The Effect of the Central Bank's Policies towards Bank Performance during the COVID-19 Pandemic: Evidence from Thailand

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A B S T R A C T

This paper examines the effects of the Central Bank's policies on the bank performance in Thailand as one of the emerging countries by exploring the impacts of the COVID-19 pandemic on the banks' returns. Several financial ratios measuring the bank performance and stock price were analyzed. The data were gathered during 2017-2021 from 10 listed banks in Thailand. General linear regression analysis was applied to investigate the relationship between the Central Bank's policies and the bank performance. The result revealed that the Central Bank's policies had a negative relationship with the bank performance; however, each policy showed different impacts on the banks' performance indicators. Banks that embraced more policies had more significant influence on its ratios than others. Credit reduction policy and liquidity improvement policy had a negative effect on the bank performance at different significance levels.

Keyword: bank performance; central bank policy; return; pandemic; COVID-19

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1. Introduction

During the COVID-19 pandemic, many countries have tried to circle out the spread using lock down policies to encourage people to stay home and consequently reducing the chance of further spread of the disease. However, as recently witnessed, the spreading of the disease has expanded substantially having adverse impact on many businesses. The hospitality and tourism sector and the airline industry have found themselves transitioning from making profits to standing losses. Cash flows have been reduced without any compensating revenue or income as business owners have carried the high costs of having too many employees. Millions of people have lost their jobs, income, and savings. The economy has turned down due to less business activities and the fear of uncertainty in controlling the pandemic.

The banking industry is one of the sectors that has been directly affected by the pandemic. The revenue of banks and financial institutions are mainly from the financial services rendered, particularly from lending activities as banks earn interest income from loans and the stream of cash flows is from installment payments from borrowers. Before the pandemic, it was common that banks provide loans and lease loan loss percentage to show the potential of default. After the pandemic, borrowers who worked in businesses that have been directly and indirectly affected have lost their ability to maintain their installments due to lower income and job loss. This causes a great negative impact on the banks' revenue and performance with a higher percentage of loan loss. As a result, the government and Central Bank released several financial rehabilitation programs to help borrowers, such as offering flexible plans for borrowers to pay back loans in smaller amount, pay back only the interest portion, or even stop payment for a certain duration. These policies surely pose effects on the bank performance, but it is better to receive some revenue than none. Each bank can choose to follow all policies guided by the Central Bank or just selectively choose one over another as suitable to its credit policy and culture, leading to different impacts on the bank performance.

2. Literature Review

2.1 Performance Indicators

D'Andrea & Masciandaro (2014) investigated the bank performance with internal and external determinators and concluded that profits positively related to sizes or capital adequacy, while credit risk and liquidity had a negative relationship with profitability. External determinants mostly have had a positive relationship with profitability, including macroeconomics indicators such as inflation, long-term interest rate, and cyclical output (Bourke, 1989; Chaudhry et al., 1995; Molyneux & Thornton, 1992).

The popular internal factors to evaluate the bank performance are financial ratios measuring return on equity (ROE), return on assets (ROA), or net interest margin (NIM) (Naceur & Omran, 2011). The greater the ROE and ROA indicates the healthier or more ability to generate the banks' profits, but non-performing loans (NPLs) decrease the banks' profits (Aebi et al., 2012; Korzeb & Niedziółka, 2021; Handayani et al., 2021).

Mirzaei and Mirzaei (2011) discovered that capital strength, liquidity, and efficiency ratios are the main determinants of the banks' profitability. Bank capital and size of banks can also be applied to indicate the bank performance during the pandemic (Mirzaei, 2011). The larger the size of the bank, the better its performance. The most important risks for banks during the pandemic are credit risk and liquidity risk (Berger & Bouwman, 2013; Demirgüç-Kunt et al., 2020; Disemadi & Shaleh, 2020). Al-Romaihi et al. (2020) emphasized a significant positive relationship during the pandemic between NPLs and the external variables such as macroeconomic factors or policies in each country. Moreover, there

are evidences of negative or insignificant relationship between non-performing financing (NPF) and financial performance during the pandemic (Ichsan et al., 2021). ROA, internal operation, and operating cost to operate income had positive and significant relationships with the bank performance in terms of stock return and ROE (Aebi et al., 2012).

2.2 The Effect of the Central Bank's Policies and Bank Regulations

During the pandemic, many countries initiate the relief packages to help the banking sector in different ways. European countries, the United States, African countries and China apply the different approaches in treating the pandemic (Ozili, 2020). Those countries that use fiscal policy and monetary policy can be categorized into policies that emphasized on the credit risk and liquidity.

