Bank heterogeneity and monetary policy response: Evidence from the emerging market economies

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Abstract

The paper investigates the bank lending channel of monetary transmission in emerging market economies using panel data for commercial banks between 2014 and 2023 for the emerging market economies, by looking at the factors that affect the bank's loan supply, such as monetary policy changes and bank balance sheet characteristics. We look at how bank-specific characteristics are essential in determining the lending sensitivity of commercial banks in emerging economies. The heterogeneous bank characteristics and macroeconomic indicators significantly determine bank lending. The operation of the bank lending channel of monetary transmission works through the factors that affect the loan supply decision by commercial banks, which in turn impact the real economy.

1. Introduction:

Banks are important financial institutions that act as intermediaries between borrowers and lenders. The bank lending channel is one of the most important channels of monetary transmission through which changes in monetary policy influence aggregate demand by affecting the bank supply of credit that impacts the real economy. The effectiveness of the monetary policy transmission relies on the well-functioning bank lending channel of the monetary policy transmission. The credit channel is the most important channel for transmitting monetary policy change by altering the credit supply by banks. The economic growth in the emerging market economy is also critically dependent on the credit supply to households and businesses. The sensitivity of the bank credit supply to monetary policy shock determines the

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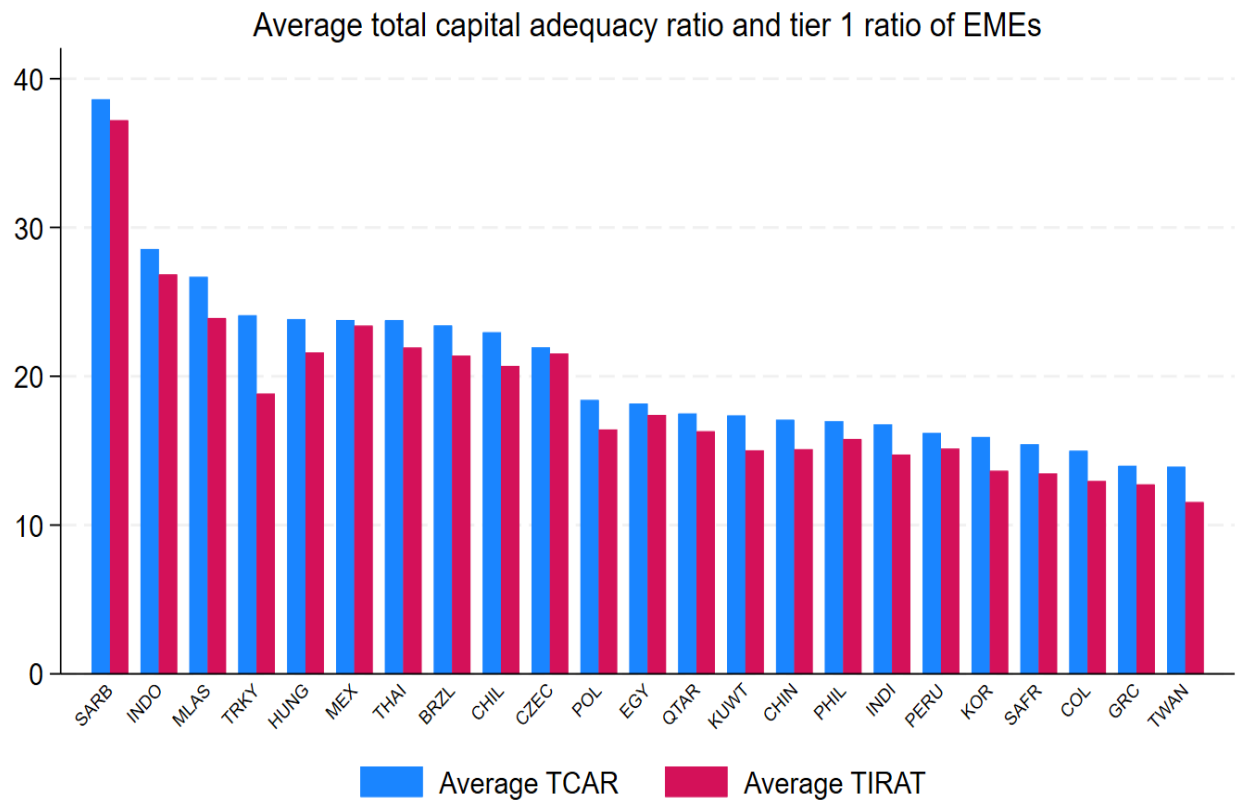
monetary policy change's effectiveness in impacting the dual objectives of stable inflation and sustained output growth. The bank lending channel's effectiveness is the key to central bankers. A suitable mix of macroeconomic stabilisation and macroprudential policy is required to sustain economic growth. Bank capital adequacy is vital for the effective transmission of monetary policy and the financial stability mandate of central banks. First, the banks with more bank capital can raise more funds from the lenders to banks compared to banks with low capital. Adequate bank capital is vital for the effective monetary transmission to the real economy. Second, bank capital helps banks absorb shocks from their lending operations in the form of non-performing assets. To improve the solvency ratio, solvent banks might cut back on their lending operations, which may be against the monetary objective of credit expansion. The tradeoff between the supervisory objective of financial stability (higher solvency ratio) of the banks and the monetary objective of the credit expansion. The bank-specific characteristics significantly affect the bank's lending decision and thus play a pivotal role in the effectiveness of the monetary policy transmission.



