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Determinant of RAROC Moderated by COVID-19

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Abstract

This paper aims to explore determinants of RAROC moderated by Risk. This research used Model Panel Data to estimate variable relationship and yearly data for manufacturing Industry. The result is that The Ratio of Gross Profit margin is positively effect on RAROC. Debt to Equity Ratio has positively an effect on RAROC. Exchange Rate has positively an effect on RAROC. Interreaction DER dan COVID-19 has negatively an influence on RAROC. Interreaction Exchange Rate dan COVID-19 has negatively an influence on RAROC. COVID-19 is a pure moderating variable in this research for relationship between Exchange Rate and DER on RAROC.

Keywords: RAROC, gross profit margin, interest coverage ratio, debt to equity ratio, risk, exchange rate, COVID-19

JEL: F31, G15, M41.

1. Introduction

Performance of company become a topic that it never ending to be discussed. Investors always discuss the company performance to decide for buying stocks. There are two approaches to measure a company performance which is European Approach and American Approach. European Approach considers risk to measure company performance which called Risk Adjusted Return on Capital (RAROC). American approach does not include risk to measure company performance for example Return on Asset (ROA) and Return on Equity (ROE). American approach always uses Price to Book Value (PBV) for bank performance, Manurung. Zaik et al. (1996) stated that RAROC systems allocate capital for two basic reasons: (1) risk management and (2) performance evaluation. RAROC mostly use to measure bank performance such as Naimy (2012), Saha et.al (2016), Lima (2014), Manurung et al. (2020) and Kartika et al. (2020).

This paper will be different to previous research of bank performance because this research wants to examine determinant of RAROC for Manufacturing company. RAROC is calculated by Bank to give a credit to a company. Mostly Bank used 5C to give credit for a company, because bank always use cash-flow analysing to give credit for a company. RAROC can be used a tool to give credit, because RAROC is more hire than other company performance measurement. RAROC is a measurement company performance that it has adjusted return to risk. Chlopek (2013) stated that RAROC is credit approach and the maximization of shareholder value. There is limited research about RAROC for manufacturing industry.

Debt to Equity Ratio is leverage ratio for a company to indicate capability of equity for debt payment. Most analyst in the bank always consider this ratio to give credit for the company. This ratio could also be used to state good or bad company. If this ratio more than 2 times, the company will have disadvantages to pay interest or they have problem to become financial distress company. This ratio has limited research an influence on RAROC. Ratio DER has research mostly to influence on Company Performance which is Khoiriah (2022), Noviyati and Agustiningsih (2023), Siswanto et.al (2022), Marmaya et.al (2018), and Buckley and Tian (2017).

Gross Profit Margin (GPM) is a variable that show capability company to operate business. Manurung (2024) stated that company has loss for 3 year or this ratio negative the company eligible to close it. Research of GPM

on RAROC is limited so this research is very valuable but there is in Firm Value such as Andrianto and Amin (2023), Mahruzal and M. Khaddafi (2020), Mao (2023), Nariswari and Nugraha (2020), and Darma (2021).

Interest coverage Ratio (IRC) is an indicator to management or decision maker to show company capability to pay interest. This ratio could also be used to assess amount of debt from bank or debt capacity. This ratio is also limited for manufacturing company. So why this research using IRC as independent variable on RAROC. Research of IRC on Company Performance is very varying such as Ji (2019), Noghondari et al (2022), Sarpta et.al (2024). McCoy et.al (2020) and Palomino et.al (2019).

Risk is an independent variable on RAROC in this research, but there is limited research for it, so why this research is conducted. Research of Risk on company performance is many mostly for banking industry. Some research is such as Noor and Abdalla (2014), Mohammed and Knapkova (2016), Iswahyudi et.al (2023), Kartika et al (2020) and Manurung et.al (2020).

Exchange Rate is a macroeconomic indicator to show economic comparability two countries. Interest rate and Inflation is the factor of Exchange Rate (Blanchard, 2021; Dornbusch, 2017). A Nation should issue a policy in monetary dan fiscal to make the product that it competes in other country. Research Exchange Rate on RAROC is very limited, but there is Exchange Rate on Company Performance such as Alagbe et al (2021), Belghitara et.al (2021), Wanjohi and Mungai (2020), and Rahimian et al (2022).