For example, Indonesia emphasizes on deduction of interest rates, extension of payment period, as well as reduction of the principal and interest arrears (Disemadi & Shaleh, 2020). In Africa, the Central Bank grants debt repayment holidays in Egypt and Nigeria, while other countries focus more on other policies such as debt repayment reduction. None of African countries use the tax deferral policies. African countries use more foreign funds by borrowing from World Bank, the US government, or UK government to deal with the COVID-19 situation (Ozili, 2020).

The stock markets around the globe also underperform during the pandemic. Liquidity and borrowing have a positive impact on the banks' return. Monetary policies such as reduction of policy interest rate and asset purchases program play an crucial role during the pandemic, but the impact on each bank is distinct depending on the bank characteristics and pre-crisis vulnerabilities (Demirgüç-Kunt et al., 2020). Previous studies indicated that bank regulations and labor reform improved the bank performance, while credit regulation, cost efficiency, structural reform had negative impacts on the bank performance. (Personal et al., 2014; Psillaki & Mamatzakis, 2017). However, Beltratti and Stulz (2012) claimed that differences in banking regulations were unrelated to the bank performance during crisis, except large banks with more restrictions performed better and had less changes in the loan amount.

Regarding the bank characteristics, Bitar and Tarazi (2020) concluded that Globally Systemically Important Banks (G- SIBs) were well capitalized before the COVID-19 periods and were able to use capital to cope with the credit risk during the pandemic as measured by a lower number of non-performing loans (NPLs). The pandemic caused only a short-term disruption on the financial sector; banks that are members of the Federal Reserve System (FRS) received liquidity benefit. Over the long-term, deposits returned and banks restored their portfolios of assets (Anderson et al., 2020).

Monetary policy and fiscal policy can help the economy and the corporations during the pandemic. Thus, this emphasizes the importance of the Central Bank's policies being investigated during the pandemic. It could cause demand shortage for loans during the pandemic as people spent less during the pandemic (Andersen et al., 2020; Guerrieri, 2020).

With respect to the banks' earning and return during the pandemic, there were no effect on the earnings but had a negative relationship with capital returns. The long run effect is only on labor scarcity and savings as mentioned in several studies with different pandemic events such as Spanish flu and the COVID-19 (Jordà et al., 2020; Karlsson et al., 2014). Kim et al. (2020) suggested that during the pandemic, banks should concentrate more on the original products and services such as deposits and loan offers to customers, rather than diversifying their portfolios since investing or diversifying exposed to more risk on the bank performance. New products or other aspects of services, for example technology, had a negative effect on the bank performance tested with the pandemic (Phan et al., 2020).

There is still lacking studies regarding the effects of the COVID-19 pandemic on the bank performance since the pandemic is still going on presently in 2021. This research attempts to fill the gap by investing the bank performance with respect to the three research objectives. First is to investigate

whether the Central Bank's policies during the pandemic have any effect on the bank performance. Second is to examine whether the Central Bank's policies during the pandemic have positive relationships with the banks' ratio performance indicators. Last is to explore whether there is any different effect on the bank performance with respect to the Central Bank's policies during the pandemic.

3. Data Collection

Central Bank of Thailand, Bank of Thailand, and Ministry of Finance play vital roles in setting up new regulations to support the banks under their supervision. Ministry of Finance supervises six banks in Thailand, which are state owned that established with the special purposes or obligations, including 1. Government Savings Bank, 2. Bank for Agriculture and Agricultural Cooperatives, 3. Government Housing Bank, 4. Small and Medium Enterprise Development Bank of Thailand (SME Bank), 5. Islamic Bank of Thailand, and 6. Thai Credit Guarantee Corporation (TCG). Bank of Thailand also regulates all commercial banks and financial institutions in Thailand.

Ministry of Finance recently released two types of policies which are liquidity enhancement policy and credit risk reduction policy. Liquidity enhancement policy emphasizes on enhancing liquidity to individuals and business sectors by providing more loans at lower interest rates, etc. Credit risk reduction policy focuses on the restructuring debt and loans for customers by categorizing debtors into different groups and providing suitable restructuring packages such as a payment reduction by allowing them to make a partial debt repayment for a mild affected group, stop payment for a while for a severe affected group, and make a normal payment for a non-affected group.

