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Impact of Interest Rates on Bank Risk in the Philippines: A Panel Data Regression Approach

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This paper seeks to examine the empirical relationship between interest rates and risk-taking activities used by banks in the Philippine setting. Adopting an earlier study conducted in China's banking risk and policies, the authors use non-performing loan ratio to estimate the bank risk and construct a panel regression model to test the bank risk's relationship with BSP's policy rate, bank-level overnight lending facility rate, and reserve requirement ratio. The study uses a quarterly database of balance sheet information containing selected performance indicators of universal bank, commercial bank, thrift bank, rural bank, and cooperative bank groups in the Philippines from 2008 to 2018. The study also analyzes and explains the effects of other alternative factors that could impact bank risks, including bank-specific characteristics and macroeconomic factors. The results show that the central bank's policy rate and overnight lending facility rate posted negative and statistically significant effects on bank risk, while the reserve requirement ratio posted a negative but insignificant effect on bank risk. The same statistically negative effect is observed on the banks' total assets, return on assets, and capital adequacy ratio, while the country's Gross Domestic Product (GDP) posted insignificant effect on bank risk. These results are theoretically interpreted by a model, and serve as a valuable reference for the further study of monetary and financial policies in the Philippines.

JEL classification: E5
Keywords: Interest Rate; Bank Risk; Monetary Policy; Philippines

1 Introduction

After dotcom bubble burst in the early 2000s, central banks lowered interest rates over an extended period to combat recession, encouraging borrowing and spending to rejuvenate their respective economies. Prior successes in warding off recessions have strengthened the support for low interest rate regimes. However, as displayed by the global financial crisis, central banks should have focused on both price and financial stability.

More than ten years after the global financial crisis, the global economy had come a long way. Banks were under greater supervision and scrutiny. Post-crisis regulations imposed by authorities had strengthened the ability of financial institutions to absorb shocks. Still, challenges have remained over the near term. More recently, policymakers have been debating whether the extended low interest-rate environment is setting the stage for the next financial crisis.

Various studies have investigated the relationship between interest rates and bank risk but have come up with conflicting results. Altunbas, Gambacorta, and Marques-Ibanez (2010), Ozsuca and Akbostanci (2012), Aklan, Akay, and Mehmet (2014), and Ramayandi, Rawat, and Tang (2014) all concluded that low level of interest rate has a positive correlation with bank risk. On the other hand, Luchetta (2007) noted that low interest rate may reduce bank risk and high interest rate may increase bank risk. Zhongyuan, Grivoyannis, Shuran, and Yunxhin (2016), using 16 samples of listed banks in China, concluded that interbank market rate and the central bank interest rate are positively correlated with bank risk, while the bank-level lending rate is negatively correlated with bank risk. More recently, Teepatiganond (2017), using quarterly data of banks operating in Thailand, found evidence that changes in monetary policy rate are positively correlated with bank risk while reducing interest rates below a theoretical benchmark rate is negatively correlated with bank risk.

Thakor (1996), Lopez, Tenjoand Zárate (2011) as well as Jiménez, Ongena and Peydro (2014) observed that interest rates have smaller effect on risky assets of banks with more capital but have larger impact on banks with more off-balance sheet businesses. Further, Ozsuca and Akbostanci (2016) concluded that large, liquid, and well-capitalized banks are less prone to risk-taking. Thus,

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banks have different reactions to interest rate changes, and banks with high capital adequacy ratios and income diversification can engage in more risk-taking activities.

In terms of the reserve requirement ratio, various studies also produced different results. A separate study by Alper et al. (2016) concluded that "quantitative tightening" through reserve requirements affects the funding needs and liquidity position of the banking system, and thus has a significant impact on bank lending behavior. Zhongyuan and Xue (2015, p. 1) simulated the effect of reserve requirement ratio on bank risk in China, and concluded that "reserve requirement ratio shows an insignificant effect on bank risk on a statistical basis for both the high and low regimes."

In this paper, an empirical analysis of the relationship between monetary policy and risk-taking by banks in the Philippine setting is made. Adopting the study of Zhongyuan et al. (2016), the researchers study the impact of interest rates on bank risk by using a quarterly database of balance sheet information and selected performance indicators of universal, commercial, thrift, rural, and cooperative bank groups in the Philippines from 2008 to 2018. To insulate the effects of monetary policy from other factors, bank-specific characteristics (size, capitalization, profitability) and real GDP growth rate are included.

