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DETERMINANTS OF NET INTEREST MARGINS OF INDONESIAN BANKING

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Abstract: The purpose of this study is to examine the effect of business cycle and bank spesific on net interest margin during the post financial crisis 2007/2008. The research method use the system generalized method moment (SYS-GMM) to analyze dynamic panel data bank in indonesian period 2009-2015. The results showed that during the post financial crisis, the effect business cycle especially the total bank loan (Credit) can be increased net interest margin in Indonesian banking but the Gross Domestic Product (GGDP) Growth is not significant. Second, bank specific on bank size (SIZE) and Capital Ratio (CAR) have a negative and significant effect on net interest margin. Meanwhile, Market Concentration (CR3) and Liquidity (LIQ) have a negative but not significant effect. Finally, Credit Quality has a positive impact on net interest margin but no significant.

Keywords: *Net Interest Margin, Business Cycle, Bank Spesific, Financial Crisis*

1. Introduction

The global financial crisis had a negative impact on the whole world, especially in Indonesia. It was not only the corporate sector that was negatively affected by the crisis, but the banking sector also experienced a fairly large negative impact. Where when the crisis occurred, the high ratio of bad loans to total credit caused panic by foreign investors so that the central bank experienced a foreign exchange reserve deficit as a result of massive withdrawals by investors leaving Indonesia (Purwono, 2018).

The 1997/1998 financial crisis had serious consequences regarding the intermediation function of banks in Indonesia. At the beginning of the crisis, Indonesian banks experienced a credit crunch phenomenon, banks were reluctant to provide new loans. This credit crunch led to a sharp decline in intermediation as indicated by a lower loan-to-deposit ratio. Banks then charge stifling interest rates on loans to cover their intermediation costs. The credit crunch is considered a factor causing the slow process of Indonesia's economic recovery compared to other Asian countries that experienced crises such as South Korea and Thailand (Trinugroho et al, 2014; Agung et al., 2001).

Focusing on Indonesian banking, Indonesian banking has best performance and more stable in asian (Yusgiantoro, 2019; Vinayak, 2016). In addition, the net interest margin behavior in Indonesian banking is very unique, where during the financial crisis the net interest margin was very high, but after the crisis it decreased.

After the financial crisis 2007/2008, the reseachers have interested about net interest margins in banking (Hanzlik and Teply, 2020; Le, 2017; Saksonova, 2014; Tarus et al, 2012; Nguyen, 2012; Entrop et al, 2012). In Indonesian banking, many have researched the net interest margin. Zukifli (2018) and Widianto (2020) focus on the determinants of net interest margin on listed banks in indonesia stock exchange. Then, Warno's study (2017) which focuses on net interest margins in conventional banks and Islamic banks. Trinugroho (2014) focuses on the determinants of net interest margin in the 1997/1998 financial crisis. Dewi (2017) focuses on the effect of internal and external factors on net interest margin.

According, study (Altunbas, 2016; Aliaga-Diaz, 2010; Turgutlu, 2010) shows the margin in the banking countercyclical business cycle. However the margin bank has been so high during the financial crisis, but not during normal times. study tarus (2012) show the business cycle has a negative impact on the net interest margin, when the business cycle grows up, the net interest margin has been declined. This study contributes to the literature is firstly examine the effect of business cycle on net interest margin in indonesian banking. Second, this study extends the literature by documenting some of the bank spesific that impact the net interest margin in indonesian bank.

2. Research Method

2.1 Data Description

The main objective of this study is to investigate the effect of business cycle and net interest margin. The study data include coventional banks operating in Indonesian Banking. Our focus on the Indonesian banking is stable and exhibited the highest performance in Asia on 2010 - 2015. Our primary analysis over the period 2009–2015 includes 142 conventional banks in Indonesian. The corresponding banks are listed and non listed in Indonesia stock exchange. The main data sources are collected from the audited annual financial report of each bank. However, the data on the macroeconomic variables are obtained from the Indonesian Statistics Agency.

2.2 Variables description

Dependent Variabel

In terms of the dependent variables, we use net interest margin measures net interest revenue to total asset (Altunbas, 2016; Aliaga-Diaz, 2010; Turgutlu, 2010).

Independent Variabel

In order to measure business cycle as our main variabel independent, we use several measures reflecting growth gross domestic produk (GGDP) and lagged of total bank loan (L.Credit) as Business Cycle (BC). In order to measure Business Cycle, we follow (Altunbas, 2016; Aliaga-Diaz, 2010; Turgutlu, 2010) using growth gross domestic product is represents the aggregate economic condition. However, GDP provides a very broad measure. To this end, total loans are also used as another measure of business cycle since a sector specific measure might be more sensitive to cyclical fluctuations.