There are three major debt relief policies of the Bank of Thailand. The first policy is debt restructuring or credit risk reduction with the objective to reduce credit risk for banks, individuals, businesses by offering choices to restructure their debt such as debt payment reduction, extension of term to maturity, and alteration from short-term to long-term debt, interest rate reduction, or reduction of both principal and interest as appropriate. The second policy, liquidity improvement group, is to enhance working capital and liquidity to individuals and businesses. The third policy, debt repayment holiday, is to help individuals and businesses during the pandemic by stopping repayment or postponing repayment. All Central Bank's and Ministry of Finance's debt relief policies are regrouped in three categories entitled Code of Central Bank Policy (CCP) as shown in Table 1. All policies offered by banks are categorized by policy code as shown in Table 2. Table 3 shows the summary of policies offered to cope with the COVID-19 pandemic situation by product type (e.g. credit card, personal loan, car loan).

Table 1 Central Bank's Policies Categorized by the Objective and the Effect on Customers

Category of the Central Bank Policy	Details	Policy List
Policy 1	Debt Restructuring/Credit Risk Reduction	1, 2, 3
Policy 2	Liquidity Improvement	6
Policy 3	Debt Repayment Holiday	4, 5

Table 2 Policy Code Categorized by the Author

Policy List	Details	Policy Code
1	Reduction of Principal and Interest Repayment	11
2	Reduction of Interest Rate	12
3	Extension of Debt Repayment Periods	13
4	Principal and Interest Repayment Holiday	34
5	Principal Repayment Holiday	35
6	More Loan Offering	26

Table 3 Summary of Policy to Cope with the COVID-19 Pandemic Situation

Product Type	Policy	Details	Policy Category	Policy List	Policy Code
Credit Card	1	Reduction of Principal and Interest Repayment (Minimum 5% of Total Debt)	1	1	11
	2	Reduction of Interest Rate	1	2	12
	3	Principal and Interest Repayment Holiday	3	4	34
Personal Loan / Car Loan	1	Reduction of Interest Rate	1	2	12
	2	Principal and Interest Repayment Holiday	3	4	34
	3	More Loan Offering	2	6	26
	4	Principal Repayment Holiday	3	5	35
	5	Extension of Debt Repayment Periods	1	3	13
	6	Reduction of Principal and Interest Repayment	1	1	11
Car Leasing	1	Principal and Interest Repayment Holiday	3	4	34
	2	Reduction of Principal and Interest Repayment	1	1	11
	3	Extension of Debt Repayment Periods	1	3	13
Home Loan	1	Principal and Interest Repayment Holiday	3	4	34
	2	Reduction of Interest Rate	2	1	12
	3	Principal Repayment Holiday	3	5	35
	4	Reduction of Principal and Interest Repayment	1	1	11
	5	Extension of Debt Repayment Periods	1	3	13
SME/Micro Finance	1	Principal and Interest Repayment Holiday	3	4	34
	2	Reduction of Interest Rate	2	1	12
	3	Reduction of Principal and Interest Repayment	1	1	11
	4	Extension of Debt Repayment Periods	1	3	13
	5	More Loan Offering	2	6	26
	6	Principal Repayment Holiday	3	5	35

Source: *https://www.bot.or.th/Thai/FinancialInstitutions/Documents/640125_Measures.pdf*

Table 4 indicates banks in Thailand applying the Central Bank's policies during the pandemic. The first column shows different types of banks by the ownership including commercial banks, state owned banks, or foreign banks. CCP1 (Debt restructuring/credit risk reduction policy), CCP2 (liquidity improvement policy) and CCP3 (debt repayment holiday policy) are categories of the Central Bank's policies that the banks adopted for all products offered after regrouping them. Total policies are summation of all three policies applied by each bank. The last column shows whether the banks are listed or non-listed in the Stock Exchange of Thailand (SET).