This research will use Covid-19 of company to become moderating variable in the model. This Covid-19 is dummy variable that it will explain in methodology. The moderating variable could be stated to strong or to weak relationship between RAROC as dependent variable and 6 variables as independent variable (Manurung, 2019, Sharma 1981). Ngo, H.T. and Duong, H.N. (2024) discuss Covid-19 and Company performance. There is limited research Covid-19 on RAROC, but there are very much research Covid-19 on company performance. Ciotti, et.al (2020) explore about the COVID-19 pandemic. Daryanto et al. (2023) discuss Covid-19 and Company performance in Construction Company. Shen et al (2020) explored The Impact of the COVID-19 Pandemic on Firm Performance. Alsamhi et al (2022) discussed COVID-19 and company performance in India. Shaharuddin (2021) discuss company performance during Covid-19.

This Research wants to explore Determinant of RAROC and testing Cointegration between Exchange Rate and RAROC.

2. Theoretical Review

RAROC (Risk Adjusted Return on Capital) is an indicator of company performance especially for Banking. This variable of RAROC is as dependent variable, so it focuses this research. This RAROC measures company performance that it adjusts to risk. RAROC is also as indicator competitiveness to other company. RAROC is mostly used to analyze bank compared to manufacturing industry or services (Manurung, 2024c). Investor is very likely the highest value of RAROC. Besides that, Bank used this RAROC as tool to decide allocation of credit. Then Klaassen and van Eeghen (2015) arranged the formula of RAROC to become factor of RoE as follows:

$$ROA = \frac{REVENUE\ (R) - COST\ (T)}{Earning\ Asset\ (EA)} = \frac{R}{EA}\left(1 - \frac{C}{R}\right)$$

$$RAROC = \frac{R - C - EL}{RRC} = \left(ROA - \frac{EL}{EA}\right) * \frac{EA}{TA} * \frac{TA}{RRC} \quad (1)$$

$$ROE = \left(RAROC - \frac{UL}{RRC}\right) * \frac{RRC}{Equity} * \frac{PAT}{PBT}$$

R = revenue

C = Cost

EL = Expected Loss

EA = Earning Assets

TA = Total Assets

RRC = Risk Required Capital

UL = Unexpected Loss

PAT = Profit After Taxes

PBT = Profit Before Taxes

Based on the Equation (1), Risk, ROA, ratio Expected Loss to Earnings Asset, ratio Earnings Assets to Total Assets are determinant of RAROC. This formula could be expanded to add macroeconomics variable which is to explore in this research.

3. Methodology

This subsection explains operational variable, methodology and source of data that it used in this paper. This paper used 7 variables which is RAROC as dependent variable, GROSS Profit Margin, Debt to Equity Ratio, Interest Coverage Charges, Risk, and Exchange Rate as independent variable and Covid-19 as moderating variable.

3.1 Operational Variable

Gross Profit Margin (GPM) is an indicator for a company to state efficiency to produce a product. Manurung (2023) stated that Gross Profit Margin measured by equation at below:

$$GPM = \frac{Gross\ Profit}{Revenue} \tag{2}$$

This ratio measure how much revenue should be gotten to have Gross Profit of US$ 1 dollar. It means the ratio will be higher if Gross Profit increase by US$ 1 Dollar.

3.2 Interest Coverage Ratio

Interest coverage ratio is a ratio to show the company capability to pay interest based on operational profit (Manurung, 2023). If the company has capability, it means the company will get profit. Interest covered ratio is measured as follows:

$$ICR = \frac{Interest\ to\ pay}{Operasional\ Profit} \tag{3}$$

3.3 Debt to Equity Ratio

Debt to Equity ratio is a ratio to indicate company leverage for the period of calculating. Ross et al. (2021) stated that DER is measured as follows:

$$DER_{i,t} = \frac{Debt_{i,t}}{Equity_{i,t}} \tag{4}$$

3.4 Risk

Manurung (2017) stated that risk is an uncertainty in the future which is company could not manage it, the company will have bad performance. Risk is measured by total risk as follows:

$$Risk = \sqrt{252 * \frac{\sum_{t=1}^{n}(R_t - \bar{R})^2}{n-1}} \tag{5}$$

3.5 Exchange Rate

As mentioned previously, Exchange rate is an indicator to show the nation capability comparability to other countries. This variable measure by:

$$EX_t = \frac{Value\ of\ EX_{t-1}}{Value\ of\ EX_{t-1}} - 1 \tag{6}$$

3.6 Covid-19

In this paper, Covid-19 is a period which is government to state that Indonesia has got problem in health called it Covid-19. Era Covid-19 is started from March 2020 to the end 2022. Covid-19 state as dummy variable. This research has period of 2017 until 2023, so this paper put 0 for period 2017, 2018, 2019 and 2023 and 1 for 2020 until 2022.

4. Data

This research used yearly data for variable of RAROC as dependent variable, GROSS Profit Margin, Deb to

Equity Ratio, Interest Coverage Charges, Risk, and Exchange Rate as Independent Variable. This data is collected from the company and Indonesia Stock Exchange and Bank Indonesia. Period of this research is 2017 to 2023.

5. Estimation Method

This research used Panel Data Model, because this model could apply cross-section and time series data. There is 3 types model in panel Data Model such Pool Model, Fixed Effect Model and Random Effect Model. This research uses Fixed Effect Model (FEM) because sample is selected using purposive sample. Gujarati (2003), Wooldridge (2002), Greene (2008), Biorn (2017) dan Sul (2019) stated the MET will be used which is Sample (N) higher than time (T) and sample is selected using purposive method (non-random). The Panel Data Model is Fixed Effect model as follows:

$$y_{i,t} = a_0 + a_1 * x_{1,i,t} + a_2 * x_{2,i,t} + \cdots + a_p * x_{p,i,t} + \varepsilon \quad (7)$$

6. Discussion

This paper discusses two topics for the research result which is Descriptive Statistics and Causality of RAROC.

6.1 Descriptive Statistics

This sub-section will discuss about Descriptive Statistics that it shows in Table 1 at below.

Table 1. Descriptive Statistics of Research Variable

	RAROC	GPM	DER	ICR	Risk	EX
Minimum	0.000885	0.010414	0.042338	0.00015	0.172439	13548
Maximum	1.154983	0.780384	3.928398	1.565032	15.35505	15731
Average	0.191728	0.319244	0.921625	0.168136	0.496998	14493
STDEV	0.206562	0.15494	0.80499	0.206439	1.064087	798.8456
Skewness	2.713843	0.511282	1.420578	2.805736	12.82065	0.715264
Kurtosis	8.310196	0.03165	1.480616	12.65894	174.5544	-0.79307
Jarque Bera	538.141	91.99623	96.88653	1164.648	280824.8	153.382

RAROC is an indicator for company performance which it has adjusted the risk. RAROC as dependent variable in this research has data varying for all sample and research period. This ratio has minimum ratio of 0.08%, maximum ratio of 115.50%, average of RAROC Ratio of 19.17% and standard of deviation of 20.65%. These figures indicate the variation of data of RAROC nearly small. This ratio has normal of distribution by using Jarque Bera test.

Ratio of Gross Profit Margin (GPM) is a ratio to indicate company capability to operate a business. This ratio can also be used as first indicator to run a company. This ratio has minimum ratio of 1.04%, maximum ratio of 78.04%, average of GPM Ratio of 31.92% and standard of deviation of 15.49%. These figures indicate the variation of GPM very small. This ratio has normal of distribution by using Jarque Bera test.

Debt to Equity Ratio is a ratio to indicate leverage a company. This ratio has minimum ratio of 4.23%, maximum ratio of 393.84%, average of DER Ratio of 92.16% and standard of deviation of 80.5%. These figures indicate the variation of data of DER very higher. This ratio has normal of distribution by using Jarque Bera test.

Ratio of Interest coverage ratio is a ratio to show company capability to pay interest payment for the year. This ratio has minimum ratio of 0.015%, maximum ratio of 156.50%, average of ICR Ratio of 16.81% and standard of deviation of 20.64%. These figures indicate the variation of ICR higher than ratio of GPM. This ratio has normal of distribution by using Jarque Bera test.