Besides Business Cycle measured by GGDP and Lagged Credit , we also consider five bank-specific control variables that might affect business cycle. These include the the natural logarisme total aset as bank size (SIZE), Total Assets of the three big banks to the total assets of all banks as Market Concentration (CR3), Credit Loss Ratio to total credit as credit Quality (NPL), Capital to total assets as Capital Ratio (CAR) and Cash plus securities to total assets

as Liquidity (LIQ). we incorporate SIZE as control variable to account for the role of the "too big to fail"effect in which larger banks tend to undertake risky projects to exploit the government bailout (Yusgiantoro, 2019; Beck et al., 2013). Because Indonesia financial safety nets law No.9/2016 eliminating the explicit government bailouts is only effective since 2016, the issues of bank moral hazard due to the too big to fail" effect in Indonesian banking is still prevalent with empiris studies (e.g Yusgiantoro et al. 2019, Ali & Puah 2018, Adusei 2015, Leaven 2014, Vinals 2013).

CR3 is measured by Total Assets of the three big banks to the total assets of all banks to control for Market structure. Greater competition market which allows banks to earn higher interest margins. concentrated banks are more developed, the availability of better information increases the potential for borrowers to increase, making it easier for banks to identify and monitor them. This raises business volume for the bank, creating higher margins (Derminig-Kunt, 1999).

The ratio of Credit Loss Ratio to total credit (NPL) is also considered as a control variable to take into account the impact of bank bad loans. The impact NPL on Net Interest margin masih menjadi perdebatan. On one the hand, NPL has positively impact on net interest margin, Banks that make risky loans may also be obliged to hold a higher amount of provisions. In turn, this may force them to charge higher margins in order to compensate for the higher risk of default, leading to a positive relationship (Tarus, 2012; Maria and Agoraki, 2010; Carbo and Rodriguez, 2007; Abreu and Mendes, 2003; Demirgüç-Kunt and Huizinga, 1999). Di satu sisi, NPL has negative impact on net interest margin, increased NPL can result in a loss of public confidence, because it is considered that the bank is unable to meet the demand for funds by depositors, and in order for depositors to continue to place their funds in the bank, the bank must provide a higher deposit interest rate (Setiawan, 2019; Zukifli, 2018; Trinugroho, 2014; Fungacova dan Poghosyan, 2011).

The ratio of capital to total assets as Capital Ratio (CAR) is control variabel and included as more capitalized banks may charge higher margins if holding equity is more costly than holding debt, for example, because of the latter's more favourable tax treatment (Altunbas, 2016; Adrian and Shin, 2010) finally, we also considered the ratio of Cash plus securities to total assets as Liquidity (LIQ) is control variabel. The banks that choose to hold more liquid portfolios pay for the cost of that liquidity by raising their margins (Altunbas, 2016).

2.3 Methodology

Regarding the econometric methodology, we run regressions in three stages. In the first stage, we regress the equation of net interest margin on the business cycle and a set of control variables simultaneously. In the second stage, we use alternatife econmtric methodology is ordinary least square. Finally, we also using another econmtric methodology is regresi data panel random effect.

In order to estimate these models, we utilize dynamic panel data techniques because bank riskiness can be affected by its past values (e.g. Foos et al., 2010; Soedarmono et al., 2017, Yusgiantoro et al.., 2019). Yet, the link between net intrerest margin and business cycle in banking might also suffer from a reverse causality problem. Our dynamic panel data model is estimated using the two-step GMM (generalized methods of moments) or the system GMM following Blundell and Bond (1998) in order to produce more efficient estimates than using the one-step GMM (Baltagi, 2005). We further take into account a finite sample correction

developed by Windmeijer (2005) and specify orthogonal transformations of instruments that might somehow account for unobservable factors related to bank-specific characteristics. Overall, our system GMM is valid when the AR(2) test and the Hansen-J test are not rejected.

3. Results and Discussion

3.1. Results

Descriptive Statistic

We applied the descriptive statistics of Net interest margin, business cycle, and bank spesific including bank size (SIZE), Market Concentration (CR3), as credit Quality (NPL), Capital Ratio (CAR) and Liquidity (LIQ). The descriptive statistics of the definition, Observsation (Obs), mean value and the standard deviation (Std.dev) of these different variables are presented in Table 1.