2. Literature Review:

Knowledge of the structure of the banking system is important for policymakers. Bank competition is a significant determinant of banks' monetary policy transmission and has important implications for financial stability. The change in monetary policy will likely have a heterogeneous impact on banks depending on their market power, liquidity, bank capital, and size. Large banks are considered to be "too big to fail" as the probability of their bailout is more relative to the small banks. The asymmetry in the market power has a different effect on the banks' lending after a change in monetary policy. Fungáčová et al. (2014), using the panel data for banks in 12-euro areas, study the role of market power in monetary policy transmission. An increase in the market power makes the bank lending channel less pronounced. Weakly capitalized banks and less liquid banks are more responsive to monetary tightening, and bank lending channel transmission decreases during times of crisis.

Bank market structure has an important implication for the effectiveness of the monetary policy transmission. Khan et al. (2016) study how bank characteristics of capitalization, liquidity, size and market concentration are important in terms of banks' response to monetary policy shock for the ASEAN economies. The bank concentration decreases the monetary policy transmission through the bank lending channel. Further, the transmission is weak for banks with high capital, more liquidity and large size. Saif-Alyousfi (2020) studied the competition fragility and competition stability hypothesis for the GCC countries and found that low market concentration, low liquidity, and small banks increase risk-taking behaviours, leading to financial fragility. The increase in the market concentration significantly reduces the bank's risk-taking and positively affects the bank's stability. The authors find that bank stability decreases with higher regulatory restrictions and the protection of creditors. Yang and Shao's (2016) empirical study of China finds that increased bank competition weakens the impact of monetary policy on bank lending. Bank competition is positively related to bank loan growth. This result contrasts Leroy (2014) and Fungáčová et al. (2014). Gambacorta and Shin's (2018) study examines the relationship between bank capital and monetary policy transmission. The study finds a positive relationship between bank capital and lending by the banks. A higher equity-to-asset ratio decreases the cost of borrowing, which translates to higher bank lending. Dang (2022) studied the bank liquidity creation channel in response to the monetary policy response for Vietnam. The study finds that increased bank market power and funding diversification (increased share of non-deposit funding) affect liquidity creation and weaken monetary transmission. The monetary policy is more effective in the market with lower market

power and a higher share of deposits in the bank funding, and the monetary policy transmission is stronger. Gambacorta and Marques (2011) study of banks in Europe and the USA found that weak capital, a greater share of non-interest income, and more dependence on market funding restricted their loan supply more strongly in the crisis period. The impact of the monetary policy shock on the small size and less liquid banks is relatively greater (Rashid et al., 2020). There is an asymmetry in the bank lending channel. It is more operative during the contractionary phase of monetary policy. The asymmetry is caused by bank heterogeneity and different bank solvency (Gomez et al., 2021). Naiborhu (2020) studied the bank lending channel in Indonesia and found that better capitalized and more liquid large banks moderate the strength of bank lending channel impact on loan growth compared to less capitalized and less liquid large banks.

