Measuring the Capital Adequacy Ratio for Bank Business Activity Group 3 that listed in Indonesia Stock Exchange

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ABSTRACT

This study analyzes how the capital condition of 10 commercial banks in the category of bank business activity group 3 which is listed on IDX. The analysis is related to central bank regulation concerning banks being required to increase capital more than the minimum capital adequacy ratio as a buffer to prevent a crisis. Using the panel data regression method to analyze the issue, four independent variables used from internal factors namely Non-Performing Loan, Net Interest Margin, Loan to Deposit Ratio, and Credit Growth, there are one bank has the capital highest and only needs to increase its capital for 4% to join bank business activity group. Furthermore, there are three banks with the lowest capital adequacy ratio. Research results found that NPL significantly affects the capital of 10 banks Group 3. Based on the result, when Non-Performing Loans increase the banks will increase their capital reserves beyond the minimum capital reserves that have been set as a buffer against potential losses.

Keywords : CAR; Bank Capital; Fixed Effect Method; Buffer; NPL

ABSTRAK

Penelitian ini dilakukan untuk mengetahui bagaimana kondisi permodalan 10 bank umum dalam kategori kegiatan usaha bank kelompok 3 yang terdaftar di BEI. Analisis ini terkait dengan peraturan bank sentral tentang bank yang wajib meningkatkan modal lebih dari rasio kecukupan modal minimum sebagai penyangga (Buffer) apabila terjadi krisis keuangan dan ekonomi yang dapat mengganggu stabilitas sistem keuangan. Dengan menggunakan metode regresi data panel untuk menganalisis permasalahan tersebut, digunakan empat variabel independen dari faktor internal yaitu NPL, NIM, LDR, Pertumbuhan Kredit. Terdapat 1 bank yang memiliki permodalan tertinggi dan dengan hanya menambah modal sebesar 4% bank tersebut dapat masuk kedalam kategori Bank Unit Kegiatan Usaha. Selanjutnya, terdapat tiga bank dengan rasio kecukupan modal terendah sehingga bank tersebut wajib meningkatkan modalnya. Hasil penelitian membuktikan bahwa NPL berpengaruh positif dan signifikan terhadap permodalan 10 bank Bank Unit Kegiatan Usaha 3. Dengan berpengaruhnya NPL terhadap permodalan bank, maka Ketika NPL meningkat bank akan menambah cadangan modal melebihi minimum cadangan modal yang telah di tetapkan sebagai penyangga terhadap potensi kerugian.

Kata Kunci : CAR; Modal bank; Metode Fixed Effect; Penyangga; NPL

INTRODUCTION

The global financial crisis in 2010 was the worst crisis since the 1930 crisis, known as the Great Depression period. Many banks with large assets and other financial institutions experienced a sharp decline, so they had to undergo a substantial restructuring. The global financial crisis was triggered by the Subprime mortgage where people with poor credit ratings obtained credit from banks so the risk of default was very high. When people with a bad rating are unable to pay their debts, the bank experiences liquidity difficulties. This poor credit quality with a large quantity causes problems and has a systemic impact on the global economy. according to Ahmadian & Schehra (2019), liquidity risk can be seen through liquid assets and the bank's cash flow. According to Herlanto (2018), Liquidity is a measure of a bank's ability to repay all of its current liabilities. Banks are required to always be in a position ready to pay, meaning that banks must have sufficient idle funds.

Indonesia experienced a crisis in 1998, according to a report by Bank Indonesia in 1998 the number of bad loans reached Rp. 10 trillion. During the crisis, the principle of Prudential Banking did not work. When viewed from the health side of banks, banks are very fragile and are one of the causes of the decline in the price of the Rupiah, bank Forex debt is swelling and at the same time affected debtors are having difficulty paying debts in foreign currency to banks.

Banking has a very important role as an intermediary institution that collects funds from the public and distributes them to the productive sector. At the macroeconomic level, banks function as monetary policy transmission and at the microeconomic level, banks function as a source of business financing (Yanyu Li, 2021).