Table 4 The Central Bank's Policy Selected by Each Bank

Type of Bank	No.	Bank List	CCP1	CCP2	CCP3	Total Policies	SET
Commercial	1	BBL	7	2	2	11	Listed
Commercial	2	SCB	10	1	4	15	Listed
Commercial	3	KBANK	9	1	7	17	Listed
State Owned	4	GSB	4	4	4	12	Non-listed
State Owned	5	KTB	6	0	0	6	Listed
Foreign	6	CITI	5	0	0	5	Non-listed
Commercial	7	BAY	7	0	6	13	Listed
Foreign	8	UOB	4	0	4	8	Non-listed
Foreign	9	AEON	2	0	1	3	Non-listed
Commercial	10	TTB	7	0	4	11	Listed
Foreign	11	BOC	6	2	4	12	Non-listed
Foreign	12	American Express	2	0	0	2	Non-listed
State Owned	13	AGRO Bank	4	3	6	13	Non-listed
Commercial	14	TISCO	6	1	3	10	Listed
State Owned	15	IBANK	5	1	6	12	Non-listed
Commercial	16	KKP	8	0	2	10	Listed
Foreign	17	CIMBT	6	2	4	12	Listed
Commercial	18	LHFG	2	0	3	5	Listed
State Owned	19	GHB	2	0	1	3	Non-listed
Commercial	20	THAICREDIT	1	1	0	2	Non-listed
State Owned	21	EXIM	2	1	2	5	Non-listed
State Owned	22	SME	2	0	1	3	Non-listed
Foreign	23	STCB	0	1	1	2	Non-listed

This research utilizes secondary data of ten Thai commercial banks listed in the Stock Exchange of Thailand during 2017-2021.

Table 5 Recent Thai Commercial Banks listed in the Stock Exchange of Thailand

Bank Symbol	Bank Name	Stock Market	Industry	Sector
BAY	BANK OF AYUDHYA PUBLIC COMPANY LIMITED	SET	Financials	Banking
BBL	BANGKOK BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
CIMB	CIMB THAI BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
KBANK	KASIKORNBANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
KKP	KIATNAKIN PHATRA BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
KTB	KRUNG THAI BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
LHFG	LH FINANCIAL GROUP PUBLIC COMPANY LIMITED	SET	Financials	Banking
SCB	THE SIAM COMMERCIAL BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking
TISCO	TISCO FINANCIAL GROUP PUBLIC COMPANY LIMITED	SET	Financials	Banking
TTB	TMBTHANACHART BANK PUBLIC COMPANY LIMITED	SET	Financials	Banking

4. Methodology

Financial ratios of each bank before and after the pandemic were tested using mean difference or t-test with descriptive statistics. To test the policy effect with respect to the bank performance, regression analysis was employed to test all types of policies. The model, panel linear regression analysis, was employed to test the relationship between dependent variables, performance ratios of banks which are ROE, ROA, NIM, and stock price, and independent variables, including three categories of policies adopted by each bank, type of banks, and size of banks.

4.1 Regression Model:

Dependent Variables = c + Total number of policies applied + Type + Size + e
Dependent Variables = c + Policy 1 + Policy 2 + Policy 3 + Type + Size + e
Dependent Variables   = Financial ratios (ROE, ROA, NIM) and stock price of each bank
c   = Intercept
Policy 1   = Debt restructuring/credit risk reduction policy applied by each bank (CCP1)
Policy 2   = Liquidity improvement policy applied by each bank (CCP2)
Policy 3   = Debt repayment holiday policy applied by each bank (CCP3)
Type = Type of banks: commercial banks, state owned banks, or foreign banks

Size =Ln (Market capitalization of bank)

e   = Error

As data is panel, regression was used to test panel least squared method. Then, Breusch-Pagan (BP) test was applied to check for fixed and random effect for cross-sectional data. If BP test shows p-value of less than 0.05, then it can be applied for fixed and random effect model. Hausman test was employed to select the best fit of regression model in terms of fixed effect or random effect for cross sectional data. The result of regression models is the best fitted version.

5. Empirical Result

5.1 Mean Difference Comparison

Table 8 shows the mean difference analysis of each financial ratio and stock price of ten commercial banks listed in SET. It showed that ROE, NIM, and stock price were significantly different before and after the pandemic. Average ROE of ten banks before the pandemic (M = 10.34, SD = 21.67), compared to average ROE of ten banks after the pandemic (M = 8.11, SD = 19.54), demonstrated a significantly better ROE performance (t = 1.8331, p = 0.01). Average   NIM of ten banks before the pandemic (M = 26.98, SD = 117.76), compared to average NIM after the pandemic (M = 23.37, SD = 56.76), showed a significantly higher net interest margin (t = 1.8331, p = 0.04). Average closing stock price of ten banks before the pandemic (M = 77.23, SD = 6565.15), compared to average closing stock price of ten banks after the pandemic (M = 57.63, SD = 3109.69), demonstrated a significantly higher stock price (t = 1.8331, p = 0.03). However, there was no significant effect with respect to average ROA (t = 1.8331, p = 0.4), average ROA of ten banks before the pandemic (M = 2.96, SD = 0.76) showed lower ROA than after the pandemic (M = 3.00, SD = 0.89).

