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**Article**

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# ANALYSIS OF SOME INNER FACTORS AFFECTING THE LENDING RATE AND COMMERCIAL BANK BEHAVIOR (An Empirical Study Based on the Commercial Banking Sector of Pakistan)

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## Abstract

This research study aims to investigate the potential inner factors of the lending rate in the commercial banking sector of Pakistan. For this purpose, seven bank-specific explanatory variables (capital adequacy, management efficiency, liquidity, asset quality, investment to asset, loan to asset and deposit to asset ratios) were selected to determine their impact on lending behavior. Panel data techniques were employed on secondary data collected from the annual financial reports from a sample of nineteen major commercial banks over a period of 2007 to 2014. For the purpose of analysis, descriptive statistics, Pearson correlation and panel data techniques for regression analysis such as the fixed effect regression models were considered after conforming to the Hausman specification (1978) test. The findings of this study revealed that only four out of seven explanatory variables (ratio of investment to total assets, deposit to asset, loan to asset and liquidity ratio) have a significant relationship with lending rate. Two of the significant determinants (liquidity ratio and investment to asset ratio) are positively correlated while the remaining two significant explanatory variables (loan to asset ratio and deposit to asset ratio) are found negatively correlated with lending rate. The findings of the study are applicable to the banking sector of Pakistan. The current study ignored the use of macro factors like GDP and inflation, etc. which could be used in future research.

**JEL classification:** C01, C23, C58, C87, D22, G10, G21, G39

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## INTRODUCTION

The variation in lending rate is a matter of great concern to all the major stakeholders in the economy. In recent times the high lending rate charged by commercial banks has raised many questions for the policy makers. The lending rate indicates the cost of borrowing funds from banks for business; this makes it critical for the expansion of economic activity in a country. While it is evident that the lending rate is crucial for the progress and development of all types of entrepreneurial activities, the most important thing is to distinguish the determinants of the lending rate in an established and integrated banking sector regulated by a central bank.

The major role of a banking system is to activate and channel assets to the real zones of the economy. A rigorous financial system rewards the shareholders for their share and encourages further investment. On the other hand, poor financial performance results in banks' downfall and failure which has a negative impact on the financial growth of the economy. Due to the vital role of banks in capital formation, banks should be more closely examined in the economy (Aspal & Nazneen, 2014). Lending rates of commercial banks determine the profitability. Higher lending rates have remained a problematic issue and been difficult to reduce. Economist and academics argue that high interest rates are a barrier to economic development. (Ngumi, 2014) Changes in lending rates disturb financial performance of CBs. In one survey, the majority of the respondents specified that lending rate variations affect productivity; competition from other monetary entities to a very great extent affects possible stock opportunities and overall development of the bank (Kananu & Ireri, 2015). In any banking sector the commercial banks use lending rates in pricing their goods and make a distinction from those offered by other banks. Commercial banks set the lending rates during the procedure of lending and deposit rates which are determined by individual bank specific factors (Siddiqui, 2012). Research on the determinants of lending rate was initially directed in developed countries. One of the classical researches was carried out by (Arifi, Durguti, Tmava & Kryeziu, 2014) in Kosovo where they investigated the effects of Basel III on the interest rate. Different ratios (capital adequacy, asset quality, investment to asset, and loan to asset, deposits to asset, management efficiency and liquidity) were tested to see how they affect the lending rate. This study had 76.5% of the variation of the

dependent variable explained by independent variables.

However, there have not been many researches directed towards developing countries that saw the applicability of the determinants of lending rate from the developed nations. (Ngigi, 2014) (Georgievska, Kabashi, Manova-Trajkovska, Mitreska & Vaskov, 2011), (Siddiqui, 2012) (ROTICH & Gladys, 2014) (Mbao, Kapembwa, Mooka, Rasmussen & Sichelwe, 2014) (Ongore & Kusa, 2013) (Kimeria, 2014) were among those scholars who studied the determinants of lending rate issues in the developing nations. There are some problems in how commercial banks in Pakistan choose their lending rates and the determinants which influence the lending rates. Many researchers use different variables to determine the lending rate in banking sectors. If Pakistan wants to become a part of the global market like other developed countries such as Japan, China, Singapore, the United States, etc., then it is compulsory to take those steps which are creative and also enhance the financial performance of the banking sector.