The next section discusses how monetary policy and financial stability measures can have an impact on banks' risk-taking activities. It also gives an overview on the Philippines' current financial environment. Section 3 describes the model and data used in the analysis, while Section 4 presents the econometric model and main results. Section 5 summarizes the main conclusions and policy implications.

2 Review of Related Literature

2.1 Related Studies

According to Fisher (1933), Hayek (1939) and Kindleberger (1978), easy monetary policies are a primary ingredient in a fluctuating economy. Financial imbalances occur when there is a decrease in the risk aversion of banks and investors due to low interest rates.

Borio and Zhu (2008) identified various risk-taking channels that are ways by which interest rate affects bank risk:

- First, low interest rates raise asset and collateral values that can impact various banks' estimates of default and volatilities. Declining volatilities in rising markets lower risk aversion and encourage position-taking.
- Second, low interest rates can incentivize risk-taking for asset managers due to various factors. With continuous lowering of interest rates, returns on highly-rated government bonds may not be as attractive and can encourage institutions to invest in higher risk investments with higher returns.
- Third, bank risk can be affected by central banks' communication strategies and reaction functions. According to studies by Farhi and Tirole (2009) and Diamond and Rajan (2009), banks take on excessive liquidity risk as they expect policy easing responses from the central banks in the event of a huge crisis. As such, Diamond and Rajan (2009) argue that monetary policy should be kept tighter than strictly necessary in good economic conditions, to diminish banks' propensity to take on more liquidity risk.

Altunbas et al. (2010) identified another way in which interest rates affect bank risk. According to the authors, monetary policy rates can affect bank risk-taking through habit formation. Campbell and Cochrane (1999) determined that risk aversion declines during economic growths driven by monetary policy easing, among others. Due to target returns, banks may also grant more loans and relax lending standards to increase revenue generating activities. Beutler et al. (2017) determined that there is a positive correlation between loan growth and interest rate risk exposure.

Various researches have been made to study the impact of monetary policy on the risk-taking behavior of banks. Studies measure monetary policy in terms of short-term interest rates.

Altunbas et al. (2010, p. iii), using ten years' worth of balance sheet data for listed banks operating in the United States and the European Union, concluded that "unusually low interest rates over an extended period of time contributed to an increase in banks' risk." The result holds for a range of risk measures and macroeconomic and institutional controls.

Studies by Paligorova and Santos (2012), Delis, Hasan, and Mylonidis (2012), and Angeloni, Faia, and Duca (2010) concluded that there is a significant positive relationship between expansionary monetary policy measures and the level of banks' risk-taking, such that low interest regimes after a financial crisis have led to banks to take excessive risks. Examining publicly listed banks in selected Asian economies, Ramayandi et al. (2014) also concluded that low interest rates increase bank risk.

Zhongyuan et al. (2016) used non-performing loan ratio to measure bank risk and constructed panel data regression models to examine the effects of the interbank market rate, central-bank rate and bank-level lending rate on bank risk in China. The study concluded that the interbank market rate and the central-bank interest rate have positive correlation with bank risk, while the bank-level lending rate has a negative correlation with bank risk.

Luchetta (2007), Tan (2011), Aklan et al. (2014), Messai and Jouini (2013) and Skarica (2013) concluded that a rise in interest rates may lead to more bank risk, as it reduces the debt servicing capacity of the borrowers, which, in turn, increases the level of the banks' non-performing loans. Moreover, impact on the bank's risk from the changes in the interest rates is higher for loans with variable interest rates. Interestingly, Thakor (1996), Lopez et al (2011) and Jimenez et al. (2014) determined that interest rates have smaller effect on risky assets of more capitalized banks, but have larger impact on banks with more off-balance sheet businesses.

Teepatiganond (2017, p. 1) concluded that the "impact of change in monetary policy rate on bank's risk is positive, while the impact of interest rate below a theoretical benchmark rate on risk taking is negative." As such, risk-taking behavior exists in Thailand.

Various studies concerning the effect of reserve requirement on bank risk have mixed results. Alper et al. (2016) noted that despite the use of reserve requirements to smoothen credit cycles in emerging markets, the transmission mechanism is still blurry. Applying bank-level data, the authors acknowledged a new channel that works through a fall in banks' liquid assets and loan supply due to an increase in reserve requirement. Alper et al. (2016) observed that "quantitative tightening" via reserve requirement raises short-term funding needs of the banking system. This is met by collateralized central bank lending, and therefore, depletes banks' unencumbered liquid assets. The results of the study suggest that such shift in bank liquidity is linked with a significant change in lending.

