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\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

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We regress the credit supply of banks on the lending interest, the interest rate spread and the deposit rate separately in different three regressions. The empirical results are consistent with the centric view of monetary policy (Kashyab and Stein, 1994). Similarly, these results are in accordance with existing literature, such as Sharpe (1995), Jermann, and Schmid (2016) and Erdogdu (2017).

In Model 1a of Table 2, the results suggest that banks' credit supply is positively and significantly related to one-period lagged credit supply). This implies that those banks hold more credit supply (debt ratio) previously continue to supply more credit. Inspecting the coefficients of banks' size, we find that banks' credit supply increase significantly with an increase in size. This result is also consistent with previous empirical studies that have reported the positive relationship between bank size and the credit supply of banks (Alper, Hulagu and Keles (2012); Köhler *et al.* (2006); Schmitz (2004)). However, one should note that this result is contrary to Pruteanu (2004) and Janjua, Rashid and Qurrat-UI-Ain (2014), who have come with positive association between bank size and credit supply. The coefficient of banks' liquidity is negative and statistically insignificant, suggesting that liquidity affects negatively the credit supply of banks. Similarly, Alper, Hulagu and Keles (2012) and Köhler *et al.* (2006) have found the negative effect of liquidity on banks' loan supply, but significant. It means there is shortage of liquidity stock to absorb monetary policy shocks. Although, Schmitz (2004) and Hasin and Majid (2012) have indicated a positive and significant relationship of banks' liquidity and loan growth, implying that liquid banks adjust the tightening of monetary policy. Banks' capital appears with the co-efficient value of 0.005 indicating it is positively and significantly related to the credit supply of banks. Several studies in the literature such as Girardin and Moussa (2011), Schmitz (2004), Bernanke and Lown, (1991) have also reported the positive relation of capital with the credit supply of banks. Further, the positive impact of capital supports the prediction of monetarists that well-capitalized banks survive more in contractions of monetary policy. The coefficient of coverage ratio is positive and statistically significant, suggesting that bank with high coverage ratio in their cash flow streams increase their supply of credit. Likewise, Sanrego and Nikmawati (2010) and Alaro and Hakeem (2011) have documented the positive relationship between coverage ratio and banks' credit supply. Credit risk appears to be negatively related to banks' credit supply, suggesting that when the credit risk of a bank increases the bank become conscious in issuing loans. This finding is consistent with the findings of Pruteanu (2004) who has explained that the classified loans become a basic source to increase credit risk because it is defined as ratio of classified loans to total loans. Banks' profitability is positively and significantly associated to banks' credit supply decision. The debt-to-equity ratio appears to affect credit supply positively and significantly, indicating that as the debt-to-equity ratio grows, the banks supply more credit to market because the banks are capable to issue more credit.

Investigating the impact of macroeconomic variables; the GDP growth and inflation on credit supply of banks, there is found positive and significant association of both macroeconomic variables with dependent variables in all three models except inflation with interest rate spread is found insignificant. In case GDP growth, Pruteanu-Podpiera (2007), Alper, Hulagu and Keles (2012), Imran and Nishat (2013), Gourio, Kashyap, and Sim (2016), Svensson (2016), and Aikman, Lehnert, Liang, and Modugno (2017) have explored the positive impact of GDP growth on credit supply. As a possible justification, the GDP growth affects the individual's income positively, making them able to deposit in banks that encourages them to issue more credit. Contrasting to above result, Hussain (2012) and Janjua, Rashid, and Qurrat-UI-Ain (2014) have noted the negative impact of GDP growth on banks' credit supply. It seems more likely that the business firms may not ask financing through bank borrowing during period of economic growth in country because there are found some other alternate sources to fund a business in a growing economy. The positive association of inflation with credit supply of banks can be justified that the banks would rush to supply credit because cash holding costs in period of inflation. Moreover, banks are likely to issue more credit responding to high inflation because high inflation devalues the stock of savings. On same path, Hussain (2012), Alper, Hulagu and Keles (2012), Evans, Fisher, Gourio, and Kran (2015), Gomes, Jermann, and Schmid (2016), Ozdagli, and Perez-Orive (2017) have found the positive and significant impact of inflation on the credit supply of banks to economy. Although, Schmitz (2004) have found a negative association of inflation to banks' loan supply.

In Model 1b of Table 2 and Model 1c of Table 2, we regress the banks credit supply on bank specific characteristics with the interest rate spread and the deposit rate, respectively as monetary policy indicator and with macroeconomic indicators. All the bank specific and macroeconomic variables are consistent with the results of previous Model 1a of Table 2. The coefficient of interest rate-spread (-0.024) and the coefficient of deposit rate (-0.022) are negatively and significantly related to the banks' credit supply testifying the centric view of monetary policy.