### Objective of the Study

The aim of this study is to investigate the impact of bank specific inner factors on average lending behavior of in the commercial banking sectors of Pakistan which ultimately enhance the corporate performance toward economic growth directly and indirectly. The researcher's main objective is to investigate different determinants which have significant impact on bank financial performance during the period of 2007 to 2014 in Pakistan. The determinants include the bank specific as well as the macro factors. The study not only finds the significance of the relationship between lending rates and factors but also the direction, comparison and strength by using different statistical and econometric tools and techniques like panel data modelling, correlation analysis and descriptive statistics.

### Research Questions

To explore this study, the researchers tried to investigate the following research questions on the basis of previous research studies specified in the literature review section.

- 1) On average, how do the inner factors contribute to commercial banking in Pakistan, including lending rate for the period of study?
- 2) What kind of association do the inner factors of a



commercial bank have along with lending behavior for the period of study?

3) How can the potential inner factors of commercial banks in Pakistan affect their lending behavior for the period of study?

4) Are the observed findings verifiable with the previous research studies?

### **Innovation of the Study**

The researcher after analyzing previous studies comes to the conclusion that previous studies especially with reference to the lending behavior of commercial banks of Pakistan for the period of study 2007-2014 lacks studies with the potential inner factor. The lending function of commercial banks is an important one, so the policy makers in commercial banks should be able to explore these factors while making lending decisions.

## **REVIEW OF LITERATURE**

Various studies have been conducted relating to this study of significant impact on lending rate. But there is very little literature available in the Pakistan commercial banking system about this context. However, other developed countries have conducted a lot of research related to this context.

(Arifi et al., 2014) This study examines the effect of determinants on the lending rate of loans in the Kosovo banking system. In this paper time series data of all the listed banks during the year 2006 to 2013 was analyzed using multiple regression models to determine the impact of capital adequacy, management efficiency ratio, liquidity ratio, asset quality ratio, investment, loans and deposits ratios on average interest rate of loans. The regression model of the Kosovo Banking System showed that all ratios mentioned in this study have a significant impact on rate of interest. This study had 76.5% of the variation of the dependent variable explained by independent variables. (Nucu, 2011) The determinants had a more significant role than preceding Basel to survive in economic crises increasing the profitability of the banking sector.

(Ali, Akhtar & Ahmed, 2011) studied the bank specific determinants of the financing sector of commercial banks in Pakistan. This study argues that sector specific factors have a great effect on the world's financial system and economies. The study shows that a significant relationship exists between financial behavior and the

Basel requirements.

(Hannoun, 2010) This study examined the effect of determinants; after implementation of the determinants the financial position of banks became four times higher than previous cases.

(Mbao et al., 2014) observed the impact of a number of variables on lending rate. This study was done in Zambia using a panel regression technique. The goal of this study was to establish the role that a bank's balance sheet data play in influencing the lending rate. Bank-specific micro and economy-wide macro data was used from 2005 to 2013. This study indicated that lending rate was to an important extent influenced by variables involving bank costs. This analysis suggested that bank expenses are important for lending rate and other factors also have great impact.

(Ngata & Njeru, 2015) studied the impression of Basel Liquidity accords in the banking system of Kenya on lending rates. In this study data was collected from CBK and World Bank. All commercial banks in Kenya were designated as the target population. The relationship of the dependent variable and independent variables; core capital requirement, liquidity ratio, reserve requirement and loan to deposit ratio requirement was measured by regression and correlation techniques. The conclusion of the study showed that there was an insignificant relationship between the core capital requirement and reserve ratio requirement on interbank lending rates but significant relationship between the liquidity ratio requirement and interbank lending rates. Finally, the findings demonstrate a significant relationship between the loans to deposits.

(Richard & OKOYE, 2014) in Deposit Money Banks studied the effect of bank lending rate on performance in Nigeria. To determine how performance of banks was affected by lending rate policy, the regression technique was used. The data was collected between 2000 and 2010. The outcomes of the study established that the monetary policy and lending rate had sound effects on the performance of banks. (Hussain et al., 2012) To solve the liquidity issue determinants used the ratio of Liquidity coverage (LCR). The main objective of this ratio is that commercial banks must have more liquid assets that are easily converted into cash to fulfill the cash requirement within 30 days. After reviewing the literature, earlier studies mainly focused on the relationship among rate of interest and non-performing debts in banking sectors.

