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# Leverage and liquidity to firm value moderated by firm size: a signaling theory approach

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**ABSTRACT**

This study used the Signaling Theory approach to determine the effect of leverage and liquidity on firm value and used firm size as a moderating variable. The research sample used is food and beverage sector companies listed on the Indonesia Stock Exchange during 2016-2021. Data processing was carried out with the STATA version 17 statistical application. The leverage variable is used to see the proportion of debt used by the company in its financing and the results show that leverage is proven to increase firm value significantly. Liquidity is used to see the company's ability to pay its debt obligations and the results show that liquidity is proven to significantly increase firm value. These findings strengthen the theory that leverage and liquidity have a positive effect on firm value. Firm size is used as a variable that is considered to strengthen the relationship between leverage and liquidity. However, the results show that firm size is not proven to strengthen the relationship between leverage and liquidity on firm value.



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# INTRODUCTION

The food and beverage sector is one of the important sectors supporting Indonesia's manufacturing growth. This sector contributes to the Gross Domestic Product (GDP) of the non-oil and gas processing industry. Based on data from Statistics Indonesia, in 2016, the GDP of the F&B industry reached IDR Mio 585,786.30 and has a continuous increase every year until IDR Mio 775,098.40 in 2021. In terms of contribution to the GDP of the non-oil and gas processing industry, in 2016 the F&B industry contributed 32.61%. This percentage contribution continuously increases every year until it reaches 37.66% in 2020. But it has decreased by 0.41% in 2021 to 37.25%. Even though it experienced a slight decline, the contribution of the F&B industry still looks consistent. According to a press release (Kementerian Perindustrian Republik Indonesia, 2021), under pandemic conditions in 2020, the F&B industry was still able to grow positively by 1.58%.

The increase of the F&B's GDP and its contribution to the GDP of the non-oil and gas processing industry is not accompanied by an increase in the value of companies in the F&B sector. One indicator that can be used to measure firm value is the closing stock price at the end of the year.

According to (Sudiyatno et al., 2020), changes in stock price reflect changes in company value which investors can consider to make investment decisions. In 2016, the average share price of the F&B sector was at IDR 3,183.75 then experienced a slight decline in 2017 to IDR 3,129.69. Then in 2018-2019, there was a consecutive increase to reach IDR 3,402.19 and IDR 3,584.63. However, in the following two years, there was a significant decline until IDR 3,028.44 in 2021.

Firm value is still an interesting topic to research in recent days. Company value is very important for companies as an indicator used by investors to see the development of company performance from year to year (Tabe et al., 2022). The firm value must be a concern for company management to achieve one of the long-term corporate goals, namely shareholders' welfare. According to the Signaling Theory, a company value that has significantly increased can provide a positive signal to investors. However, this is inversely proportional to the average share price of the F&B industry which tends to experience a downward price trend. Several actors influence the ups and downs of share price, and one of the influencing factors is the financial performance of each company.

One of the factors that affect firm value is leverage. Signaling theory explains that debts are one of the supporting aspects in expanding the company, and are a crucial source of funding (Ichwanudin et al., 2022). Several researchers who have proven that debt has a positive correlation with firm value include (Hirdinis, 2019), (Akhmadi & Robiyanto, 2020), and (Jihadi et al., 2021). However, it is different from research (Ibrahim & Isiaka, 2020), (Huu Luu, 2021), and (Fahri et al., 2022) shows that debt has a negative correlation with firm value because high debt can make companies face the risk of bankruptcy, thereby reducing firm value.

The next factor that affects firm value is liquidity. Signaling theory explains that good liquidity can be a positive signal for investors to invest because the company is considered capable of paying its obligations. Several previous studies have shown the results of a positive influence of liquidity can increase firm value. Some researchers who have proven this positive correlation include (Reschiwati et al., 2019), (Hapsoro & Falih, 2020), and (Agustina, 2020). In contrast to research (Fajaria & Isnalita, 2018), (Ifada et al., 2019) and (Nguyen et al., 2020) show that liquidity has a negative influence on firm value. High liquidity reduces firm value because companies are vulnerable to having idle funds which will reduce company profits.