In the Panel B of Table 2, the diagnostic tests reveal that our instruments are robust. Especially, the estimates of J-test do not provide any significant evidence in favour of rejecting the null hypothesis. Similarly, we do not find any significant evidence of the existence of autocorrelation in the residuals. Overall, these diagnostic tests prove the

validity of the instruments.

**4.2. RESULTS OF EXTENDED MODEL ON BASIS OF BANKS' SIZE**

The base-line model is extended after categorizing banks on the basis of size. Two dummies are included; small bank dummy and large bank dummy in the base-line model to observe the impact of monetary policy indicators on banks' credit supply on the basis of size. In Table 3, we regress the extended model of small versus large banks' credit supply on bank-specific variables, macroeconomic conditions, and monetary policy indicators. Panel A presents the estimation results of bank-specific, the macroeconomic variables and monetary policy indicators in three regressions. Almost, these results are similar to the results presented in Table 2. Further, the coefficient value of the credit supply suggests that banks' credit supply is positively and significantly related to one-period lagged credit supply in Table 3. This implies that those banks hold more credit supply previously would supply more credit to economy. The banks' size, the banks' capital, the coverage ratio, the banks' profitability and the debt-to-equity ratio are positively and significantly related to credit growth of banks. The coefficient of banks' liquidity and the credit risk is negative and significant to banks' credit supply. Only coverage ratio changes its sign from positive to negative, when it is regressed with the deposit rate.

Table 3. The impact of monetary policy indicators on bank loan supply after categorizing banks on basis of size (Small and Large)

Panel A. Estimation Results						
	Model 2a		Model 2b		Model 2c	
Variables	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Lagged Debt Ratio	0.716***	0.084	0.828***	0.075	0.745***	0.082
Banks size	0.017**	0.008	0.024**	0.012	0.036***	0.017
Banks Liquidity	-0.477***	0.228	-0.617**	0.317	-0.02*	0.164
Banks Capital	0.002**	0.001	0.002*	0.002	0.003***	0.001
Coverage ratio	0.002***	0.001	0.002**	0.001	-0.001	0.001
Credit risk	-0.205***	0.090	-0.212**	0.114	-0.537***	0.191
Banks Profitability	0.014***	0.004	0.013**	0.008	0.004**	0.004
Debt to equity ratio	0.002***	0.001	0.002***	0.001	0.001*	0.001
Lending rate $\times D^{Small\ banks}$	-0.025***	0.007				
Lending rate $\times D^{Large\ banks}$	-0.021***	0.006				
Interest rate spread $\times D^{Small\ banks}$			-0.043***	0.006		
Interest rate spread $\times D^{Large\ banks}$			-0.033***	0.005		
Deposit rate $\times D^{Small\ banks}$					-0.038***	0.006
Deposit rate $\times D^{Large\ banks}$					-0.027***	0.009
GDP Growth	0.132 ***	0.052	3.491	2.621	12.527***	4.502
Inflation	0.119***	0.027	0.109***	0.022	0.031**	0.018
Constants	12.346***	7.807	-11.377***	8.872	43.607***	15.404

  

Panel B. Diagnostic Tests			
Observations	221	194	194
Banks	27	27	27
AR (2)	1.03	0.86	0.61
p-value	0.304	0.390	0.543
J- statistic	16.24	17.22	9.35
p-value	1.000	1.000	1.000

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Notes: The J-statistics test observes overidentified restrictions to ensure the validity of the instruments and distributed as chi-squared under the null of instrument validity and the Arellano-Bond AR (2) test is to observe the second-order serial correlation in the residuals.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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Overall, all three monetary policy indicators are associated negatively and statistically significant with the credit supply of banks that support the presence of centric view of monetary policy in all three regressions. It is notable that small banks are more responsive to tightening monetary policy in all three models. We found the responses of credit supply of banks is -0.025 for small banks and -0.021 for large banks due to one unit change in the lending interest, -0.043 for small banks and -0.033 for large banks due to one unit change in the interest rate spread, and -0.038 for small banks and -0.027 for large banks due to one unit change in the deposit rate in different three models. Alper, Hulagu and Keles (2012) have concluded that the negative coefficient suggests that small banks lend more under tight monetary policy. These empirical results are consistent with the centric view of monetary policy (Kashyab and Stein, 1994; Sharpe, 1995; Hasin and Majid, 2012). Moreover, the large banks are found able to absorb the effects of tightening monetary policy, whereas the small banks that are affected more due to monetary policy actions. Further, the small banks reduce their financing more than large banks. The small banks are not able to find out an external source of financing because of heavy cost of external financing. Several studies such as, Bernanke and Blinder (1995), Gertler and Gilchrist (1993) and Kashyab and Stein (1995) have noted the differential effects of monetary policy on banks' credit supply across small and large banks.