A study by Zhongyuan and Xue (2015) simulated the effects of the interest rate and reserve requirement ratio on bank risk in China, and concluded that while both variables exert a positive impact on bank risk for the low regime and a negative impact for the high regime, reserve requirement ratio shows an insignificant effect on bank risk for both regimes.

There are also some studies on other factors affecting banks' risk-taking activities. A study by Skarica (2013) showed that real gross domestic product (GDP) growth was the main driver of the changes in non-performing loans for the past five (5) years of banks in Central and Eastern Europe. The improvement in the real economy generated a reduction of the level of NPLs of these banks. Similar to the study of Teepatiganond (2017), results show that GDP has influence on risk-taking as domestic economic indicator.

Brana, Campmas, and Lapteacru (2017) focused on unconventional monetary policy stances in Europe. Results showed that non-standard monetary tools have made it possible for banks to recover from a financial crisis and that levels of capitalization, liquidity, and asset scan impact the relationship between monetary policy and bank risk.

Habermeier et al. (2015) concluded in the IMF's Policy Paper on Monetary Policy and Financial Stability that effective cyclical and structural macroprudential policies can target imbalances and market imperfections better than monetary policy. They serve as support policies for monetary policies to focus on price stability.

Alper et al. (2014) noted that reserve requirement ratios have been extensively used by both inflation targeting and non-inflation targeting emerging market economies as an additional mechanism to moderate the trade-off between price stability and financial stability. They cited the case of Brazil, Turkey, Colombia, and Peru, which have actively used the tool to address the policy dilemmas caused by strong and volatile capital inflows. Further, Alper et al. (2014) noted that reserve requirements may have also helped to smooth credit growth during the expansionary and contractionary phases of the economic and financial cycle.

2.2 Philippine Setting

The Philippine economy has continued to expand at a robust pace a decade after the global financial crisis against the backdrop of strengthening domestic economy, with real GDP growth hovering above 6% annually since 2012. This has fueled credit growth, of which some are from foreign currency sources.

However, real GDP growth has slowed in the past two years, especially in 2018 with the sluggish performance of the agriculture sector and high inflation, forcing the Bangko Sentral ng Pilipinas (BSP) to raise the overnight reverse repurchase rate (policy rate) to a total of 175 basis points during the year, from 3.0% to 4.75%. With price pressures set to ease further and return to the central bank's 2% to 4% target range, the BSP is forecast by some economists to cut interest rates by 50 basis points in 2019 and resume its plan of lowering its reserve requirement ratio for banks to support the Philippines' slowing economy. Still, given the current market conditions, the BSP must weigh cutting interest rates anew, as such move may result in more credit growth that could instigate a crisis if left uncontrolled.

As of this writing, BSP has pre-deployed macro prudential policies that can be adjusted in a countercyclical way to prevent financial imbalances, such as caps on loan-to-value ratios, general loan loss provisioning, single borrower limits, concentration limits, limits on open FX positions, asset cover for banks' FCDU liabilities, and liquidity measures (BIS, 2017). Aside from these, the BSP has also other tools to make sure that those banks and other financial intermediaries under their supervision are sound and healthy (BIS, 2017).

While these macro prudential policies and other monitoring tools have been quantitative at most, they may not be able to completely capture the effect of a policy on market behavior and expectations. As such, judgment is still a primary role for policy makers, and is required when a gradual or rapid action must be taken to mitigate risks in the financial system.

3 Methodology

Considering the econometric model by Zhongyuan et al. (2016), a panel regression model was constructed to evaluate the effects of interest rates on bank risk as follows:

$$\mathrm{RISK_{it}} = \mathrm{B_0} + \mathrm{B_1RATE_{it}} + \mathrm{B_2ln^2(ASSET_{it})} + \mathrm{B_3ROA} + \mathrm{B_4ln(CAR_{it})} + \mathrm{B_5GDP_{it}} + \mathrm{\varepsilon_{it}} \qquad (1)$$

where the dependent variable, $RISK$, of the bank group i at time t, is a function of interest-rate variables ($RATE$), a set of bank-level control variables [$ASSET$, Capital Adequacy Ratio (CAR), and Return of Assets (ROA)] and a macroeconomic control variable [Gross Domestic Product (GDP)]. B_0 denotes the constant term, B_j (j = 1,2…, 6) represents the parameters,ε_{it} means the random disturbance, and ln is natural logarithm.