Company size is one of the variables that is also considered by investors in making investment decisions (Susanti & Restiana, 2018). Large companies are easier to gain investor trust and the products produced are easily recognized by the public, so large assets can support companies in increasing their profits. According to (Akhmadi et al., 2021), large company size is a booster when companies want to borrow funds from external sources because these assets can be used as collateral to creditors. According to (Santosa, 2020), large company assets can be used to pay its debt obligations, thus encouraging an increase in company value.

By the data phenomena and research gaps found regarding factors that affect firm value such as leverage and liquidity, this research will analyze how company size can support to increase in the relationship between leverage and liquidity on firm value in food and beverage companies listed on the Indonesia Stock Exchange for the period 2016-2021 using the Signaling Theory approach. This research is expected to contribute to the field of science by confirming the Signaling theory regarding the relationship between leverage and liquidity to firm value. Then, this study is expected to increase our understanding of the form of moderating variables. The last, companies and investors may use this study's findings as a reference for designing important regulations or policies in making a decision.

# RESEARCH METHOD

**Conceptual Framework**

The proposed research model can be seen in Figure 1, below:

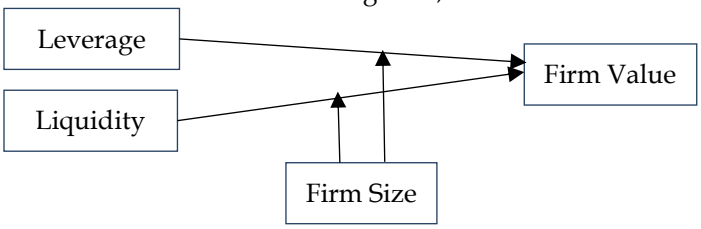


**Figure 1.** Conceptual framework

Figure 1 presented the direct effect of leverage and liquidity on firm value. Then, it also presented the moderation effect of firm size on the relationship between leverage and liquidity to firm value.

**Research Hypotheses**

Based on previous explanations, this study aims to test the following hypotheses:
H1: The higher the leverage, the higher the firm value
H2: The higher the liquidity, the higher the firm value
H3: The higher the firm size, the higher the firm value
H4: Firm size strengthens leverage effect on firm value
H5: Firm size strengthens liquidity effect on firm value

**Population and Sample**

The population used in this study is the food and beverage companies listed on the Indonesian Stock Exchange (IDX) during 2016-2021. Purposive sampling was used to conduct the sampling in this study. The criteria for determining the sample are:

1. The food and beverage companies that were consistently listed in IDX during 2016-2021
2. The food and beverage companies that published financial or annual reports for the 2016-2021 period.

A total sample used is 16 F&B companies listed on the IDX for the period 2016-2021. The data used in this study are secondary data obtained from financial reports and annual reports of F&B companies in 2016-2021. Data testing using the STATA version 17 statistical application.

**Variable Measurement and Empirical Specifications**

**Dependent Variable**

The dependent variable used is firm value. The stock price is used to determine a firm value using the stock price at the end of the year in the form of the natural logarithm (Komara et al., 2020).

**Main Variable**

(a) Leverage

Leverage is a ratio that measures how effective the company is in managing its debt. In this study, the indicator that can be used to measure leverage is the Debt to Equity Ratio (DER), a ratio that measures the debt used by a company by comparing total liabilities to its equity (Jihadi et al., 2021). The robustness test uses Long-term Debt to Equity Ratio (LTDER), which is defined as Long-term debt over the total equity (Uzliawati et al., 2018).

(b) Liquidity

Liquidity is a ratio that measures a company's ability in paying its short-term obligations. In this study, the indicator that can be used to measure liquidity is the Current Ratio (CR), a ratio

comparing current assets with current liabilities (Tumanan & Dyah Ratnawati, 2021). The robustness test uses Quick Ratio (QR), which is calculated by the company's most liquid asset by total current liabilities ((Current Asset-Inventory)/Current Liabilities).