The capital structure of banks is different from that of non-bank companies because of different business characteristics. According to Drehmann et al (2020), banks can carry out their business by fulfilling credit requests depending on the strength of the bank's capital buffer. Because of the important role of banks in raising funds and extending credit to the public, clear and strict rules are needed to avoid the risks that follow. The Basel Committee for Banking Supervision (BCBS) stipulates a rule called the Basel Capital Accord wherein in this rule a bank must have a minimum capital of 8% of Risk Weighted Assets (RWA). Bank Indonesia also stipulates regulations under BCBS.

Table 1. The level of risk profile according to Bank Indonesia is based on risk performance and quality assessment, namely credit risk, market risk, liquidity risk, operational risk, legal risk, strategic risk, compliance risk, and reputation risk. Bank Indonesia regulation no 15/12/PBI/2013 concerning Prudential Principles in Equity Participation Activities states that to increase the quantity of capital, banks need to form additional capital above the minimum capital requirement according to the risk profile which functions as a buffer, in the event of a financial and economic crisis that could disrupt the stability of the country's financial system.

Table 1. Risk profile level and minimum CAR

No.	Risk Profile Level	CAR Minimum Requirements
1	1	8%
2	2	9% up to < 10%
3	3	10% up to < 11%
4	4	10% up to < 11%

Source: Bank Indonesia, 2013

Based on Table 1., the buffer referred to in Bank Indonesia Regulation No. 15 of 2013 is the Capital Conservation Buffer which is additional capital that functions as a buffer in the event of a loss during a crisis period. Countercyclical Buffer is additional capital that functions as a buffer to anticipate losses in the event of excessive bank credit growth that has the potential to disrupt financial system stability. Capital Surcharge for Domestic Systemically Important Banks (D-SIB) is additional capital that serves to reduce the negative impact on financial system stability and the economy in the event of a Bank failure with a systemic impact through increasing the Bank's ability to absorb losses as shown in Figure 1.
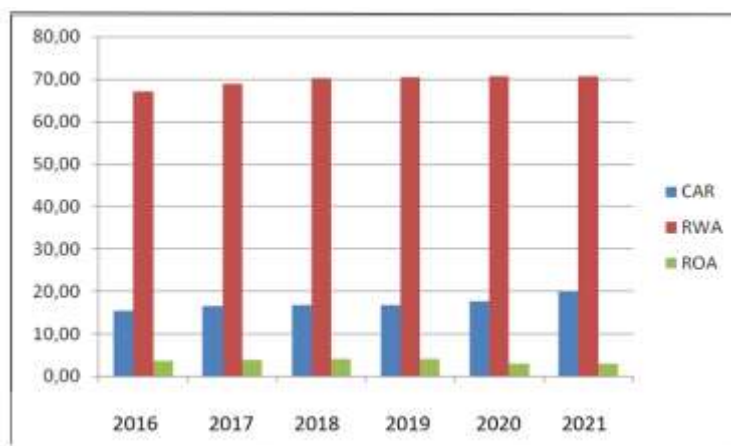
Source: Processed data, 2023

Figure 1. CAR, RWA (ATMR), ROA of Bank Business Activity Group 3 banks

Figure 1. shows the CAR, RWA, and ROA conditions of Bank Business Activity Group 3 banks in 2016-2021. According to Bank Indonesia regulations, banks are required to increase capital beyond the minimum CAR that has been set as a buffer against potential losses. With increased capital, banks will be more confident in improving their business performance, because, with higher capital, the banking business by increasing credit distribution as the bank's core business will also grow (ceteris paribus). One of the main sources of bank capital that can be used to absorb losses without having to stop their business activities is retained earnings. Figure 1 reflected through ROA. By using profits, banks can increase capital both as a loss buffer and as business expansion. Based on the problem of increasing capital, the author will measure the condition of banks that are included in the category of group 3 bank business activities listed on the IDX in increasing their capital. According to research conducted by Sitaresmi and Prasentyatono (2015), the factors that affect a bank's CAR are credit growth, leverage, NPL, and ROE. Meanwhile, according to Kasmir (2015), bank CAR is influenced by profitability. According to Herlanto (2018), a bank's NPL reflects the bank's CAR level. If the NPL is high, the reserves formed will be even greater, and even bank capital can also be eroded.