The whole system of commercial banks was to a great degree facilitated without increasing the lending rate. A main reason in fluctuation of lending rate generally depends upon the financial strength of the banking sector and variation in market rates of their assets and liabilities, although a very few developing countries show an incredible contribution on determinants of the lending rate. So, there is need to evaluate the impact of determinants on lending behavior of commercial banks of Pakistan.

## SOURCE OF DATA AND METHODOLOGY

### Nature and Source of Data

The data was collected from “Financial statement of the commercial banks in Pakistan”, available online at their respective website for bank specific factors. Panel data techniques were employed on secondary data collected from the annual financial reports from a sample of nineteen major commercial banks over a period of 2007 to 2014. It is a short panel data due to its nature. Cameron and Trivedi (2009) stated that a panel is considered to be a short panel when it has a large or many entities but few time periods. In the current research, there are 19 banks and an 8 year time period, so it is a short panel. This study is applicable to the commercial banking sector of Pakistan. On the other hand, this study is not applicable to the non-financial sectors and financial sectors of Pakistan other than commercial banks due to a change of their financial structure, nature of the business and lending factor.

### Modelling

The current study aims to investigate the impact of some bank specific factors on lending rate which can be shown as a relationship in the form of correlation analysis, regression analysis and the Hausman specification test.

### Economic Model

The researchers expected to form the following economic relation between lending rate and factors that determine it. The following economic model can be formed:

$$LNDR = f(\text{Banking specific factors})$$

The bank specific factors includes Capital adequacy ratio, management efficient ratio, liquidity ratio, asset quality ratio, investment to asset ratio, loan to asset ratio

and deposit to asset ratio.

### General Econometric Models for Panel data

The current study utilized the dataset in the shape of a panel. It refers to the pooling of observations over a series of a number of time periods and cross sections (Baltagi, 2005). The structure of the general econometric model for panel data is as follows:

$$y_{it} = \alpha + X'_{it}\beta + \mu_{it} \quad (1)$$

$$i = 1, \dots, N; t = 1, \dots, T$$

where “ $i$ ” denoting cross sections and “ $t$ ” denoting the time period dimension of panel data, “ $y$ ” denotes the dependent variable in the above equation 3.1 while “ $X$ ” is the  $i$ th observation on  $k$  explanatory variables (Baltagi, 2005). “ $\beta$ ” denotes  $K \times 1$  and “ $\alpha$ ” denotes the scaler in the above equation while “ $\mu_{it}$ ” denotes the unobservable factors affect in the panel data modelling stated above. It is further composed of the following two elements:

$$\mu_{it} = \mu_i + v_{it} \quad (2)$$

where the term “ $\mu_i$ ” captures the specific-individual effect not included in the regression model while the term “ $v_{it}$ ” denotes the remaining unobservable factors which is the usual error term in the regression model.

### Fixed Effect Model

(Baltagi, 2005) stated that when our inference is limited to the individual behavior of a group of firms, the fixed affect model is an appropriate choice for prediction of the relationship between dependent and independent variables in a panel data model. In this case the term “ $\mu_i$ ” is a parameter which is assumed to be fixed and is estimated for the purpose of inference in panel data. The remaining unobservable factors are stochastic with “ $v_{it}$ ” which are distributed identically as  $IID(0, \sigma_v^2)$  and changes with individual and time invariants. It is further assumed under the fixed affect model that for all “ $i$ ” and “ $t$ ”, the “ $X_{it}$ ” does not depend on “ $v_{it}$ ” for the purpose of inference. So, the econometric model for fixed effect in panel data will take the form as follows:

$$y_{it} = (\alpha + \mu_i) + X'_{it}\beta + v_{it} \quad (3)$$

The model for current study can be converted into fixed effect for bank specific factors as follows:

$$(Lending\ Rate)_{it} = (\beta_0 + \mu_i) + \beta_1(Capital\ Adequacy\ Ratio)_{it} + \beta_2(Management\ Efficiency\ Ratio)_{it} + \beta_3(Liquidity\ Ratio)_{it} + \beta_4(Asset\ Quality\ Ratio)_{it} + \beta_5(Investment\ to\ Asset\ Ratio)_{it} + \beta_6(Loan\ to\ Asset)_{it} \quad (4)$$