Table 6 The Banks' Financial Ratios Performance (ROE, ROA, and NIM) during 2017-021Q1

Bank	ROE					ROA					NIM				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
BAY	10.71	10.6	12.8	8.25	7.95	2.81	2.98	3.32	2.24	2.05	23.45	23	27.38	20.48	23.82
BBL	8.46	8.67	8.52	3.92	3.76	2.66	2.70	2.78	1.62	1.49	29.62	29.4	27.08	14.78	22.86
CIMB	1.29	0.02	3.98	3.22	1.34	1.62	1.47	1.99	1.41	1.02	2.93	0.05	10.61	8.65	9.72
KBANK	10.24	10.6	9.9	6.97	7.81	2.57	2.64	2.52	1.72	1.84	25.28	28.4	27.07	21.75	20.64
KKP	14.06	14.5	13.9	11.33	11.34	4.53	4.39	4.21	3.37	2.86	36.9	35.3	31.25	24.67	26.58
KTB	7.99	9.6	0.09	4.91	4.74	2.37	2.65	2.57	1.53	1.39	19.58	26.5	25.58	15.9	22.35
LHFG	8.84	7.94	7.95	5.16	4.63	3.06	3.1	3.27	2.28	2.03	40.09	44	40.67	26.55	30.67
SCB	12.37	10.8	10.4	6.71	6.88	2.91	2.65	3.09	1.77	1.72	31.72	29	24.03	18.65	26.61
TISCO	18.5	19.4	18.9	15.42	15.4	4.34	4.51	4.71	3.91	3.90	31.73	35.2	37.42	32.08	34.57
TTB	10.01	12.3	4.92	5.06	4.3	2.49	2.89	1.58	1.68	1.47	23.31	24.2	18.14	14.7	16.52

Source: https://www.set.or.th

Table 7 Closing Stock Price and Ln Market Capitalization of Each Bank during 2017 – 2021Q1

Bank	Closing Stock Price (Thai Baht)					Ln Market Capitalization				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
BAY	39.75	38.5	30	31.25	32.75	12.59	12.55	12.30	12.35	12.39
BBL	202	203	160	118.5	117	12.86	12.87	12.63	12.33	12.32
CIMB	1.07	0.77	0.53	0.6	0.86	10.39	10.20	9.82	9.95	10.31
KBANK	232	185	151	113	122.6	13.23	13.00	12.80	12.50	12.58
KKP	79.25	66.25	66	51.75	56.75	11.11	10.93	10.93	10.69	10.78
KTB	19.2	19.2	16.4	11.1	11.1	12.50	12.50	12.34	11.95	11.95
LHFG	1.69	1.37	1.36	1.05	1.06	10.49	10.28	10.27	10.01	10.02
SCB	150	133.5	122	87.5	104.5	13.14	13.02	12.93	12.60	12.78
TISCO	88.5	78.25	99.25	88.5	89.75	11.17	11.05	11.28	11.17	11.18
TTB	3.02	2.2	1.68	1.08	1.15	11.79	11.48	11.99	11.55	11.62

Source*: https://www.set.or.th.*

Table 8 Mean Differences Comparison

	ROE		ROA		NIM		Stock Price	
	2017-2018	2019-2020	2017-2018	2019-2020	2017-2018	2019-2020	2017-2018	2019-2020
Mean	10.34	8.11	2.96	3.00	26.98	23.37	77.23	57.63
Variance	21.67	19.54	0.76	0.89	117.76	56.76	6565.15	3109.69
Observations	10	10	10	10	10	10	10	10
Pearson Correlation		0.8272		0.8763		0.8665	0.9749	
Hypothesized Mean Difference		0.0000		0.0000		0.0000	0.0000	
df		9.0000		9.0000		9.0000	9.0000	
t Stat		-2.6357		-0.2551		-1.9921	2.1069	
P (T ≤ t) one-tail		0.0136		0.4022		0.0388	0.0322	
t Critical one-tail		1.8331		1.8331		1.8331	1.8331	
P (T ≤ t) two-tail		0.0271		0.8044		0.0775	0.0644	
t Critical two-tail		2.2622		2.2622		2.2622	2.2622	