This study aims to identify and analyze the capital conditions of 10 commercial banks from group 3 bank business activities (listed on the IDX) in Indonesia from 2016 to 2021. This study analyzes whether Non-Performing Loans (NPL), net interest margin (NIM), loan-to-deposit ratio (LDR) and credit growth (CG) influence banks in determining capital as a buffer against loss risk.

RESEARCH METHOD

This research was conducted by analyzing 10 commercial banks from the bank business activity group 3 (listed on the IDX) in Indonesia from 2016 to 2021. The ten commercial banks are BNLI, MEGA, BBTN, BBKP, BBJR, NISP, BNGA, BDMN, BTPN, and BNII. Financial variables such as non-performing loans (NPL), net interest margin (NIM), loan-to-deposit ratio (LDR), and credit growth (CG) will be used as explanatory variables to estimate the influence of these variables on the capital adequacy ratio. Panel data analysis will be carried out to find out how these variables influence the capital adequacy ratio. This study uses panel data regression analysis techniques (a combination of cross-section and time series data). The tools that can be used in conducting panel data regression analysis are the fixed effect model (FEM) and the random effect model (REM). To determine which model should be used, the Hausman test was carried out. This study uses a fixed effect model (FEM). The regression model in this study is:

$$CAR\ it = \beta 0 + \beta 1\ NPLit + \beta 2 CGit + \beta 3 LDRit + \beta 4 NIMit + \varepsilon \quad (1)$$

Where, CAR = Dependent Variable; β0 = Constant; β1 = The coefficient for problem loans; NPL = Problem Credit; β2 = Credit growth coefficient; CG= Credit Growth; β3 = The coefficient of the loan to deposit ratio; LDR = Loan to Deposit Ratio; β4 = The coefficient for the net interest margin; NIM = Net Interest Margin; ε = Error

RESULT AND DISCUSSION

Based on Table 2. it can be formulated the panel data regression model equation which explains the effect of all independent variables on the capital adequacy ratio in commercial banks in the category of group 3 bank business activities, namely:

$$CARit = 12,099 + 2,197546\ NPL-0,060\ NIM - 1,8899\ CG + 0,0438\ LDR \quad (2)$$

Table 2. Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.09373	0.709394	17.04798	0.0000
NPL?	2.197546	0.055086	39.89276	0.0000
NIM?	-0.060856	0.075898	-0.801809	0.4232
CG?	-1.889913	1.271013	-1.486935	0.1379
LDR?	0.004381	0.004850	0.903241	0.3670

Source: Processed data, 2023

F test

The F test or simultaneous test is used to see whether or not the effect of the independent variables on the dependent variable is significant, as shown in the Table3.

Table 3. F-Test

Cross-section fixed (dummy variables)			
R-squared	0.920315	Mean dependent var	17.32976
Adjusted R-squared	0.916389	S.D. dependent var	3.017633
S.E. of regression	0.872567	Akaike info criterion	2.613561
Sum squared resid	262.6739	Schwarz criterion	2.806672
Log likelihood	-456.3613	Hannan-Quinn criter.	2.690322
F-statistic	234.3858	Durbin-Watson stat	1.212214
Prob(F-statistic)	0.000000		

Source: Processed data, 2023

From Table 3, the Prob F-stat is obtained. F count 0.000. Due to Trouble. F count (0.000) < 0.05. Thus it can be concluded that there is a significant effect simultaneously between NPL, NIM, LDR, and CG on CAR.

T-Test

To determine the significance or not the effect of the independent variable partially on the dependent variable, the t-test is used. It is known that t table with a value of 1.967, the result is only NPL which has a significant effect on CAR.

Test Multiple Problems in Regression Analysis
Multicollinearity test using Variance Inflation Factors

Variance Inflation Factors (VIFs) are a method for measuring the degree of collinearity between regressors in an equation. VIF shows how much of the variance of the estimated coefficient of the regressor has been inflated due to collinearity with other regressors, as shown in Table 4.