Risk is measured by total risk to show company faced all risk. This ratio has minimum ratio of 17.24%, maximum ratio of 1535.51%, average of Exchange Rate of 49.70% and standard of deviation of 106.41%. These figures indicate the variation of risk very high. It means manufacturing company faced high risk. This ratio has normal of distribution by using Jarque Bera test.

Exchange Rate is a macroeconomic variable to show a nation capability of economic to trade between two countries. This ratio has minimum EX of Rp. 13,458 per Dollar, maximum EX of Rp. 15.731 per Dollar, average of Exchange Rate of Rp.14,493 per dollar and standard of deviation of 798.85. These figures indicate the variation of Exchange Rate very high. It means that Exchange Rate will face problem to manufacture a product because there is fluctuation of price of raw materials. This ratio has normal of distribution by using Jarque Bera test.

6.2 Causality

In this section of causality will discuss variable of GPM, DER, ICR, Risk, Pandemic Era on RAROC. RAROC model for this research is as follows:

$$\begin{aligned} RAROC_{i,t} = {} & 0.03461 + 0.3033\ GPM_{i,t} - 0.0501\ ICR_{i,t} + 0.0261\ DER_{i,t} \\ & \quad (-4.798) \qquad (-1.22) \qquad (2.104) \\ & + 0.0638\ Risk_{i,t} + 0.2021\ EXs_{i,t} + 0.0340\ PDMC_{i,t} \\ & \quad (1.546) \qquad (1.998) \qquad (1.37) \\ & + 0.0513\ (GPM_{i,t}*PDMC_t) + 0.0408\ (ICR_{i,t}*PDMC_{i,t}) \\ & \quad (1.514) \qquad (1.077) \\ & - 0.0131\ (DER_{i,t}*PDMC_t) - 0.2756\ (EX_t*PDMC_t) \\ & \quad (-1.609) \qquad (-2.099) \\ & - 0.0607\ (Risk_{i,t}*PDMC_t) \qquad (8) \\ & \quad (-1.448) \end{aligned}$$

R^2 = 92.74% and F_{test} = 55.037; t-test is number in brackets

This model has coefficient of determination of 92.74%. The value of 92.74% for Coefficient of Determinations explain that all variable could explain variation of RAROC's variable by 92.74% and the rest by other factor. This figure is also very good for finance model. Then, testing of goodness of fit also is did using F test.

This testing stated that Equation (8) is appropriate model to estimate RAROC for Manufacturing Industry. As mentioned previously, this research wants to explore determinant of RAROC. The first variable is Gross Profit Margin (GPM) which is an indicator capability company to get profit. This variable has effect positively on RAROC at level of significant of 1%. This ratio increase that it would increase the RAROC. It means to support the theory of GPM on RAROC. This research supports the previous research of Andrianto and Amin (2023), Mahruzal and M. Khaddafi (2020), Mao (2023), Nariswari and Nugraha (2020), and Darma (2021).

This research found that Debt to Equity Ratio has significantly a positive effect on RAROC. If Company management has policy to increase debt, it will affect RAROC to increase. If Debt increases that it will put company management to manage for good results. This result support previous research of Zaik (1996), Khoiriah (2022), Noviyati and Agustiningsih (2023), Siswanto et al. (2022), Marmaya et al. (2018), and Buckley and Tian (2017).

As mentioned previously, Exchange Rate (ER) included as external variable of company to affect RAROC. Exchange Rate is a variable that it has big impact to Indonesia's Economic. This variable is expected positively relationship with Company Performance. If the Exchange Rate increases that it will be higher risk to be faced by company, so investor want to get RAROC higher. In this research found that Exchange Rate has positively influence on RAROC. It means that Empirical is similar to its expected. This research supports the previous research such as Alagbe et al (2021), Belghitara et.al (2021), Wanjohi and Mungai (2020), and Rahimian et al (2022).