Note: *Before the pandemic (2017-2018) and after the pandemic (2019-2020)*

5.2 Regression Analysis

With respect to ROE prediction in Model 1 and 2, it was found that the number of Central Bank's policies applied (Beta = -0.26, $p < 0.01$) and type of banks (Beta = -3.7, $p < 0.1$) were negatively significant predictors of the banks' return on equity. Size or market capitalization was not a significant predictor (Beta = -0.39, n.s.) in determining ROE. The overall model fit was R squared = 0.43. However, when ROE was predicted by different types of the Central Bank's policies (CCP), it was found that debt restructuring or credit risk reduction policy (Beta = -0.57, $p < 0.01$) was a significant predictor with a negative relationship. The other two policies were not significant predictors of ROE. The overall model

fit was R squared = 0.43. The result reveals that the more CCP1 implemented by banks, the lower the banks' return on equity.

ROA was predicted in Model 3 and 4, it was discovered that total number of the Central Bank's policies applied (Beta= -0.08, $p < 0.01$), market capitalization (Beta = -0.49, $p < 0.05$), and type of banks (Beta = -1.02, $p < 0.01$) were significant predictors with a negative effect on the banks' ROA. The overall model fit was R squared = 0.35. When ROA was predicted by different types of the Central Bank's policies, it was attained that debt restructuring or credit risk reduction (CCP 1) policy (Beta = -0.14, $p < 0.1$) was a significant predictor with a negative relationship. The other two policies were not significant predictors. The overall model fit was R squared = 0.25.

Models 5 and 6 were used to predict net interest margin. Total number of the Central Bank's policies utilized by each bank (Beta = -1.0, n.s.) and market capitalization (Beta = -6.16, n.s.) were not significant factors in predicting NIM. Type of banks (Beta = -16.59, $p < 0.05$,) was a significant predictor with a negative impact on NIM. The overall model fit was R squared = 0.16. When NIM was predicted by different types of the Central Bank's policies, it was realized that all three policies were not significant predictors. The overall model fit was R squared = 0.38.

Models 7 and 8 were employed to predict the stock price using the annual closing stock price variable. It was revealed that the number of the Central Bank's policies adopted by each bank (Beta = -1.09, $p < .05$) and market capitalization (Beta = 48.44, $p < 0.01$) were significant predictors with a negative effect on the number of policy usage and a positive effect on the market capitalization. Type of banks was not significant predictor for the stock price (Beta = -13.49, n.s.). The overall model fit was R squared = 0.55. When the closing stock price was predicted by different types of the Central Bank's policies, it was found that liquidity improvement (CCP2) policy (Beta = -12.06, $p < 0.1$) was a significant predictor with a negative relationship with respect to the stock price. The other two policies were not significant predictors. The overall model fit was R squared = 0.34.

Table 9 Regression Analysis Result

Dependent Variables	ROE		ROA		NIM		Stock Price	
Model	1	2	3	4	5	6	7	8
Intercept	10.230 (0.00)***	10.240 (0.00)***	10.030 (0.00)***	3.048 (0.00)***	126.547 (0.0132)**	31.492 (0.00)***	-478.942 (0.00)***	71.394 (0.00)***
Central Policy Sum Total numbers of policies adopted by each bank	-0.258 (0.00)***		-0.084 (0.00)***		-1.004 (0.1276)		-1.091 (0.0111)**	
Market Capitalization Ln (Market Capitalization): Size of Bank	0.394 (0.6765)		-0.487 (0.029)**		-6.155 (0.1241)		48.435 (0.00)***	
Type of Banks (Structure and Ownership)	-3.650		-1.018		-16.587		-13.488	

	1	2	3	4	5	6	7	8
(Commercial banks, State owned banks, or Foreign banks)	(0.056)*		(0.008)***		(0.0121)**		(0.5998)	
Central Bank Policy Group 1 (CCP1) Debt Restructuring/Credit Risk Reduction Policy		-0.566 (0.000)***		-0.141 (0.0521)*		-0.967 (0.6992)		-2.304 (0.1575)
Central Bank Policy Group 2 (CCP2) Liquidity Improvement Policy		0.539 (0.4327)		0.023 (0.9339)		1.962 (0.8443)		-12.064 (0.0657)*
Central Bank Policy Group 3 (CCP3) Debt Repayment Holiday Policy		0.123 (0.6659)		0.023 (0.8473)		0.169 (0.9675)		0.268 (0.9200)
R-Squared	0.4291	0.4328	0.3485	0.2503	0.1639	0.3778	0.5480	0.3392
Adjusted R-Squared	0.3955	0.3994	0.3102	0.2062	0.1147	0.1805	0.5214	0.3003