Table 4. *Variance Inflation Factors (VIFs)*

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	30.68750	636.6374	NA
NPL	0.104165	14.79451	1.700666
NIM	0.131928	199.2706	1.526373
CG	54.12072	2.858767	1.062321
LDR	0.002781	437.4108	1.085070

Source: Processed data, 2023

Table 4. shows the Centered VIF NPL, NIM, CG, and LDR values of less than 10, it can be stated that there is no multicollinearity problem in the model.

Autocorrelation Test
Durbin-Watson test

The Durbin-Watson test is used to determine the correlation in the regression model. Autocorrelation is the correlation between members of a series of observations sorted by time. With T = Number of samples (n), K = Number of variables and dL = Lower limit of Durbin Watson, dU = Upper limit of Durbin Watson, Then with a value of T = 363, k = 5. Obtained values of dL = 1.80465 and dU = 1.84957 (4 - d) = 2.77. Based on this value, positive autocorrelation results can be determined: If d < dL, there is a positive autocorrelation, namely 1.325 d < 1.84957 there is a positive autocorrelation. Negative correlation results can be determined: If (4 - d) > dU then there is no negative

autocorrelation, 2.7 > 1.84957 then there is no negative autocorrelation. Based on the Durbin-Watson test (1.325 d <1.84957, there is a positive autocorrelation), it is known that this model has autocorrelation problems.

Breusch-Godfrey test

The Breusch–Godfrey serial correlation LM test shown in Table 5. is a test for autocorrelation in errors in the regression model. This test utilizes the residuals from the model considered in the regression analysis. Based on the results in Table 5., with the hypothesis: H0: There is no autocorrelation problem H1: There is an autocorrelation problem with Probability < Alpha (0.05), then H0 is rejected, H1 is accepted Probability > Alpha (0.05), then H1 is rejected, H0 accepted.

Table 5. Breusch-Gofrey Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.948821	Prob. F(2,19)	0.4048
Obs*R-squared	2.360969	Prob. Chi-Square(2)	0.3071

Source: Processed data, 2023

Based on Table 5., the probability value of F (Prob chi-square) is greater than 0.05 (5%), so it can be concluded that there is no autocorrelation problem.

Heteroscedasticity Test

The heteroscedasticity test is used to test whether in the regression model used in this study, there is an inequality of variance from one residual observation to another. If the variance in one residual from one observation to another is constant, it is called homoscedasticity, and if the variance is different, it is called heteroscedasticity. A good regression model is homoscedasticity or there is no heteroscedasticity (Ghozali, 2007: 105) as shown in Table 6.

Table 6. Breusch-Pagan-Gofrey

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.330304	Prob. F(4,21)	0.2915
Obs*R-squared	5.256277	Prob. Chi-Square(4)	0.2620
Scaled explained SS	4.675464	Prob. Chi-Square(4)	0.3222

Source: Processed data, 2023

The results of Table 6. show where the Prob. Chi-square (4) is equal to 0.2620. Because the p-value is 0.2620 > 0.05 then accept H0 or which means the homoscedasticity regression model or in other words there is no heteroscedasticity problem. Based on the tests that have been carried out, the estimation results show that NPL has a significant effect on the Bank's capital. relationship between CAR and NPL.

Non-Performing Credit (NPL)

NPL is a benchmark for assessing the quality and performance of a bank. A higher NPL indicates poorer bank credit quality so the bank's risk is getting bigger and the bank must increase its capital as a buffer to avoid this risk. Non-performing loans (NPL) are also generally associated with high risk and poor management (Barrios and Blanco, 2003). The estimation results show that Non-Performing Loans (NPL) have a positive and significant effect on the bank's capital adequacy ratio. This indicates that the bank has anticipated an increase in the potential loss of bad loans by increasing its capital. The results are also in line with Anggono (2017) where the bank's intermediary function will be disrupted when

NPLs increase, as a result, banks may have difficulty providing new loans and at the same time, banks must increase core capital or convert risky liquid into liquid assets that are less risky to maintain liquidity.