(c) Firm Size

Firm size describes the total assets of the company. It's calculated in millions of IDR then it should be converted into a natural logarithm (Hapsoro & Falih, 2020).

**Control Variable**

The control variable used is company growth. In this study, the indicator that can be used to measure company growth is net profitability (EAT) growth, which is calculated by the difference between the profit of a particular year and the profit of the previous year compared with the net profit of the previous year ($(EAT_t - EAT_{t-1})/EAT_{t-1}$) (Napitupulu, 2019). The control variable in this study is to test the consistency of the results of hypothesis testing on the model research.

**Model Specifications**

This study uses moderation analysis with the following equations:

$$LnSP = \beta0 + \beta1.DER + \beta2.CR + \beta3.LnTA + \beta4.DER*LnTA + \beta5.CR*LnTA + e$$

| | |
|---|---|
| LnSP | = Firm Value |
| β0 | = Constanta |
| β1, β2, β3, β4, β5 | = Regression Coefficient |
| DER | = Leverage |
| CR | = Liquidity |
| LnTA | = Firm Size |
| DER*LnTA | = Interaction between Leverage and Firm Size |
| CR*LnTA | = Interaction between Liquidity and Firm Size |

By following this equation we will examine the direct effect of leverage, liquidity, and firm size on the firm value. We also use this equation to examine the moderating effect of firm size and the form of moderator variable: quasi, or pure moderator by looking at the interaction between the independent variables and the moderator.

# RESULTS AND DISCUSSIONS

**Descriptive Statistics**

The summary of descriptive statistics provides the mean, standard deviation, minimum value, and maximum values for all variables.

**Table 1.** Descriptive statistics

| Variable | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| Ln_SP | 96 | 7.396085 | 1.279449 | 4.867534 | 9.680344 |
| DER | 96 | 1.062746 | 1.587911 | -2.13 | 13.55113 |
| CR | 96 | 2.217576 | 1.620397 | 0.15 | 8.0505 |
| Ln_TA | 96 | 28.94026 | 1.508311 | 27.06581 | 32.82039 |

Based on Table 1, it is shown that the mean (average value) for Firm value which is proxied by the natural logarithm of the stock price (Ln Stock Price) is 7.396 with a standard deviation of 1.279, indicating low diversity in F&B companies' firm values. The minimum value of Ln Stock price is

4.867 and the maximum value is 9.68. Leverage proxied by DER had a mean of 1.062 and 1.587 as the standard deviation, indicating that the ability of F&B companies to manage their debt is similar. The minimum value of DER is -2.13 and the maximum value is 13.551. As a liquidity proxy, CR had a mean of 2.217 and 1.620 as the standard deviation, indicating less heterogeneous data. The minimum value of CR is 0.15 and the maximum value is 8.050. For firm size measurement, the natural logarithm of the total asset (Ln TA) had a mean of 28.940 and 1.508 as the standard value, indicating low diversity in F&B companies' firm values. The minimum value of Ln TA is 27.065 and the maximum value is 32.820.

**Baseline Results**

Table 2 presents the baseline regression results of the hypotheses test. All data variables were winsorized at 1% and 99% levels to mitigate outliers. Based on the results of the analysis, the regression equation can be written as follows:

$$LnSP = -20.3692 + 3.3236.DER + 6.2155.CR + 0.9655.LnTA - 0.1237.DER*LnTA - 0.2111.CR*LnTA + e$$

**Table 2.** Baseline regression results

| | (1) Ln_SP_w |
|---|---|
| _cons | -20.3692*** |
| | (2.2979) |
| DER_w | 3.3236** |
| | (1.0998) |
| CR_w | 6.2155*** |
| | (.7681) |
| Ln_TA_w | .9655*** |
| | (.0823) |
| DERLn_TA_w | -.1237** |
| | (.0412) |
| CRLn_TA_w | -.2111*** |
| | (.027) |
| Observations | 96 |
| R-squared | .4659 |
| Firm Dummy | YES |
| Year dummy | YES |
| Std err clustered by firm and year | YES |