The GDP growth and inflation are found positive and statistically significant in all three regressions. In Table 3, the Panel B, the diagnostic tests reveal that our instruments are robust. Overall, the diagnostic tests prove the validity of the instruments.

## 5. CONCLUSIONS AND POLICY IMPLICATIONS

The banks' lending channel of monetary policy has recently received an increased attention after the financial crisis in last decade. In this paper, we have examined the existing of credit-view channel of monetary policy and the impact of monetary policy on credit supply of small *versus* large banks. In empirical models, three alternative measures of monetary policy are regressed on banks' credit supply, several bank-specific variables and macroeconomic indicators as control variables. Estimating the baseline model, we provide the strong evidence on the existence of banks' lending supply channel of monetary policy. The results from the extended model indicate that large banks respond less to monetary policy as compared to their small counterparts. The relatively less response of large banks to monetary policy may make it difficult for the central bank to achieve the desired objectives of the monetary policy.

We can suggest several policy implications for monetary policy authorities. First, since centric view plays a key role in transmission of monetary policy, the central bank should manage interest rate to stabilize the credit supply through banks. Second, our findings suggest that for an effective monetary policy, there is a vital need to consider the size of banks while devising the instruments to manage credit supply in the economy, otherwise there may appear puzzles to monetary policy. Third, the policy makers should keep in preference the microeconomic aspects of banks' credit supply behavior in formulating monetary policy because we have found the small-sized banks are affected more as compared to their counterparts in Pakistan.

## REFERENCES

- Aikman D., Lehnert, A., Liang, N. and Modugno, M. (2017). Credit, Financial Conditions, and Monetary Policy Transmission. *Hutchins Centre Working Paper #39*.
- Aikman D., Lehnert, A., Liang, N. and Modugno, M. (2017). Credit, Financial Conditions, and Monetary Policy Transmission. *Hutchins Centre Working Paper #39*.
- Alper, K., Hulagu, T., & Keles, G. (2012). An empirical study on liquidity and bank lending. *Central Bank of the Republic of Turkey*, Working Paper, 4.
- Anwar, S., & Nguyend, L. P., (2018). Channels of Monetary Policy Transmission in Vietnam. *Journal of Policy Modelling* 23, 32
- Ashcraft, A. B., and Campello, M. (2007). Firm balance sheets and monetary policy transmission. *Journal of Monetary Economics*, 54(6), 1515-1528.
- Auclert, Adrien (2017), "Monetary Policy and The Redistribution Channel", NBER Working Paper Series, Working Paper 23451, Cambridge, MA 02138, 1-46.
- Aysun, U. & Hepp, R. (2013). Identifying the balance sheet and the lending channels of monetary transmission: A loan-level analysis. *Journal of Banking & Finance*, 37, 2812-2822.
- Bernanke, B. S., Lown, C. S., & Friedman, B. M., (1991). The Credit Crunch Brookings Papers on Economic Activity. 205-247.
- Bernanke, B.S. & Blinder A.S. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, 9(4).