Intercept Capital Adequacy Ratio for 10 Banks

By using the fixed-effect method in the capital adequacy ratio model, an intercept is obtained that will be used to differentiate the CAR of each bank studied. Table 7. is the intercept of each bank which is analyzed from the test results using the fixed effect approach:

Table 7. Intersep CAR pada 10 Bank Bank Business Activity Group 3

No	Bank	Intercept C	Intercept Bank	Intercept of fixed effect
1	A	12,09373	0,946177	11,14755
2	B	12,09373	0,597731	11,49655
3	C	12,09373	0,57494	11,51879
4	D	12,09373	0,785995	11,30774
5	E	12,09373	-0,552886	12,64662
6	F	12,09373	-0,332176	12,42591
7	G	12,09373	0,151627	11,94215
8	H	12,09373	-0,542338	12,63607
9	I	12,09373	-0,468513	12,56224
10	J	12,09373	-0,859869	12,95365

Source: Processed data, 2023

Based on the intercept of each Bank Business Activity Group 3 bank in Table 7, it is known that for Bank A, if all independent variables are considered zero or constant, then Bank A needs to increase capital by 11.1% to develop its business. For Bank B, if all independent variables are considered zero or constant, then Bank B needs to increase its capital by 11.4% to expand its business. At Bank C, if all independent variables are considered zero or constant, then Bank C needs to increase its capital by 11.5% to expand its business. Bank D, If all independent variables are considered zero or constant, then Bank D must increase capital by 11.3% to expand its business.

Bank E, If all independent variables are considered zero or constant, then Bank E must increase capital by 12.6% to expand its business. Bank F, If all the independent variables of RWA are considered zero or constant, then Bank F must increase capital by 12.6% to expand its business. At Bank G, if all independent variables are considered zero or constant, then Bank G must increase capital by 11.9% to expand its business.

For Bank H, if all independent variables are considered zero or constant, then Bank H must increase capital by 12.6% to expand its business. Bank I, If all the independent variables are zero or constant, then Bank I must increase capital by 12.6% to expand its business. And finally for Bank J, if all independent variables are considered zero or constant, then Bank J must increase capital by 12.95% to expand its business.

CONCLUSION

Based on the results of research on measuring the capital adequacy ratio of Bank Business Activity Group 3 banks listed on the IDX, it can be identified that the CAR of 10 Bank Business Activity Group 3 banks listed on the IDX is influenced by NPL. The results of the study prove that NPL has a positive and significant effect on the capital of 10 bank books. 3. With the effect of NPL on bank capital, when NPL increases, banks will increase capital reserves beyond the minimum capital reserves that have been set as a buffer against potential losses. Furthermore, at Bank Business Activity Group 3 banks, bank J is

the bank with the highest CAR, followed by bank I and Bank H. Bank A is the bank with the lowest CAR, followed by bank C and Bank D. Bank J is a bank that only increases its capital by 4%, the bank can compete in group (Bank Business Activity Group) 4.

RECOMMENDATION

The Bank increases its Capital Adequacy Ratio (CAR) to exceed the minimum CAR set by the Regulator to have a strong foundation to avoid the risks that follow.

REFERENCES

Anggono, H. (2017). The determinant factors of asset and liability management and the bank performance: empirical study on foreign exchange commercial banks in Indonesia from 2008 to 2013', Int. J. Business and Globalisation, Vol. 19,No. 4, pp.512–527.
https://doi.org/10.1504/IJBG.2017.087298

Azhari Azhari, Kamaruddin Kamaruddin, Irvan Murizal, Mai Simahatie. Are conventional rural banks more efficient than sharia: empirical evidence from dea.
DOI10.24198/sosiohumaniora.v24i1.35546

Bank Indonesia. (2011). Penilaian Tingkat Kesehatan Bank Umum. Bank Indonesia web site https://www.bi.go.id/id/peraturan/perbankan/Pages/pbi_130111.

Bank Indonesia. (2013). Kewajiban Penyediaan Modal Minimum Bank Umum. Bank Indonesia web site: https://www.bi.go.id/id/peraturan/perbankan/Pages/pbi_151213.