*Standard errors are in parentheses*

**** p<.01, ** p<.05, * p<.1*

Based on the regression result, it can be seen that the coefficient value of leverage which was proxied by the DER variable is 3.3236 and significant at the 5% level. This result indicates that there is a positive relationship between leverage to firm value, it can be concluded that **H1 was accepted**. As the measurement of liquidity, the CR variable showed a coefficient value of 6.2155 and was significant at the 1% level. This result indicates that there is a positive relationship between liquidity to firm value, it can be concluded that **H2 was accepted.** Variabel firm size which is proxied by Ln_TA showed a coefficient value of 0.9655 and was significant at the 1% level. This result indicates that there is a positive relationship between firm size to firm value, it can be concluded that **H3 was accepted.** The interaction between leverage and firm size showed a coefficient value of -0.1237 and

was significant at the 5% level. This result indicates that firm size weakness the effect of leverage on firm value, so it can be concluded that **H4 was rejected.** The interaction between liquidity and firm size showed a coefficient value of -0.2111 and was significant at the 1% level. This result indicates that firm size weakness the effect of leverage on firm value, so it can be concluded that **H5 was rejected.** Based on the result of the 3rd – 5th hypotheses, it can be concluded that firm size acts as a quasi-moderator in the relationship between leverage and liquidity to firm value.

**Robustness Test Results**

The robustness test in this study was conducted to verify the consistency of hypothesis testing results on the baseline model by changing the variable measurement.

**Adding Control Variable to Baseline Model**

We add firm growth as a control variable to the baseline model which is proxied by net profit growth (EAT Growth) and the analysis results can be seen in Column (2) in Table 3 below. By adding a control variable, we found result that leverage and liquidity are positive and significant to firm value similar to the baseline model in Column (1). Net profit growth also had a positive and significant relationship to firm value with a coefficient of 0.0016 and significant at the 10% level., as shown in Column 3. Regarding the moderating role of firm size, we found a similar result with the baseline model that firm size acts as a quasi-moderator in every model. It is shown that firm size had a positive and significant relationship with firm value and had a negative interaction with leverage and liquidity (weakening the relationship to firm value). This can be concluded that the results were robust with adding a control variable.

**Table 3.** Robustness test with adding control variable

| | (1) | (2) |
|---|---|---|
| | Ln_SP_w | Ln_SP_w |
| _cons | -20.3692*** | -22.1476*** |
| | (2.2979) | (2.168) |
| DER_w | 3.3236** | 4.8023*** |
| | (1.0998) | (.9686) |
| CR_w | 6.2155*** | 6.4642*** |
| | (.7681) | (.7375) |
| Ln_TA_w | .9655*** | 1.03*** |
| | (.0823) | (.0766) |
| DERLn_TA_w | -.1237** | -.1776*** |
| | (.0412) | (.035) |
| CRLn_TA_w | -.2111*** | -.2209*** |
| | (.027) | (.0262) |
| EAT_G_w | | .0016* |
| | | (.0008) |
| Observations | 96 | 96 |
| R-squared | .4659 | .4981 |
| Firm Dummy | YES | YES |
| Year dummy | YES | YES |
| Std err clustered by firm and year | YES | YES |

*Standard errors are in parentheses*

**** p<.01, ** p<.05, * p<.1*

**Alternative Leverage, Liquidity, and Firm Size Measurements**

We used Long-Term Debt to Equity Ratio (LTDER) as an alternative leverage measurement, Quick Ratio (QR) as an alternative liquidity measurement, and the natural logarithm of sales (Ln Sales) as an alternative firm size measurement. The analysis results can be seen in Column (2) in Table 4 below and the results remained similar to the main model in Column (1).

Leverage proxied by LTDER had a positive and significant relationship to firm value with a coefficient of 6.5982 and significant at a 10% level. Liquidity proxied by QR had a positive and significant relationship to firm value with a coefficient of 6.1531 and significant at a 1% level. Firm size proxied by Ln Sales had a positive and significant relationship to firm value with a coefficient of 0.8727 and significant at a 1% level. Regarding the moderating role of firm size, we found a similar result with the baseline model that firm size acts as a quasi-moderator in every model in Columns 1-2. It is shown that firm size had a positive and significant relationship with firm value and had a negative interaction with leverage and liquidity (weakening the relationship to firm value). This can be concluded that the results were robust using alternative measurements of leverage, liquidity, and firm size.