*Note: *Confidence level is 10%. ** Confidence level is 5%. ***Confidence level is 1%.*

Table 10 Summary of the Factors Affecting the Banks' Performance Indicators and their Relationships

Dependent Variables	ROE		ROA		NIM		Stock Price	
Model	1	2	3	4	5	6	7	8
Central Policy Sum (Number of Policies)	(-)		(-)		ns		(-)	
Market Capitalization (Size)	ns		(-)		ns		(+)	
Type of Banks (Ownership Structure)	(-)		(-)		(-)		ns	
CCP1		(-)		(-)		ns		ns
CCP2		ns		ns		ns		(-)
CCP3		ns		ns		ns		ns
R-Squared	0.4291	0.4328	0.3485	0.2503	0.1639	0.3778	0.5480	0.3392

6. Discussion

The result of mean difference test (Table 8) showed the significant difference in the bank performance before and after the pandemic with respect to ROE, NIM and stock price but no effect on ROA. Thus, it is confirmed that the pandemic lowered the banks' performance. When decomposing each ratio, ROE and NIM related directly to the net interest income and earning assets, while ROA related to the banks'

assets having no effect from the pandemic as the size of the banks' assets still does not change. Therefore, only ROE, NIM, and stock price were directly affected by the pandemic.

Return on equity (ROE) is measured by net income of the bank compared to its total equity where the bank's net income derived from net interest income deducted the burden and provision for loan losses plus gain on securities investment and deducted tax. The change in net interest income is an important variable effecting the banks' return on equity. Thus, a huge reduction of net interest income received after the pandemic has a negative impact on the banks' ROE. This variable is also a component of net interest margin ratio (NIM) which showed a significant lower in a mean difference after the pandemic. Another important variable affecting net income is a provision for loan losses (PLL), a non-cash expense representing the estimation of potential incremental lost revenue or income due to bad debt. An overstated amount of PLL could affect the huge reduction in the banks' net income. Lower income of the bank also results from lower demand for loans during the pandemic as borrowers are concerned about the economy recovery, solutions for COVID-19 pandemic, the effectiveness of the vaccines, and the ending of the pandemic. Current borrowers cannot make payment on their debts due to the negative effect of the pandemic on their businesses' and individuals' income. Therefore, the willingness of investors to invest in the banking sector would be less attractive than before despite of the Central Bank's policies adopted by banks, evidenced by the large fluctuation of the stock prices in the Stock Exchange of Thailand.

When exploring the result of the regression analysis, the more the number of the Central Bank's policies applied by each bank, the larger the significant effect on the banks' performance, especially on ROE, ROA, and stock price. However, the empirical result showed negative effects towards the banks' performance implying that the more policies applied, the lower the banks' performance. Policies implemented by banks related to their product types offered in the market. Banks accepting more policies covering most of their products received less repayment or inflow steams than banks adopting less policies. Banks adopting less policies imply less product types covered in the debt relief program. Thus, they can still earn income from those exempt portfolio product that were not included in the program. As a result, the study concludes that the more policies applied by each bank lead to greater negative effects on the bank performance due to the fact that more products were covered by the debt relief program.

The market capitalization was utilized as an independent variable to test the effect of the banks' size on their performance. The result concludes that ROA and stock price are affected by the size of the banks. ROA measures the bank's return on assets deriving from net income over total assets and the market capitalization is obtained from the stock price multiplied by the number of shares outstanding. Thus, changes in the stock price result in changes in the banks' market capitalization. The study concludes that market capitalization inversely affects the banks' ROA but positively affects the banks' stock price, implying that lower market capitalization resulted from lower demand of the stocks in the market led to higher ROA and lower stock price during the pandemic.

Type of the banks (structure and ownership), commercial banks, state owned banks, and foreign banks, had a negative effect on the banks' ROE, ROA and NIM. The effect of the bank's type directly revealed that the owner structure played an important role reflecting the bank performance during the pandemic. The effect towards ROE can be explained by the structure of return on equity deriving from net income over total equity. The change in equity structure, represented by the percentage of the ownership, can be part of the significant effect, which can be altered more during the pandemic for commercial banks and foreign banks comparing to state owned banks, which this issue can be further explored. The study reveals that NIM surprisingly shows a negative and significant effect with respect to the banks' structure and ownership.