The contribution of the study First, finding how bank heterogeneity is relevant in terms of the asymmetric impact of banks on the monetary policy shocks the panel data of the emerging and transition economies. Second, the conclusion regarding the relationship between bank market concentration and monetary policy transmission is mixed. Third, heterogeneity is in response to monetary policy shock across the specialisation of banks within the banking system. Fourth; We examine whether the credit supply decision depends on banks' balance sheet characteristics in response to the monetary policy change. Fifth, What are the important bank characteristics and features that play an essential role in monetary policy design and implementation? Sixth, the role of the bank’s financial structure, such as size, liquidity ratio, capitalisation, and ownership, affects the bank lending channel. The potential factors that drive the bank lending channel are sensitivity to the monetary shock by the central bank.

3. Methodology and Data

3.1 Data

This study uses panel data for 660 commercial banks from 23 emerging market economies for period spanning from 2014 to 2023. The macroeconomic indicators of inflation and seasonally adjusted real GDP growth come from the CEIC database. The data source and the variable description is shown in Table 1. The sample of banks considered for the analysis includes emerging market economies that are part of the MSCI emerging market index in 2023.

Figure 1 Scatter plot of the growth in loan with independent variables

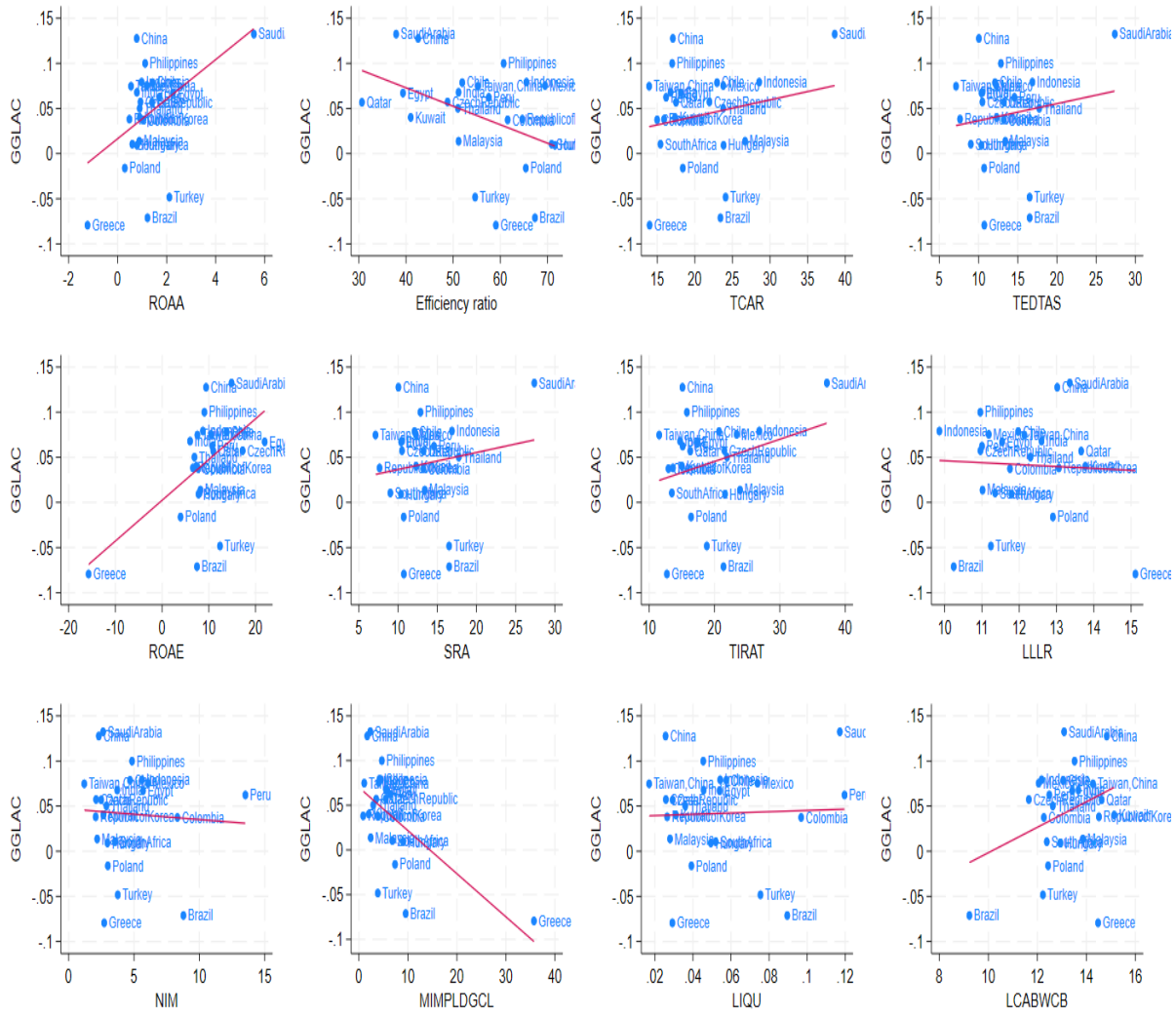


Table 2: Mean of the dependent and independent variable across the emerging market economies.