Before the empirical analysis was done, the variables used in the model, as well as the data set were discussed. Quarterly data from 2008 to 2018 of the five (5) banking groups as classified by the Bangko Sentral ng Pilipinas (BSP) in their statistics, namely universal bank group, commercial bank group, thrift bank group, rural bank group, and cooperative group were used. In comparison with the study of Zhongyuan et al. (2016), where data is retrieved from a sample of 16 individual Chinese listed banks whose assets account for over 65% of the assets of the Chinese banking industry in 2012, the data in this study was the aggregate of the Philippine banking system, subdivided into 5 banking groups, which take different levels of risk.

Table 1 provides descriptive statistics for all the variables utilized in the analysis. Table 2 provides the coefficients of correlation for these variables.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
NPL	215	6.87	4.74	1.22	28.46
POLICY RATE	215	3.92	0.69	3.00	6.00
OLF RATE	215	5.58	1.18	3.50	8.00
RR	215	19.42	1.00	18.00	21.00
ln2(ASSET)	215	2.98	0.11	2.79	3.15
ROA	215	1.28	0.98	-4.95	3.45
ln(CAR)	215	2.81	0.32	0.00	3.22
GDP	215	5.67	1.96	0.50	8.90

NPL: non-performing loans; Policy Rate: BSP's reverse-repurchase rate; OLF Rate: BSP's overnight lending facility rate; RR: BSP's reserve requirement ratio; ASSET: Total assets per banking group; ROA: Return on Assets; CAR: Capital Adequacy Ratio; GDP: Gross Domestic Product

Table 2. Correlation Matrix

	Policy	OLF	RR	ln2(Asset)	ROA	ln(CAR)	GDP
Policy	1						
OLF		1					
RR			1				
ln2(Asset)	-0.068	-0.080	-0.004	1			
ROA	0.039	-0.006	0.108	-0.066	1		
ln(CAR)	-0.135	-0.127	-0.029	-0.091	0.076	1	
GDP	-0.513	-0.450	-0.172	0.046	-0.046	0.075	1

Based on Table 2, the correlation coefficients between variables do not exceed 0.8, and as such, multicollinearity would not be a severe problem (Gujarati, 2000). The succeeding paragraphs show an analysis of the choice of dependent, explanatory, and control variables.

3.1 Bank risk

Considering the study of Zhongyuan et al. (2016), the authors proxy the dependent variable – bank risk – using the ratio of non-performing loans (NPLs) to total loans. Data were obtained from the official statistics found in BSP's website.

The ratio of NPLs to the total loans is used widely for analyzing credit risk. According to Investopedia (2019), NPL is the sum of borrowed money upon which the debtor has not made his scheduled payments for at least 90 days. A non-performing loan is either in default or close to being in default. Once a loan is non-performing, the odds that it will be repaid in full are considered to be substantially lower. As an indicator of credit risk, a bank's NPLs correspond to the quality of its assets, and thus could be a good representative of the overall status of the financial security. Once the loan quality collapses, the mark-to-market value of the bank asset declines immediately following the increase in bad loans. As such, a high ratio of NPL exposes the bank to more credit risks.

3.2 Interest Rates

To emphasize the interaction between interest rates and bank risk, Zhongyuan et al. (2016) considered various types of interest rates to reach a comprehensive and exhaustive result: central-bank rate, which is a 1-year benchmark deposit rate, officially set by the People's Bank of China; bank-level lending rate; and interbank market rate, which is market-oriented. This paper considers various types of interest rate officially set by the BSP: BSP's policy rate, which refers to the overnight reverse repurchase rate (RRP), the rate at which the central bank borrows from banks with government securities as collateral (BSP, 2019a); BSP's overnight lending facility rate, the rate at which the BSP

provides collateralized overnight funding to banks to clear end-of-day imbalances, and serves as a ceiling for the overnight interbank rate (BSP, 2019b); and BSP's reserve requirement ratio (RR), which refers to the percentage of bank deposits and deposit substitute liabilities that banks must set aside in deposits with the BSP which they cannot lend out (BSP, 2019c). Compared to the study of Zhongyuan et al. (2016), interest rates set by the BSP were specifically chosen, as these are aimed at directly influencing the level of liquidity in the economy. Data for the interest-rate variables were obtained from BSP through BSP's website and Bloomberg.