$$Ratio)_{it} + \beta_7(Deposit\ to\ Asset\ Ratio)_{it} + v_{it}$$

**Random Effect Model**

(Baltagi, 2005) further stated that the random effect model is appropriate in a situation where the researcher intends to draw individuals randomly from a large population. In this case the term “ $\mu_i$ ” is assumed to be random. So,  $\mu_i \sim IID(0, \sigma_{\mu}^2)$ ,  $v_{it} \sim IID(0, \sigma_v^2)$  and that the values of  $\mu_i$  are independent of the values of  $v_{it}$ . In addition, the values of  $X_{it}$  are also independent from  $\mu_i$  and  $v_{it}$ .

The random effect model is as follows:

$$y_{it} = \alpha + X'_{it}\beta + (\mu_{it} + v_{it}) \tag{5}$$

where  $\mu_{it}$  represents between-entity error and  $v_{it}$  represents within-entity errors.

The fourth model of current study using the random effect approach for bank specific factors can be stated as:

$$(Lending\ Rate)_{it} = \beta_0 + \beta_1(Capital\ Adequacy\ Ratio)_{it} + \beta_2(Management\ Efficiency\ Ratio)_{it} + \beta_3(Liquidity\ Ratio)_{it} + \beta_4(Asset\ Quality\ Ratio)_{it} + \beta_5(Investment\ to\ Asset\ Ratio)_{it} + \beta_6(Loan\ to\ Asset\ Ratio)_{it} + \beta_7(Deposit\ to\ Asset\ Ratio)_{it} + (\mu_{it} + v_{it}) \tag{6}$$

**Pooled OLS Model**

The Pooled OLS model is used when it is assumed or applicable that an individual effect of a cross-section or time period does not exist “ $\mu_i = 0$ ”, so the OLS pooled model is considered an efficient way to gain consistent parameter estimates (Baltagi, 2005). The Pooled OLS model can be stated as follows:

$$y_{it} = \alpha + X'_{it}\beta + \varepsilon_{it} \quad (\mu_i = 0) \tag{7}$$

The 7th model is established to analyze the effect of bank specific factors on lending rate of loans using the Pooled OLS approach as follows:

$$(Lending\ Rate)_{it} = \beta_0 + \beta_1(Capital\ Adequacy\ Ratio)_{it} + \beta_2(Management\ Efficiency\ Ratio)_{it} + \beta_3(Liquidity\ Ratio)_{it} + \beta_4(Asset\ Quality\ Ratio)_{it} + \beta_5(Investment\ to\ Asset\ Ratio)_{it} + \beta_6(Loan\ to\ Asset\ Ratio)_{it} + \beta_7(Deposit\ to\ Asset\ Ratio)_{it} + \varepsilon_{it} \tag{8}$$

**Choice of Modelling**

In panel data analysis, the Hausman specification test (1978) is run for the selection of fixed effect or random effect while the Breusch-Pagan Lagrange multiplier or LM test is used to choose between the random effect model and Pooled OLS. The nature of the data set used was a short panel as this study was conducted for a short span of time according to (Baltagi, 2008).

**DESCRIPTION OF VARIABLES**

Earlier research studies revealed that various proxies were used to determine the lending rate. For this purpose, the researcher used seven bank-specific explanatory variables.

A brief description about each variable is given below.

**Hypothesis of Study**

The following hypotheses are generated with reference to earlier studies, (Arifi et al., 2014).

$H_0$ : Commercial bank’s specific inner factor should

**Table 1: Description of dependent and independent variables**

	Variables	Measures	Notation
Dependent Variable	Lending rate of loan	(The average interest rate on lending at each bank in percent) BOZ (2010), “Survey on How Commercial Banks Determine their Base Lending Rates,” Bank of Zambia.	LNDR
Independent Variables	Capital Adequacy Ratio	Tier 1 capital + tier 2 capital / Risk weighted asset.	CAR
	Management Efficiency Ratio	Expenses / Revenues	MER
	Liquidity Ratio	Liquid assets / Current Liability.	LR
	Assets Quality Ratio	Loan Loss Reserve / Net Loans	AQR
	Investment to asset Ratio	Investment / total assets	ITA
	Loan to asset Ratio	Loan / Total assets	LTA
	Deposit to Asset Ratio	Total Deposit / Total Assets	DTA



have a positive effect on their lending behavior for the period of study in Pakistan.