- Bernanke, B.S., Gertler, M. & Gilchrist, S. (1999). The Financial Accelerator in a Quantitative Business Cycle Framework. *Handbook of Macroeconomics*. Amsterdam: Elsevier.
- Blundell R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87, 115–143.
- Cecchetti, S., G. (1999). Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism. *NBER Working Paper No. W 7151*.
- Ciccarelli, Matteo, Angela Maddaloni, and Jose-Luis Peydro. (2015). Trusting the Bankers: A New Look at the Credit Channel of Monetary Policy. *Review of Economic Dynamics* 18(4), 979-1002.
- Ehrmann, M., Gambacorta, L., Martínez-Pagés, J., Sevestre, P., & Worms, A., (2001). Financial Systems and the Role of Banks in Monetary Policy Transmission in the Euro Area. *ECB Working Paper*, 105.
- Ekimova, Ksenia; Kolmakov, Vladimir; Polyakova, Aleksandra (2017). The Credit Channel of Monetary Policy Transmission: Issues of Quantitative Measurement. *Economic Annals-XXI*. Vol. 166, Issue 7/8, Pages, 51-55.
- Erdogdu, Aylin, (2017). Functioning and Effectiveness of Monetary Transmission Mechanisms: Turkey Applications. *Journal of Finance and Bank Management*, American Research Institute for Policy Development, Vol. 5(1), 29-41.
- Evans, C., Fisher, J., Gourio, F., & Kran, S., (2015). Risk Management for Monetary Policy Near the Zero Lower Bound. *Brookings Papers on Economic Activity*, 141-219.
- Gertler, M., & Gilchrist, S. (1993). The role of credit market imperfections in the monetary transmission mechanism: Arguments and evidence. *The Scandinavian Journal of Economics*, 95(1), 43–64.
- Girardin, E., & Moussa, Z. (2011). Quantitative easing works: Lessons from the unique experience in Japan 2001–2006. *Journal of International Financial Markets, Institutions and Money*, 21, 461-495.
- Hussain, K., (2009). Monetary Policy Channels of Pakistan and Their Impact on Real GDP and Inflation”, CID Graduate Student Working Paper Series No 40, Centre for International Development at Harvard University.
- Ippolito, F., A. K. Ozdagli, and A. Perez-Orive. (2017). The Transmission of Monetary Policy through Bank Lending: The Floating Rate Channel. *Finance and Economics Discussion Series*. Washington. Board of Governors of the Federal Reserve System.
- Janjua, P. Z., Rashid, A., & Qurrat-Ul-Ain. (2014). Impact of Monetary Policy on Bank’ Balance Sheet in Pakistan. *International Journal of Economics and Finance*, 6(11), 187-196.
- Jermann, Urban J. (2016). Negative Swap Spreads and Limited Arbitrage." Available at SSRN (2016).
- Kashyab, A. K., & Stein, J. C. (1994). Monetary policy and bank lending in Monetary policy. *The University of Chicago Press*, 29(1).
- Kashyab, A. K., & Stein, J. C. (1995). The Impact of Monetary Policy on Bank Balance Sheets. *NBER*, Working Paper No. 4821.
- Kishan, R. P., & T. P. Opiela. (2000). Bank Size, Bank Capital, and the Bank Lending Channel. *Journal of Money, Credit and Banking*, 32(1), 121–141.
- Köhler, M., Judith H., & Matthias, G. (2006). The Role of Banks in the Transmission of Monetary Policy in the Baltics. *Centre for European Economic Research (ZEW)*, Discussion Paper, 06-005.
- Majid, M. S., & Hasin, Z. (2012). Islamic Banks and Monetary Transmission Mechanism in Malaysia. *Journal of Economic Cooperation and Development*, 35(2), 137-166.
- Mishkin, F. S. (1996). *The Channels of Monetary Transmission: Lesson for Monetary Policy*. *NBER Working Paper No. 5464*.
- Pruteanu, Anca. (2004). The Role of Banks in the Czech Monetary Policy Transmission Mechanism. *Czech National Bank*, Working Papers 2004/03.
- Sanrego, Y. D., & Nikmawati, K. (2010). Transmission Mechanism of Sharia Financing in Malaysia. *The Journal of Muamalat & Islamic Finance, Research (JMIFR)*. 7(1).
- Santis, R. A., & Surico, P. (2013). Bank lending and monetary transmission in the euro area. *Economic Policy*, 28(75), 423–457.
- Schmitz, B. (2004). What Role do Banks play in Monetary Policy Transmission in EU New Member Countries? ” *Mimeo* 4(2).
- Shah, SMAR, & Rashid, A. 2015. Governing Principals of Shari’ah: A Study of Islamic Business Transactions for Contemporary Practices. *Al-Azhār Special Edition*, 1(2): 158-170.
- Shah. MAR, Raza K., & Alazhari, M. A. 2018. An Introduction to Monetary Policy Framework in Pakistan: Instruments, Objectives, and Mechanism. *Pakistan Journal of Economic Studies (PJES)* 1(2): 111-129.
- Shah, S. M. A. R., & Rashid, A. 2019. The credit supply channel of monetary policy transmission mechanism: an empirical Investigation of Islamic banks in Pakistan Versus Malaysia. *Journal of Islamic Monetary*

- Economics and Finance 5(1): 21-36.
- Shah, S. M. A. R., Farooq, M. U., & Akmal, M. 2021. Embracing Islamic banking as a new engine toward economic growth. In *Contemporary Issues in Islamic Social Finance* (169-184). Routledge.
- Sharpe, Steven A. (1995). Bank Capitalization, Regulation, and the Credit Crunch: A Critical Review of the Research Findings. *Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series* no. 95-20.
- Wong, K. (2000). Variability in the effects of monetary policy on economic activity. *Journal of Money, Credit and Banking*, 32(2),179-198.