Basel Committee on Banking Supervision. (2011). International regulatory framework for banks (Basel III). Bank for International Settlement http://www.bis.org.

Hirtle Beverly, Kovner Anna and Plosser Matthew (2016)"The impact of supervision on bank performance" No 768, Staff Reports from Federal Reserve Bank of New York.
https://www.newyorkfed.org/research/staff_reports/sr768.html

Drehmann, M (2014): "The credit-to-GDP gap and countercyclical capital buffers: questions and answers", BIS Quarterly Review, March.
https://econpapers.repec.org/scripts/redir.pf?u=http%3A%2F%2Fwww.bis.org%2Fpubl%2Fqtrpdf%2Fr_qt1403g.pdf;h=repec:bis:bisqtr:1403g

Deny Asna Widyanto1, R. E. (2022). Analisis Faktor-Faktor Yang Mempengaruh Net Interest Margin Pada Perusahaan Perbankan Yang Terdaftar Di Bursa Efek Indonesia Periode 2012-2016. Media Akuntansi Universitas Muhammadiyah Semarang, Vol.10 (1) 2020, 12-22.
DOI: https://doi.org/10.26714/vameb.v17i1.6942

Dewi Kartika, Siauwijaya Rahmat. Analisis efisiensi teknis perbankan di Indonesia.Jurnal Manajemen Atmajaya. Vol. 13 No. 2 (2016): Jurnal Manajemen
https://doi.org/10.25170/jm.v13i2.801

Effendi, N., Indiastuti, R., Yunus, T.Z., & Setiawan, M, (2014) Technical Efficiency and Interest Rate Spread in the Indonesian banking Industry, European Journal of Social Sciences, ISSN 1450-2267, Vol. 44(4):386-392
DOI: https://doi.org/10.25170/jm.v16i1

El Mehdi Ferrouhi, (2018), Determinants of banks' profitability and performance: an overview, MPRA Paper, University Library of Munich, Germany
http://jme.mbri.ac.ir/article-1-410-en.pdf

Victor E. Barrios and Juan M. Blanco, (2003), The effectiveness of bank capital adequacy regulation: A theoretical and empirical approach, Journal of Banking & Finance, 27,

(10), 1935-1958

http://hummedia.manchester.ac.uk/schools/soss/cgbc ... apers/dpcgbcr124.pdf

Kasmir, (2015), Bank dan lembaga keuangan lainnya, Jakarta : Raja Grafindo Persada, 2015.

Li Yanyu. 2021. Analysis on the Functions of Financial Intermediary. Advances in Economics, Business and Management Research, volume 203.

DOI 10.2991/assehr.k.211209.024

Oktoviyanti Oktoviyanti, Murwaningsari Etty. Faktor - faktor yang mempengaruhi financial sustainability pada sub-sektor perbankan. Jurnal Trisakti

https://doi.org/10.25105/jet.v3i1.15533

Poniman1, H. B. (2022). Dampak Camel Terhadap Profitabilitas Perbankan Yang Listing Di Bei 2016-2020. Measurement: Jurnal Akuntansi, Vol 16 No. 2 :121 - 129.

https://www.journal.unrika.ac.id/index.php/measurement/article/view/4721

Puspitas Purwanto, Dedik And Pangestuti, Irene Rini Demi,(28 September 2020), Determinan Net Interest Margin Bank Umum Konvensional Di Indonesia (Studi pada Bank Umum Konvensional Tahun 2015-2017)ari, Elisa. 2014. "Analisis Faktor-Faktor yang Mempengaruhi Net Interest Margin pada Bank-Bank Umum di Indonesia". Jurnal Ilmu Manajemen. Volume 2 Nomor 4, Oktober 2014.

URI:https://repofeb.undip.ac.id/id/eprint/7561

Raharjo, Pamuji Gesang., Dedi Budiman Hakim., Adler Hayman Manurung, dan Tubagus N.A. Maulana. 2014. "The Determinant of Commercial Banks's Interest Margin in Indonesia: An Analysis of Fixed Effect Pannel Regression". International Journal of Economics and Financial Issues. Vol.4, No. 2, 2014, pp. 295-308.