3.3 Control Variables

Several control variables were chosen for the regression analysis. To evaluate the effect of the macroeconomic environment status at the country level on bank risk, Philippine's real GDP year-on-year growth rate was used as the key control variable. It represented the growth rate between the reference period and that same period a year ago. Data for the GDP growth rate were obtained from the BSP and Philippine Statistics Authority, through Bloomberg.

For bank-specific characteristics that could affect bank risk, a series of indicators was utilized, following Zhongyuan et al. (2016). *ASSET* represented the size of a banking group, measured by the total asset of a specific banking group. Banks differing in sizes might have different motivations to engage in risk-taking activities. In the regression, the square of the natural logarithm of the total asset was used for data-size proportionality with other variables. *CAR*, as a measure of bank capitalization, is the ratio of capital to risk-weighted assets. Banks are expected to trade-off higher levels of equity for riskier assets. In the regression, the natural logarithm of the *CAR* was used for data-size proportionality. *ROA*, the ratio of profits to total assets, is used for measuring bank profitability, whose impact on bank risk is uncertain.

The table below shows the summary of the variables used in the study, with their corresponding definitions:

Table 3. Definition of Variables

Variable	Definition
NPL	Ratio of non-performing loans to total loans. Non-performing loans are the sum of borrowed money upon which the debtor has not made his scheduled payments for at least 90 days.
Policy	Refers to the overnight reverse repurchase rate (RRP), the policy interest rate at which the BSP borrows from banks with government securities as collateral.
OLF	Refers to the overnight lending facility rate, the rate at which the BSP provides collateralized overnight funding to banks to clear end-of-day imbalances.
RR	Reserve requirement ratio - refers to the percentage of bank deposits and deposit substitute liabilities that banks must set aside in deposits with the BSP which they cannot lend out.
ASSET	Represents the size of the banking group, in terms of total assets.
CAR	Capital Adequacy Ratio - a measure of bank capitalization, is the ratio of capital to risk-weighted assets.
ROA	Return on Assets - the ratio of profits to total assets, is used for measuring bank profitability
GDP	Philippine's real GDP year-on-year growth rate, represents the growth rate between the reference period and that same period a year ago.

4 Results and Analysis of Data

From the panel regression data model specified in the previous section, 3 models in terms of the 3 interest rates were created to examine the relationship between changes in interest rates and bank risk. In selecting NPL as bank risk, 3 panel data regression models were established as follows:

$$NPL_{it} = B_0 + B_1 POLICY_{it} + B_2 \ln^2(ASSET_{it}) + B_3 ROA + B_4 \ln(CAR_{it}) + B_5 GDP_{it} + \varepsilon_{it} \quad (2)$$

$$NPL_{it} = B_0 + B_1 OLF_{it} + B_2 \ln^2(ASSET_{it}) + B_3 ROA + B_4 \ln(CAR_{it}) + B_5 GDP_{it} + \varepsilon_{it} \quad (3)$$

$$NPL_{it} = B_0 + B_1 RR_{it} + B_2 \ln^2(ASSET_{it}) + B_3 ROA + B_4 \ln(CAR_{it}) + B_5 GDP_{it} + \varepsilon_{it} \quad (4)$$

where NPL, POLICY, OLF and RR denote, respectively, the NPL ratio, BSP's policy rate, overnight lending facility rate, and reserve requirement ratio.

Based on the results of the Hausman test, the fixed effects regression model was used for the panel data. The results of the regression, based on Stata, are reported in Tables 3 using the statistical significance at the 5% level. Individual results from Stata are included in the Appendix section.

Table 4. The fixed effects regression for the panel data

	POLICY RATE	OLF RATE	RR
POLICY RATE	-0.748591(-3.04)*		
OLF RATE		-0.5448647(-3.48)*	
RR			-0.0877715 (-0.67)
ln2(ASSET)	-51.64592 (-3.74)*	-65.76608(-4.22)*	-30.01964 (-2.47)*
ROA	-0.9512123 (-7.06)*	-0.96123(-7.20)*	-0.9804854 (-7.12)*
ln(CAR)	-0.8543225 (-2.09)*	-0.8249742(-2.04)*	-0.7797631(-1.88)
GDP	0.0813166 (1.08)	0.1038135(1.44)	0.1533624 (2.10)*
F-statistic	59.44	61.13	56.82
R-squared	0.7952	0.8033	0.763