Regarding the differed types of the Central Bank's policies employed by banks, it showed that the policy regarding debt restructuring or credit risk reduction policy (CCP1) to customers in various groups had a negative and significant relationship with the bank performance with regards to ROE and ROA. It could be explained that the more debt restructuring or credit risk reduction policy given to the customers, the lower the banks' financial performance. This inverse relationship suggested that the debt restructuring policy would not strengthen the banks' performance in the future. With a limited time, the banks are still struggling from the pandemic even with the policies' adoption. Debt restructuring or credit risk policy emphasize on customers debt repayment relief objective. By receiving less amount of repayment from principal reduction, interest rate reduction and extension periods, these polices negatively affect the banks' revenue in long run. Loans, a major source of funds of banks, represent the banks' earning assets to compensate with the interests on the depository accounts the banks pay to depositors. The negative effect of the Central Bank's policy possibly related to the imbalance of loans and deposit accounts as well as other expenses incurred by banks. The imbalance of source of funds and use of fund would cause the banks' problems for example liquidity and credit risk in long run. The policy has objective to reduce customers credit risk during the pandemic. Even though the result of less revenue or cashflows will affect the banks' performance, banks allowed customers to adopt the policies in short run around three to six months for the longest periods. It indicated that banks would not risk by allowing customers to take such policies for a long period of time. Banks attempt to deal with these negative impacts by allowing customers who are truly affected by the pandemic to continue the next phrase of debt relief policy with stringent evaluation criteria. The policy reducing credit risk of customers have a negative effect on the banks' return from imbalance of funds. As such, the banks only handle this risk in short-term with an option for customers to renew the program with rigorous criteria. However, the long-term effect should be investigated.

Liquidity improvement policy (CCP2) influenced the stock price only, showing a negative relationship between the stock price and policy implementation. This implies that this policy may not help increase the customers' ability to borrow in the market if the banks still apply the same criteria in offering the loans before the COVID-19 pandemic. The less strict evaluation criteria are one of the most sensitive issue for banks. The subprime crisis and other financial crises from the past showed the failure and the aftermath of banks offering loans to customers with no capacity to repay their debts. However, liquidity improvement is still necessary during the pandemic. Banks need to apply this policy carefully with respect to customer segmentation. However, the policy was offered to business sectors or commercial loan segment especially to the sectors that affect directly from the pandemic rather than the consumer loan market. Individuals have received cash from many government programs which help enhance their liquidity during the pandemic. The size of consumer loan market is quite large for many banks; however, more stringent evaluation criteria and narrowed market segment coverage of policy resulted in the lower demand from investors to buy and hold stock in the exchange market. Thus, CCP2 policy with more stringent criteria and selective market segment covered by the policy possibly leads to a negative relationship in terms of the stock price and policy implementation.

The last group of the Central Bank's policy, debt repayment holiday policy (CCP3) to help customers maintained their cash flows or income and reduced debt burden during the lock down, had no significant effect on any of the banks' financial performance ratios. However, it showed a positive relationship with the bank performance with no significant effect even the customers stop making payments for a short period of time. This relationship can be further explored for the extended period.

7. Conclusion

This paper investigated the impact of the Central Bank's policies on the banks' performance in Thailand during the COVID-19 pandemic. It showed that several of the Central Bank's policies during the pandemic significantly altered the banks' performance indicators. The number of policies bank adopted had a negative impact on ROE, ROA, and stock price. Size and ownership structure had an inconclusive effect with respect to the banks' performance indicators. Type of banks had a negative and significant effect on the banks' ROE, ROA, and NIM. The size of banks had an influence only on ROA and stock price, showing a negative relationship with ROA and a positive relationship with stock price at different significance levels.

In addition, the different types of the Central Bank's policies (CCP) affected the banks' performance indicators differently. Debt restructuring or credit risk reduction policy (CCP1) had a negative impact on ROE and ROA, while liquidity improvement policy (CCP2) had a negative impact on the stock price only. The Central Bank's policies groups with a significant effect showed inverse relationships with the banks' performance indicators (ROE, ROA and stock price). The policy of debt repayment holiday (CCP3) had positive relationships with the banks' performance, but none of the indicators showed a significant effect. The study of the effect of the Central Bank's policies on the banks' performance during the pandemic could yield different impacts comparing to the normal economic cycle. The effect of the banks' performance from such policies might not reflect as expected due to the uncertainty of the government policies in controlling the COVID-19 pandemic, the lock down order, the vaccinated rate of population, and other factors. Further study can extend the length of study for longer periods to investigate the effects of the Central Bank's policies and other variables such risk indicators on the bank performance.

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