$H_1$ : Commercial bank's specific inner factor should have a negative effect on their lending behavior for the period of study in Pakistan.

### Regression Analysis and Discussion of Results

Table 2 expresses the summary of descriptive statistics of all those variables included in the study. The data consist of 19 commercial banks of Pakistan from

2007 to 2014.

The Table 2 shows that the average lending rate of commercial banks in Pakistan is found to be 0.45 which means on average lending rate contributes about 45% of equity of financial banks. The table also indicates that overall variation of the lending rate is about 60%. Deposit to asset ratio on average (mean) value is 72.41%, Investment to asset ratio on average (mean) value is 34.4%, liquidity ratio on average (mean) value 16.20%, and loan to asset ratio contributes on average (mean) value 10.98%.

**Table 2: Descriptive statistics**

Variables	Variations	Obs.	Mean	STD	Min	Max
Lending Rate	Within	T=8		0,481	-0,501	4,324
	Between	n= 19		0,370	0,043	1,557
	Overall	N= 152	0,450	0,601	0,006	4,622
Capital Adequacy Ratio	Within	T=8		0,076	-0,278	0,798
	Between	n= 19		0,094	0,064	0,489
	Overall	N= 152	0,167	0,119	0,017	1,119
Management Efficiency Ratio	Within	T=8		0,129	0,435	0,668
	Between	n= 19		0,164	0,523	1,129
	Overall	N= 152	0,832	0,206	0,357	1,641
Liquidity Ratio	Within	T=8		0,051	0,041	0,389
	Between	n= 19		0,048	0,104	0,622
	Overall	N= 152	0,162	0,069	0,066	0,380
Asset Quality Ratio	Within	T=8		0,496	-1,569	4,089
	Between	n= 19		0,317	-0,227	1,228
	Overall	N= 152	0,153	0,585	-1,168	4,571
Investment to Total Ratio	Within	T=8		0,107	0,111	0,832
	Between	n= 19		0,082	0,212	0,513
	Overall	N= 152	0,345	0,134	0,108	1
Loan to Asset Ratio	Within	T=8		0,078	-0,076	0,787
	Between	n= 19		0,054	0,029	0,280
	Overall	N= 152	0,110	0,094	0,002	0,804
Deposit to Asset Ratio	Within	T=8		0,036	0,537	0,823
	Between	n= 19		0,064	0,556	0,775
	Overall	N= 152	0,724	0,072	0,449	0,828

Source: the above values are reported from the output of STATA 11 software

For the purpose of determining the association between all variables, the Pearson correlation with P-values is analyzed and reported in the following Table 3 as below.

Table 3 shows the association between variables along with their significant values. The correlation matrix represents the dependent and explanatory variables of commercial banks of Pakistan for the period of 2007-2014. This table indicates that capital adequacy ratio, management efficiency ratio, liquidity ratio and asset quality ratio are positively correlated with lending rate while investment to asset, loan to asset and deposit to asset ratios are negatively correlated with lending rate. The above table also indicates that the highest correlation exists between Liquidity ratio and lending rate of about 73.91%.

For the purpose of measuring the effect of inner factors on lending behavior of the commercial banking sector of Pakistan for the period of study 2007-14, the researcher applied panel data models like fixed effect, random effect and Pooled OLS. After verifying from Hausman Specification (1978), the researcher concluded that the fixed effect model is appropriate in the current study. The coefficient values along with their corresponding P-values are reported in the following Table 4. In addition, the R-square, model fitness, and the value of the Hausman Specification test (1978) has been reported as well in the same table.

Table 4 shows the results of the fixed effect model;

data consist of nineteen commercial banks for eight years from 2007-2014. The value of R2 shows that the overall model is best fit and shows significant results. It shows an insignificant relationship between capital adequacy ratio and lending rate and accepts the 1st null hypothesis. This result is consistent with the study of researchers like (Georgievska et al., 2011) and (Bonner & Eijffinger, 2013).