Tabel 1 Deskriptif statistik

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	Mean	Sd	min	max
nim	719	0.0502	0.0242	-0.0501	0.198
ggdp	719	12.87	2.499	9.051	16.13
credit	719	2.533e+07	6.384e+07	1,229	5.584e+08
size	719	16.03	1.729	11.41	20.56
cr3	719	0.382	0.00746	0.369	0.394
npl	719	1.423	6.892	0	181
car	719	30.94	114.9	0	2,529
liq	719	0.123	0.0900	0.00519	0.940

Source: Author Calculation (2021)

After obtaining the correct data sample, we create the ratios, winsorize the extreme values NPL and CAR at the 1st and 99th percentiles, and dari 719 observasi menjadi 616 observasi (Risfandy, 2018).

From Table 2, it can be shown that only aLagged Credit and SIZE are higher value is 0.6489. If the correlation value between two variables is 0.9 or greater, then there exists a problem of multi-collinearity in the model (Yusgiantoro, 2019; Ali, 2018; Arif & Anees, 2012; Masood & Ashraf, 2012). Therefore, Table 2 reports the correlation between independent variables, which is not exceeding the minimum threshold level, suggests that multi-collinearity is not a problem in our case.

Tabel 2 Correlation Matrix

	NIM	GGDP	L.Credit	Size	Cr3	Npl	Car	Liq
NIM	1.0000							
GGDP	0.0719	1.0000						
L. Credit	-0.0023	-0.1132	1.0000					
Size	-0.0796	-0.1480	0.6489	1.0000				
Cr3	-0.0187	-0.0313	0.0154	0.0060	1.0000			
Npl	-0.0126	-0.0752	-0.0681	0.0187	0.1449	1.0000		
Car	-0.1700	-0.0131	-0.1437	-0.3812	0.0317	-0.2102	1.0000	

Liq	-0.1591	-0.0879	0.1034	0.0897	0.0523	-0.0280	0.1138	1.0000

Result of generalized method of moment dynamic model

Table 3 below presents the empirical results of the estimation of model (1) using four measure we end up with these two main specifications, which pass all the econometric concerns discussed in the methodology section above. Therefore, the model appears to fit the dynamic panel data well, since all relevant tests are highly significant as presented below in Table 3. We are interested using the GMM-system estimator, more specifically with the use of the GMM system estimator of Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) to verify the existence of the effect of the explanatory variables on the bank stability. Table 3 presents the results of the Hansen test for the most restriction identification and the AR (2) of the second-order correlation series.

Table 3 System Generalized Method Moment

	Nim
L.nim	0.441***
	(0.114)
Business Cycle	
L.credit	3.35e-11***
	(1.17e-11)
Ggdp	0.00000537
	(0.000129)
Bank Spesific	
Size	-0.00195**
	(0.000788)
Cr3	-0.0925
	(0.0685)
Npl	0.000280
	(0.000580)
Car	-0.000231***
	(0.0000618)
Liq	-0.0102
	(0.00687)
Constant	0.0992***
	(0.0293)
Observations	616
No. of instruments	14
AR1 (p-value)	0.0127
AR2 (p-value)	0.126
Hansen-J (p-value)	0.275

Sources and notes: Author's calculations. This table is a table of the results of regression analysis using two-step GMM for the period 2009-2015. Listed: Banks are listed on the Bursa Efek Indonesia. Non-Listed: The bank is not listed on the Bursa Efek Indonesia. ***, **, and * show significance at 1%, 5% and 10%, respectively. The standard error of each coefficient in parentheses..

According to Table 3, the Hansen test with a p-value much greater than 0.1, which means that the null hypothesis H0 of the validity of over identification restrictions (validity of instruments) cannot be rejected. It can therefore be concluded that the instruments used for this regression are valid, thus inducing the validity of the results. The second-order autocorrelation tests of disturbances show that the AR(2) test values. This implies that the empirical model has been correctly specified because there is no serial (autocorrelation) correlation in the transformed residues; therefore the instruments used in the models are valid.

This study also uses several econometric alternatives. Then, this paper use the ordinary least square method and random effect panel data regression on the alternative econometric.

Table 4 Ordinary Least Square dan Random Effect

	(OLS) Nim	(RE) Nim
Ggdp	0.000307	0.000361
	(0.85)	(1.58)
L.credit	5.56e-11*	5.74e-11*
	(2.54)	(2.22)
Size	-0.00343***	-0.00457***
	(-4.28)	(-3.93)
cr3	0.0125	-0.0744
	(0.08)	(-0.80)
Npl	-0.00119	0.000380
	(-1.25)	(0.47)
Car	-0.000454***	-0.000164
	(-5.40)	(-1.91)
Liq	-0.0395**	0.00416
	(-3.09)	(0.42)
_cons	0.111	0.149***
	(1.77)	(3.67)
N	616	616

Source and notes: Authors' calculation. ***,**, and * indicate significance at the 1%, 5% and 10%, respectively.