	DL	DMP	CAP	SIZE	LLP	LIQ	EFR	LEV	ROAA	NINI	IRR	HHI
Brazil	-.008	.222	16.509	14.635	6.161	.359	67.344	8.892	1.22	3.674	8.785	.198
Chile	.089	.688	12.090	16.193	3.237	.281	51.911	11.301	1.419	2.005	4.687	.142
China	.124	-.028	10.036	17.239	3.267	.263	42.549	12.369	.775	.715	2.304	.077
Colombia	.048	1.021	13.206	15.216	5.082	.195	61.584	8.792	1.01	2.735	8.316	.171
Czech Rep	.05	.659	10.494	15.723	3.077	.368	48.805	52.182	.932	.737	2.097	.146
Egypt	.039	1.046	10.377	15.406	6.342	.456	39.303	10.508	2.265	1.323	5.69	.315
Greece	-.067	.413	10.731	17.489	17.632	.158	59.066	8.119	-1.232	.775	2.718	.326
Hungary	.024	1.144	10.366	15.466	5.935	.407	71.581	10.751	.792	2.639	2.97	.287
India	.067	-.169	10.500	16.932	3.692	.102	51.138	11.446	.783	1.441	3.717	.111
Indonesia	.07	-.192	16.911	14.405	2.688	.228	65.537	9.438	.969	1.109	5.598	.089
Kuwait	.039	.236	12.309	17.186	5.207	.311	40.988	8.27	.901	.978	2.663	.425
Malaysia	.013	-.023	13.408	16.088	1.963	.337	51.144	9.14	.88	1.231	2.182	.14
Mexico	.08	.884	12.271	15.574	4.813	.42	69.419	12.167	1.193	2.672	6.071	.122
Peru	.061	.417	14.582	14.46	6.257	.299	57.484	8.063	1.705	2.247	13.51	.23
Philippines	.086	.28	12.852	15.454	2.757	.225	60.71	8.765	1.119	.977	4.85	.114
Poland	-.019	.451	10.711	16.167	4.958	.237	65.475	11.83	.28	1.199	3.007	.12
Qatar	.054	.167	13.238	17.525	3.343	.196	30.646	7.789	1.403	.707	2.493	.591
Rep. Korea	.042	.167	7.636	18.237	.808	.145	64.657	13.7	.481	.791	2.064	.132
Saudi Arabia	.135	.414	27.733	16.832	2.329	.271	37.953	5.351	5.651	10.201	2.638	.225
South Africa	.007	.264	9.011	15.66	2.801	.204	70.868	11.778	.597	2.148	3.555	.252
Taiwan	.079	-.002	7.120	17.128	1.349	.294	55.237	17.216	.543	.728	1.192	.053
Thailand	.046	.002	17.744	16.271	3.925	.309	51.004	7.249	.898	1.054	2.886	.123
Turkey	-.058	3.722	16.510	15.204	4.007	.268	54.651	333.289	2.109	5.041	3.769	.104

3.2. Model

We employ the dynamic GMM model with the following regression framework to study the bank lending channel.

$$Loan\ Supply_{i,t} = \alpha + \beta * Loan\ Supply_{i,t-1} + \delta * Bank_{i,t-1} + \gamma * Industry_{i,t-1} + \varphi * Macro + \lambda_{it} + \eta_{it} + \epsilon_{it} \quad (1)$$