Note: T-statistics are in parentheses, statistical significance at the 5% level
* *statistically significant*

4.1 Effects of interest rates on bank risk

With NPL set as the measure of bank risk, the results of the regression above (Table 4) show that the BSP's policy rate (-0.749) and BSP's overnight lending facility rate (-0.545) have a statistically significant negative effect on bank risk. This is similar to the international mainstream viewpoints, such as that of Altunbas et al. (2010), Ozsuca and Akbostanci (2012), Aklan et al. (2014), and Ramayandi et al. (2014), that low interest rates can increase bank risk. Lower interest rates result in lower interest on loans for banks, which could mean lower profitability to meet target revenues. As Zhongyuan et al. (2016) mentioned, the 'search for yield' channel stimulates banks to take on riskier activities, such as investing in higher-yielding assets, or lending to less creditworthy investors. On the other hand, lower interest rates mean that investors loan more from the bank or invest in high-risk financial instruments, which leads to higher bank risk. As such, the number of non-performing loans could increase.

Among the three (3) interest rates, although the BSP's reserve requirement ratio (-0.088) also has a negative effect on bank risk, the relationship between the variables is statistically insignificant. This is similar to the study by Zhongyuan and Xue (2015). The infrequent adjustment of the reserve requirement ratio by the BSP compared to the two other interest rates may not have affected the funding needs, liquidity position, and bank lending behavior of the banking system the way the other two rates did.

4.2 Effects of the control variables on bank risk

Based on the results of the regression, bank-specific variables total assets, ROA and CAR generally have significant and negative effects on bank risk as measured by its NPL ratio. The negative relationship between total assets of the bank and the bank's NPL ratio may be because large, liquid, and well-capitalized banks are less prone to risk-taking, as noted by Ozsuca and Akbostanci (2012). The negative effect of ROA and CAR on bank risk suggests that enhancing profitability and capital adequacy can effectively reduce the risk of banks.

GDP generally has shown insignificant relationship with the banks' level of NPL, contrary to the study conducted by Skarica (2013) and Teepatiganond (2017), which shows that improvement in the real economy generates a reduction of the banks level of NPLs.

5 Conclusion and areas for further research

The Panel Regression Model was adopted for the analysis of the impact of interest rates on bank risk by using a quarterly database (from 2008 to 2018) of balance sheet information and selected performance indicators of different bank groups in the Philippines, namely: universal, commercial, thrift, rural, and cooperative bank groups. Results suggest that the BSP's policy rate and overnight lending facility rate have negative and statistically significant effects on bank risk, while BSP's reserve requirement ratio's effect on bank risk is statistically insignificant. Moreover, the effects of banks' total assets, ROA, and CAR to bank risk are also negative and statistically significant.

The empirical results have theoretical implications and practical significance. Monetary authorities should include nonlinear effects and financial stability considerations in their macroeconomic decision-making model. Among the policies that can be considered are the following: first, the conduct of monetary policy, in particular, the setting of interest rates, does not seem neutral to the financial stability goal. Therefore, in the context of monetary policy formulation, financial stability should be considered into macroeconomic models (Agur & Demertzis 2013); second, this suggests a bigger role of macroprudential policy focusing on possible excesses in finance and its related areas, even during periods of low inflation when interest rates are usually kept low; third, as Asian economies are not well insulated from the loose monetary policy of the advanced economies, it is vital for policy makers to allow the exchange rates to move more flexibly, especially in level terms. There will be episodes when policy makers—by letting interest rates decline excessively—not only incite risk-taking activities, but also conflict with the goal of domestic stability.

In the case of BSP, the findings of this study could be a great input to the central bank as it weighs its next policy move seeking to balance the trade-off trying to stimulate slowing economic growth at a time when credit growth is high. Since the effect of interest rates on bank risk is negative and statistically significant, while the effect of the reserve requirement ratio is insignificant, the BSP may opt to utilize the reserve requirement ratio instead to stimulate the economy without being afraid of the adverse effects on bank risk. In using this macroprudential tool, BSP may avert any financial instability that may arise had it opted to use its two other interest rates instead.

Development of this study can further make helpful specific suggestions to policymakers in monetary policy formulation in BSP. Further research on the transmission mechanism from monetary policy to financial stability for the development of this study may be warranted. More importantly, amid expectations that BSP could cut anew its reserve requirement ratio this year, further research on the transmission mechanism from reserve requirements to bank-lending behavior is a priority.

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