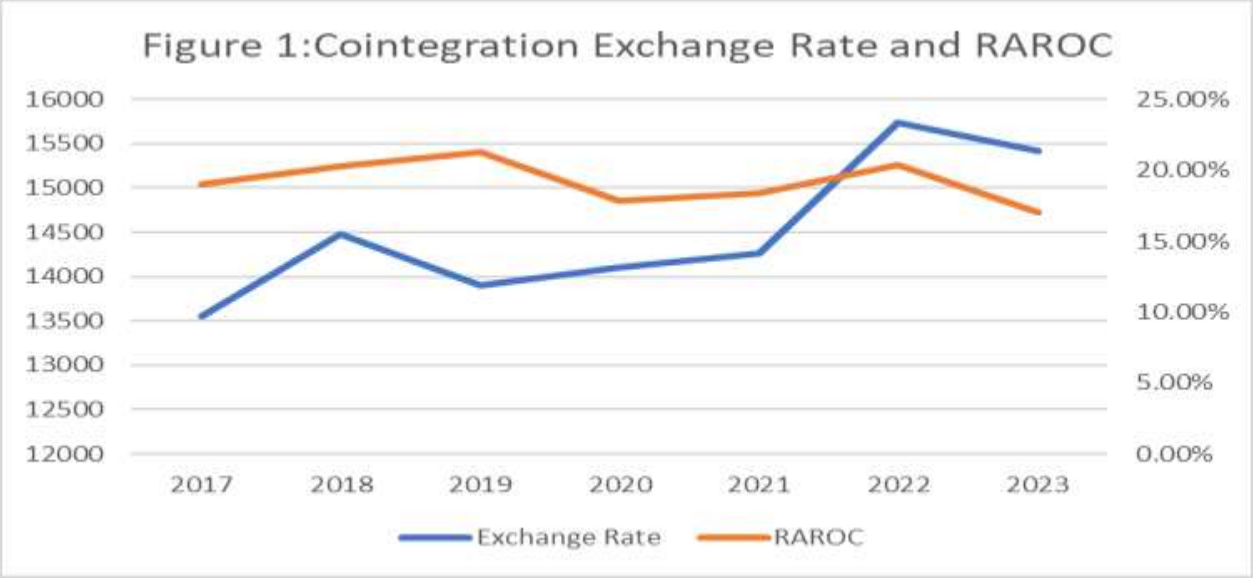
This Research use data for period 2017 to 2023 that there is period of COVI-19 or Pandemic Era. As mentioned in methodology, this research put Dummy variable to state Covid-19. Besides that, we suggest Covid-19 Variable to become moderating Variable. Based on Sharma et al. (1981) and Manurung (2024b), a variable become a pure moderator if moderating variable does not be significant to affect response variable which is the interreaction

affect dependent variable. In this research found that Covid-19 does not significantly affect on RAROC. It means, COVID-19 could be a pure moderating variable, if the interaction COVID-19 and other dependent variable significant influence on RAROC. Based on Equation (8), interreaction of Debt Equity Ratio and Exchange Rate to Covid-19 are significant relationship to RAROC. So Covid-19 is a pure moderating variable for Debt Equity Ratio and Exchange Rate on RAROC.

This research found that Interest coverage ratio (ICR), and Risk did not have impact on RAROC. The Interreaction of gross profit margin (GPM), interest coverage ratio, and risk to Covid-19 did not have impact on RAROC.

6.3 Cointegration

This research also explores relationship exchange rate and RAROC. Previously finding, the Exchange Rate has significantly influence on RAROC. Then, this research wants to test the relationship using Cointegration method to state relationship for short and long term period. Figure 1 at below to show the relationship.



Based on Figure 1, there is a cointegration between Exchange Rate and RAROC. This method is called as simple method for cointegration. Then, this research also used Augmented Dickey Fuller to see cointegration. The result stated that there is a cointegration between Exchange Rate and RAROC. The Research supports the previous research for cointegration Macroeconomic Variable with company performance such as Lubis et al. (2024) and Hasan et.al (2020).

7. Conclusion

Based on the previous explanation, it concludes as follows:

1. The Ratio of Gross Profit margin is positively effect on RAROC.
2. Debt to Equity Ratio has positively an effect on RAROC.
3. Exchange Rate has positively an effect on RAROC
4. Interreaction DER dan COVID-19 has negatively an effect on RAROC.
5. Interreaction Exchange Rate dan COVID-19 has negatively an effect on RAROC
6. COVID-19 is a pure moderating variable in this research for relationship between Exchange Rate and DER on RAROC.
7. There is a cointegration between Exchange Rate and RAROC.

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