The variable description is presented in Table 1

Table 1 : Variable description and source

Variable	Variable Description	Data Source
Lending	Bank loan growth	Bureau van Dijk
Size	Log of total assets	Bureau van Dijk
CAR	Capital adequacy ratio	Bureau van Dijk
RISK	Provision for the credit risk to total asset	Bureau van Dijk
LIQ	Liquidity: liquid asset/ total asset	Bureau van Dijk
LLP	Credit Risk: Loan loss provision	Bureau van Dijk
NINI	Diversification: non-interest income / average total asset	Bureau van Dijk
IRR	Interest rate risk: net interest rate margin	Bureau van Dijk
EXPS	Operating cost is measured as the ratio of operating expense to total asset	Bureau van Dijk
ROA	Bank profitability	Bureau van Dijk
CONC	Herfindahl-Hirschman concentration index	Bureau van Dijk
INF	Inflation	CEIC
GROWTH	GDP growth	CEIC
PRATE	Policy rate	CEIC
List of emerging market economies included are Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Kuwait, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Republic of Korea, Saudi Arabia, South Africa, Taiwan-China, Thailand, Turkey		

We use the dynamic panel data model and apply the Arellano Bond-Blundell and Bover (A-B-B) two-stem Generalized Method Moments (GMM) estimator. The dependent variable is the growth of the loan by the commercial banks. The change in the policy rate is taken as the variable for the monetary shock. The panel data model is used to examine how the bank-specific characteristics and monetary policy changes by the central bank have an impact on the bank lending channel of monetary policy. The two macroeconomic controls, GDP growth and inflation, have been considered in the A-B-B model estimation. The A-B-B model is preferred over the Arellano Bond estimator (A-B) as in the A-B estimation, there is the problem of potential first-order autocorrelation in the residuals.

4. Empirical Results

The results from the panel data regression model in Table 1 show the impact of the bank market power on monetary policy transmission. The GMM model estimates confirm that a bank lending channel of monetary policy exists and that contractionary monetary policy decreases the growth in lending by commercial banks. The coefficient for the lagged change in the monetary policy is negative and statistically significant. One strand of empirical literature suggests that an increase in the banks' market power decreases their cost of borrowing and leads to higher profit and more lending growth. The other strand of empirical literature suggests that the banks' risk-taking decreases with increasing market power, thus leading to lower lending growth in the economy. The coefficient for the market power is negative and statistically significant, indicating that in the sample of the emerging market economies, an increase in the market power lowers the growth rate of learning in the economy. In a market with a higher market for power banks, the lending rates are more rigid and less responsive to monetary policy change, and they have access to alternative sources of finance other than short-term deposits. The impact of the monetary policy change on lending growth and bank risk-taking decreases as the banks' market power increases. The net interest margin is a measure of the interest rate risk. Interest rate margin is a metric for the performance of the asset over the liabilities. Net interest margin is a financial indicator measuring bank lending activities' profitability. An increase in the interest rate margin can positively affect the bank's profitability, incentivizing banks to lend more and leading to increased economic lending growth. The coefficient for the NIM is positive and statistically significant. As expected, the estimated coefficient of the liquidity ratio is positive and significant. The improved liquidity ratio for the banks is associated with higher lending growth. The coefficient for the return on asset is positive, and the coefficient for the non-performing loan is negative, as expected. The

decreased asset quality decreases the ability of the banks to supply more credit. The high loan loss provision helps banks mitigate the financial stability concern and provides a cushion against credit risk; on the other side, a higher loan loss provision limits the funds which can be used for lending by the banks and negatively affects the lending activity of the banks. The cost of low loan provision threatens the bank's financial stability, especially during the downward trend of the business cycle. of the higher loan loss provision hurts the lending growth for commercial banks across emerging market economies. The bank capital structure has an important role in the banks' funding cost. In the capital structure theories, the Modigliani-Miller (MM) theorem states the irrelevance of the firm's capital structure in deciding the firm's value. Banks prefer more debt over equity, so an increase in the equity to total assets leads to an increase in the cost of borrowing for the firms, which is reflected in lower lending growth by the banks. The coefficient for the capital is negative and statistically significant. The increase in the equity component of the capital structure has a negative impact on the lending growth. The coefficient for the efficiency ratio measured by the cost-to-income ratio is negative. The increase in the cost-to-income ratio can be due to rising non-performing roles, high risk-taking and poor management. An increase in the cost-to-income ratio is associated with the lower lending growth of the banks. Theoretically, the bank size coefficient is expected to positively influence commercial bank lending as large banks have greater access to deposits and alternative sources of funds. The bank coefficient in our study sample is negative and statistically significant, indicating that lending growth decreases with an increase in the banks' size. The reason for the lower lending growth as the bank's size increases is that larger banks tend to diversify their portfolio. In contrast, small banks are more reliant on the traditional lending activity of the banks. The coefficient for liquidity is positive and statistically significant. The diversification ratio measured by the non-interest income to average total asset enhances the bank's ability to withstand the financial shock and positively impacts lending growth. Diversification gains from mixing traditional lending with non-interest business areas come at the cost of increased risk as returns from the other business line is more volatile compared to traditional lending. The diversification coefficient is positive and significant, suggesting that banks have profited from the diversification and has a positive impact on lending growth through the profit channel.