The regression result also shows an insignificant relationship between Management efficiency Ratio and average lending rate and accepts the 2nd null hypothesis. This shows a consistent result with the study of (Arifi et al., 2014). The Liquidity ratio shows a significant result, it also expresses a positive significant relation with lending rate. It accepts the 3rd alternate hypothesis. This result is consistent with the studies of (Georgievska et al., 2011) (Arifi et al., 2014) (Ngata & Njeru, 2015) and (Bonner & Eijffinger, 2013). Asset quality Ratio is not significant. It indicates that lending rate is not influenced significantly by this in the banking sector. It accepts the null hypotheses and rejects the 4th alternate hypotheses. This result consistent with the study of (Arifi et al., 2014). Investment to asset ratio is significant at a 1% level and showing positive significant relationship with lending rate. It accepts the 5th alternate hypothesis and is also consistent with the previous researcher (Arifi et al., 2014). Loan to asset ratio is significant at a 5% level. It shows negative significant relationship between investment to asset ratio and lending rate. It rejects the null hypotheses and accepts the 6th alternative hypothesis; this result is consistent with the research study (Arifi et al., 2014).

**Table 3: Correlation Matrix for Banking Sector**

	LNDR	CAR	MER	LR	AQR	ITA	LTA	DTA
LNDR	1							
CAR	0,4217 0	1						
MER	0,159 0,0504	0,1003 0,2187	1					
LR	0,7391 0	0,5088 0	0,0335 0,6818	1				
AQR	0,0398 0,6264	0,0091 0,9116	0,1516 0,0622	0,0604 0,4595	1			
ITA	-0,1309 0,1079	0,1053 0,1969	-0,2083 0,01	-0,2745 0,0006	-0,0923 0,2582	1		
LTA	-0,0321 0,6943	-0,0765 0,3486	0,125 0,125	-0,0254 0,7563	-0,2119 0,0088	0,1353 0,0965	1	
DTA	-0,3421 0	-0,4197 0	-0,2367 0,0033	-0,3183 0,0001	0,04 0,6247	0,1077 0,1865	-0,4301 0	1

Source: The above values are reported from the output of STATA 11 software



**Table 4: Results of Fixed Effect Model**

Independent Variables	Dependent variable= Lending Behavior (LNDR)			
	Coefficients	Std. Err.	t-values	P-values
CAR	0,3783774	0,445741	0,85	0,398
MER	-0,1855714	0,2061906	-0,9	0,37
LR	7,104665	0,6413934	11,08	*0.000
AQR	0,0635819	0,0592055	1,07	0,285
ITA	1,002042	0,2868323	3,49	*0.001
LTA	-1,032874	0,3902941	-2,65	**0.009
DTA	-2,195891	0,8559373	-2,57	**0.011
Constant	0,737846	0,6746097	1,09	0,276
Number of Observations			152	
Number of Groups			19	
F (7,126)			29,99	
Prob > F			0	
Hausman test			Prob > Chi2 = 0.0007	
R-Square (within)			0,6249	
R-Square (Between)			0,4851	
R-Square (overall)			0,5372	

\*significant at 1%, \*\*significant at 5%

Source: This output is generated through STATA 11

Deposit to asset ratio is significant at a 5% level. It indicates the negative significant relationship with lending rate. It accepts the null hypotheses and rejects the 7th alternative hypothesis. This result is not consistent with the result of (Arifi et al., 2014).

are also consistent with earlier studies. The banking sectors should preferably increase the liquidity ratio and investment to asset ratio as it will increase the lending rate and ultimately strengthen the bank financial position.

## CONCLUSION AND RECOMMENDATIONS

This study explored whether these variables (liquidity ratio, investment to asset ratio, loan to asset ratio and deposit to asset ratio) have significant effect on lending rate on loans in the commercial banking system of Pakistan. The commercial banking sector of Pakistan should take into consideration all of the above mentioned variables while making lending rate policies as well as financial decisions. The current study findings

## Limitations and Suggestions

This study is only applicable in the banking system. This study is not applicable to non-financial sectors as well as financial sectors other than banking because their capital structures are entirely different. This study ignores the macroeconomic variables like inflation or GDP growth. A future researcher may also conduct the study on other financial sectors by using the same explanatory variables or by increasing the macroeconomic variables.

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