In table 4, this result is the effect of business cycle on credit to net interest margin is robust with all models, but the growth of gross domestic product is not significant because its widenly to large (Turgutlu, 2010). Then banks spesific, especially bank size (SIZE) and Capital Ratio (CAR) robust affect to net interest margin.

3.2. Discussion

We document that the Business Cycle in particular on credit has a positive and significant impact on net interest margin. This result signifies that the net interest margin increase with the improvement in the business cycle, particularly in increasing its lending business activities. This result is contrary to research by Altunbas (2016) which states that the business cycle behaves countercycle to bank margins. Furthermore, Tarus (2012) research states that an increase in business activity and an increase in business performance among borrowers. Improved performance lowers loan default rates, resulting in a reduced risk premium, a

situation that prompts banks to reduce their interest margins. Then, Maria and Agoraki (2010) stated that economic growth in the business cycle causes a weakening of the debt service capacity of domestic borrowers and contributes to an increase in credit risk, so that interest margins increase.

The results of this study also support Dewi's research (2017) which states that economic growth has a positive impact on net interest margin in the business cycle, although it is not yet significant. In Indonesian banking, with the improvement in economic growth after the crisis, it will increase banking activities in conducting their business, so that it will have an impact on increasing net interest margins. This study is in line with Trinugroho (2014) which states that the positive impact of small scale loans (SMALL) on interest margins (NIM). Banks with a greater proportion of small scale loans in their loan portfolio set a higher interest margin.

Then, our result five bank-specific control variables, first, bank (SIZE) has a negative and significance of net interest margin. Where when the size of the bank gets bigger, it is likely that the bank will diversify which has an impact on decreasing bank margins. The results of this study are in line with research by Altunbas (2016) and Maudos and de Guevara (2004) which state that larger banks have more possibility to diversify, which could reduce their cost of credit and lead to a narrowing of margins. Then Setiawan's research (2019) states that bank size negatively affects net interest margin. However, this study contradicts research which states that with the large size of the bank, diversify products that are more diverse than banks with a smaller scale, so that large banks get higher net interest margins (Dewi, 2017; Iloska, 2014; Ugur et al, 2010; Saad and Moussawi, 2012; Tan and Christos, 2012; Tariq et al, 2014).

Second, Market Concentration (CR3) has a negative but not significant effect on the net interest margin. The results of this study are contrary to Altunbas (2016) which states that the more concentrated the market is, the higher the risk of competition, causing an increase in margins. Then, in Tarus's research (2012) stated that the highly concentrated market in which few large banks controls the market collude in setting the margins and a result, widens the interest margins. Then, Trinugroho's research (2014) states that Banks set a higher interest margins when they face relatively inelastic demand and supply functions in the markets enabling them to exercise their monopoly power. Further research by Derminig-Kunt (1999) states that the Greater competition market which allows banks to earn higher interest margins. concentrated banks are more developed, the availability of better information increases the potential for borrowers to increase, making it easier for banks to identify and monitor them. This raises business volume for the bank, creating higher margins.

Third, Credit Quality as a proxy for Non Performing Loans (NPL) has a positive effect on net interest margin but is not significant. The results of this study are in line with previous research (Altubans, 2016; Derminig-Kunt, 1999) which states that an increase in credit default rates may lead banks to in- crease their margins. The results of this study contradict previous studies (Trinugroho, 2014; Fungáčová and Poghosyan, 2011) which stated that Indonesia market discipline by depositors is pronounced in the price of deposits. Depositors require a higher interest rate on deposits for riskier banks.

Fourth, the Capital ratio has a negative and significance on net interest margin. The results of this study are in line with Altunbas (2016) and Adrian (2010) which state that more

capitalized banks may charge higher margins if holding equity is more costly than holding debt, because of the latter's more favorable tax treatment.

Finally, Liquidity has a negative and significance in the OLS model. This research is in line with research by Altunbas (2016) which states that banks that choose to hold more liquid portfolios pay for the cost of that liquidity by raising their margins.

4. Conclusion

In this paper, we investigates the effect of business cycle on net interest margin in Indonesian banking. The study employs a panel of 142 banks in Indonesia during the period 2009-2015. In an attempt to address the problems of heteroskedasticity and endogeneity and to offer precise and consistent parameter estimations, we use two-step GMM estimations.

The study has several findings, first, finding the higher business cycle, especially the total bank loan (Credit) can be increased net interest margin in Indonesian banking but the Gross Domestic Product (GGDP) Growth is not significant. Second, bank specific on bank size (SIZE) and Capital Ratio (CAR) have a negative and significant effect on net interest margin. Meanwhile, Market Concentration (CR3) and Liquidity (LIQ) have a negative but not significant effect. Finally, Credit Quality has a positive impact on net interest margin but no significance.

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