Rinka Az-Zahra, I. Y. (2022). Analisis Pengaruh Risiko Suku Bunga Bank Indonesia Dan Net Interest Margin Terhadap Profitabilitas Bank Konvensional Di Indonesia. Jurnal Mirai Manajemen, Vol 7, No 1 (2022), Pages 133 - 142.

DOI: https://doi.org/10.37531/mirai.v7i1.1570

Sampurnaningsih R Sri, dkk, The Effect of Capital Adequacy Ratio (CAR), Loan To Deposit Ratio (LDR) And Net Profit Margin (NPM) on Financial Performance of Bank DKI. Jurnal Ilmiah Ilmu Administrasi Publik: Jurnal Pemikiran dan Penelitian Administrasi Publik. Volume 11 Number 2, July December 2021. Page 497-506

https://doi.org/10.26858/jiap.v11i2

Setiadi Kelvin reinard, Suhartoko Y. B. Analisis pengaruh indikator penilaian tingkat kesehatan bank berbasis risiko terhadap nilai market share pada bank Bank Unit Kegiatan Usaha iv di indonesia periode 2009-2019. Vol. 18 No. 1 (2021): Jurnal Manajemen

https://doi.org/10.25170/jm.v18i1.1689

Sitaresmi W, dan Prasetiantono,Tony, Faktor- Faktor yang Berpengaruh Terhadap Capital Adequacy Ratio: Analisis Data Panel Pada 10 Bank Umum Konvensional di Indonesia Triwulan I/2009 - Triwulan III/2015.

http://etd.repository.ugm.ac.id/penelitian/detail/105547

Sarwendah Nugrahaning P, S. W. (2015). Analisis Pengaruh Npl Dan Ldr Terhadap Nim Dengan Roa Sebagai Intervening, Pengaruh Npl Terhadap Nim Dengan Car Dan Roa Sebagai Intervening, Serta Bopo Terhadap Nim Bank Go Public Di Indonesia Periode 2011-2015. Diponegoro Journal Of Management.

https://ejournal3.undip.ac.id/index.php/djom/article/view/17881

Simanjuntak, J. (2018). Inflasi Dan Suku Bunga Terhadap Net Interest Margin Pada Bank Konvensional. Journal Of Accounting & Management Innovation, Vol.2 No.2, July 2018, Pp. 161-169.

DOI: http://dx.doi.org/10.19166/%25JAMI%256%252%252022%25

Siregar Sopater Yosua, dkk. Analisis portofolio kredit, risiko, dan return bank umum konvensional. Vol. 19 No. 1 (2022): Jurnal Manajemen. Atmajaya https://doi.org/10.25170/jm.v19i1.2334

Soetjiati, Mais G Rimi. (2019)" Analisis Faktor – Faktor yang mempengaruhi Profitabilitas Bank Umum di Indonesia. Vol 16 No 01 (2019): [JAM] Jurnal Akuntansi dan Manajemen Vol 16 No 01 (April - 2019)
DOI: https://doi.org/10.36406/jam.v16i01.270

Sofiati Nunung Ayu, dkk. Increased customer satisfaction using digital marketing implementation in the banking industry image.
DOI10.24198/sosiohumaniora.v25i1.45604

Triaryati, P. L. (2018). Pengaruh Car, Npl, Bopo,Dan Ldrterhadap Net Interst Margin Pada Perusahaan Perbankan Yang Terdaftar Di Bei. E-Jurnal Manajemen Unud, Vol. 7, No. 1, 2018: 387-411.
DOI: https://doi.org/10.24843/EJMUNUD.2018.v7.i01.p15

Wanady1, C., Wibowo2, C., & Ervina3, D. (Vol. 1, No. 2, Juli, 2022). Determinan Net Interest Margin Bank Umum Di Indonesia: Studi Saat Tren Penurunan. Liaison Journal Of Best Issn: 2809-6819. ISSN: 2809-6819