Table 1

VARIABLES	DL	DL	DL	DL	DL	DL	DL	DL	DL	DL
L.DL	0.0220*	0.0252**	-0.129***	-0.132***	-0.190***	-0.190***	-0.170***	-0.172***	-0.170***	-0.261***
	(0.0113)	(0.0110)	(0.0137)	(0.0141)	(0.0150)	(0.0151)	(0.0158)	(0.0159)	(0.0162)	(0.0158)
L.DMP	0.00274	0.00364**	0.000516	0.000770	0.000939	0.00115	0.00882***	0.00889***	0.00942***	0.00836***
	(0.00184)	(0.00184)	(0.00187)	(0.00193)	(0.00201)	(0.00209)	(0.00232)	(0.00237)	(0.00220)	(0.00241)
L.CAP	0.00666***	0.00971***	0.0158***	0.0163***	0.0132***	0.0134***	0.0162***	0.0161***	0.0186***	0.0174***
	(0.000310)	(0.00102)	(0.00102)	(0.00103)	(0.000992)	(0.00101)	(0.00125)	(0.00126)	(0.00131)	(0.00123)
L.SIZE		0.00233***	0.00373***	0.00273*	0.00499***	0.00498***	0.00151	0.00115	-0.00448**	-0.000694
		(0.000787)	(0.00112)	(0.00155)	(0.00154)	(0.00155)	(0.00190)	(0.00195)	(0.00201)	(0.00265)
L.LLP			-0.0460***	-0.0484***	-0.0365***	-0.0374***	-0.0468***	-0.0462***	-0.0232***	-0.0273***
			(0.00334)	(0.00350)	(0.00429)	(0.00427)	(0.00438)	(0.00440)	(0.00406)	(0.00408)
L.LIQ				0.0716	-0.420***	-0.420***	0.150	0.182	0.302***	0.794***
				(0.0869)	(0.0885)	(0.0888)	(0.103)	(0.111)	(0.105)	(0.125)
L.EFR					0.00175***	0.00175***	0.00112***	0.00113***	0.00181***	0.00229***
					(0.000280)	(0.000280)	(0.000294)	(0.000294)	(0.000349)	(0.000418)
L.LEV						0.000113	7.86e-05	7.26e-05	-3.03e-05	-0.000205
						(0.000225)	(0.000196)	(0.000199)	(0.000246)	(0.000274)
L.ROAA							-0.0641***	-0.0629***	-0.0331***	-0.0442***
							(0.00715)	(0.00724)	(0.00825)	(0.00830)
L.NINI								-0.00412	0.00871	0.0567***
								(0.00705)	(0.00777)	(0.00800)
L.IRR									-0.0313***	0.00626
									(0.00541)	(0.00632)
HHITASS										-3.205***
										(0.338)
Observations	5,131	5,131	4,916	4,916	4,882	4,882	4,882	4,882	4,882	4,882
R-squared										
Number of Banks	652	652	641	641	638	638	638	638	638	638

Standard errors in parentheses

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

6. Conclusion

The bank's type, size, capital, liquidity, market structure, portfolio of assets, non-performing assets, and capital structure, profitability are essential factors determining the effective transmissions of the bank lending channel of the monetary policy transmission. The critical findings from the study are as follows: First, internal and external factors significantly influence the bank lending channel, which has important implications for monetary policy transmission. The bank heterogeneous characteristics are found to statistically significantly influence the banks' lending behaviour. The bank's capital structure has significantly impacted lending growth in emerging market economies. The increase in market power lowers the effectiveness of the bank lending channel and thus the monetary policy transmission; policymakers shall try to create a more competitive banking structure and prevent the commercial banking sector from becoming more oligopolistic. A more competitive market structure is crucial for effectively transmitting monetary policy.

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Appendix:

Table 2

VARIABLES	DL	DL	DL	DL	DL	DL	DL	DL	DL	DL
L.DL	-0.213***	-0.209***	0.0434***	0.0453***	0.0449***	0.0450***	0.0488***	0.0482***	0.0545***	0.0529***
	(0.000177)	(0.000171)	(0.000337)	(0.000457)	(0.000430)	(0.000521)	(0.000503)	(0.000712)	(0.000505)	(0.000327)
CMPP	-0.0189***	-0.0257***	-0.00455***	-0.00364***	-0.00577***	-0.00532***	-0.00525***	-0.00456***	-0.00486***	-0.00555***
	(7.53e-05)	(5.72e-05)	(9.42e-05)	(9.63e-05)	(0.000120)	(9.69e-05)	(8.89e-05)	(0.000117)	(0.000122)	(0.000125)
L.CMPP	0.00806***	0.0170***	0.0168***	0.0166***	0.0198***	0.0197***	0.0166***	0.0164***	0.0141***	0.0186***
	(8.21e-05)	(7.78e-05)	(9.63e-05)	(0.000107)	(0.000119)	(0.000139)	(0.000101)	(0.000191)	(0.000127)	(9.49e-05)
L.CAP	-0.00460***	-0.00473***	-0.00326***	-0.00336***	-0.00444***	-0.00451***	-0.00444***	-0.00461***	-0.00366***	-0.00385***
	(5.77e-06)	(1.26e-05)	(1.02e-05)	(1.56e-05)	(1.22e-05)	(1.12e-05)	(1.79e-05)	(1.81e-05)	(1.10e-05)	(1.50e-05)
L.SIZE		-0.249***	-0.225***	-0.234***	-0.237***	-0.237***	-0.241***	-0.241***	-0.243***	-0.249***
		(0.000323)	(0.000303)	(0.000497)	(0.000444)	(0.000602)	(0.000531)	(0.000506)	(0.000372)	(0.000416)
L.LLP			0.0122***	0.0114***	0.0107***	0.0107***	0.0103***	0.0102***	0.0102***	0.00956***
			(2.10e-05)	(2.80e-05)	(1.80e-05)	(2.26e-05)	(2.11e-05)	(2.17e-05)	(3.23e-05)	(3.79e-05)
L.LIQ				0.0884***	0.0973***	0.0992***	0.0780***	0.0651***	0.0651***	0.0619***
				(0.000936)	(0.00106)	(0.00114)	(0.000807)	(0.000933)	(0.00131)	(0.00147)
L.EFR					0.000190***	0.000186***	8.30e-05***	9.06e-05***	-8.38e-05***	-9.33e-06**
					(2.28e-06)	(1.48e-06)	(2.27e-06)	(2.84e-06)	(4.14e-06)	(3.68e-06)

L.LEV						0.000283***	0.000257***	0.000255***	0.000326***	0.000212***
						(1.74e-05)	(1.51e-05)	(1.80e-05)	(1.79e-05)	(2.04e-05)
L.ROAA							-0.00649***	-0.00768***	-0.00191***	-0.00258***
							(5.20e-05)	(6.55e-05)	(5.76e-05)	(7.18e-05)
L.NINI								0.00295***	-0.00121***	-0.000770***
								(6.72e-05)	(5.69e-05)	(5.92e-05)
L.IRR									-0.00996***	-0.00962***
									(5.52e-05)	(6.40e-05)
HHILTASS										-2.486***
										(0.00847)
RGDPQOQ	-0.00144***	-0.00112***	-0.00178***	-0.00179***	-0.00188***	-0.00188***	-0.00195***	-0.00193***	-0.00190***	-0.00193***
	(6.08e-06)	(4.98e-06)	(5.29e-06)	(9.38e-06)	(7.11e-06)	(6.08e-06)	(7.11e-06)	(7.37e-06)	(7.44e-06)	(8.12e-06)
INFLA	0.00209***	0.00454***	0.00263***	0.00267***	0.00281***	0.00279***	0.00314***	0.00300***	0.00336***	0.00330***
	(2.08e-05)	(1.36e-05)	(2.82e-05)	(2.05e-05)	(1.79e-05)	(2.33e-05)	(2.22e-05)	(3.11e-05)	(2.86e-05)	(2.19e-05)
Observations	7,702	7,702	6,916	6,916	6,770	6,770	6,770	6,770	6,770	6,770
Number of Banks	404	404	381	381	375	375	375	375	375	375

Standard errors in parentheses

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