**Table 4.** Robustness test with alternative independent variable measurement

| | (1) | (2) |
|---|---|---|
| | Ln_SP_w | Ln_SP_w |
| _cons | -20.3692*** | -17.7234*** |
| | (2.2979) | (2.9894) |
| DER_w | 3.3236** | |
| | (1.0998) | |
| CR_w | 6.2155*** | |
| | (.7681) | |
| Ln_TA_w | .9655*** | |
| | (.0823) | |
| DERLn_TA_w | -.1237** | |
| | (.0412) | |
| CRLn_TA_w | -.2111*** | |
| | (.027) | |
| LTDER_w | | 6.5982* |
| | | (2.6258) |
| QR_w | | 6.1531*** |
| | | (1.1478) |
| Ln_Sales_w | | .8727*** |
| | | (.1039) |
| LTDERLnSales_w | | -.2461** |
| | | (.0901) |
| QRLn_Sales_w | | -.208*** |
| | | (.0401) |
| Observations | 96 | 96 |
| R-squared | .4659 | .5168 |
| Firm Dummy | YES | YES |
| Year dummy | YES | YES |
| Std err clustered by firm and year | YES | YES |

*Standard errors are in parentheses*

**** p<.01, ** p<.05, * p<.1*

**Discussions**

**Effect of Leverage on Firm Value**

The testing result shows that leverage proxied by DER had a positive and significant effect on firm value. This result proved that DER value improvement can increase firm value. This finding is in line with Signaling Theory that leverage had a positive correlation with firm value. Any increase in the debt ratio used for operational activities or company development that can increase company profits can be seen as a positive signal by investors and have an impact on increasing firm value. The result of this study was in line with research conducted by (Hirdinis, 2019), (Akhmadi & Robiyanto, 2020), (Jihadi et al., 2021), and (Tumanan & Dyah Ratnawati, 2021).

**Effect of Liquidity on Firm Value**

The testing result shows that liquidity proxied by CR had a positive and significant effect on firm value. This result proved that CR value improvement can increase firm value. This finding is in line with Signaling Theory that liquidity had a positive correlation with firm value. Firms with good liquidity can provide a positive signal for investors to invest because the firms are considered capable of paying their obligations. The result of this study was in line with research conducted by (Reschiwati et al., 2019), (Hapsoro & Falih, 2020), and (Agustina, 2020), (Jihadi et al., 2021), and (Tumanan & Dyah Ratnawati, 2021).

**Effect of Firm Size on Firm Value**

The testing result shows that firm size proxied by Ln Total Asset had a positive and significant effect on firm value. This result proved that Ln TA value improvement can increase firm value. This finding is in line with Signaling Theory that firm size had a positive correlation with firm value. Large companies are considered more stable to attract investors to invest and have an impact on increasing the firm value. The result of this study was in line with research conducted by (Hapsoro & Falih, 2020), (Nguyen et al., 2020), (Santosa, 2020), (Sudiyatno et al., 2020), and (Tabe et al., 2022).

**Effect of Leverage on Firm Value Moderated by Firm Size**

The testing result shows that firm size had a negative interaction with the leverage effect on firm value. This result proved that firm size is unable to strengthen the leverage effect on firm value. Large companies need large funds for their operational activities so they need external funds. If the debt is not used to increase productivity or expansion that can increase profitability, it will decrease the firm value. The result of this study was in line with research conducted by (Audrey Tunggal & Ngatno, 2018), (Suteja & Abas, 2018), and (Fahri et al., 2022).

**Effect of Liquidity on Firm Value Moderated by Firm Size**

The testing result shows that firm size had a negative interaction with the liquidity effect on firm value. This result proved that firm size is not able to strengthen the liquidity effect on firm value. Large companies that have excess liquidity are considered to have a lot of idle cash which results in low profits and a decrease in firm value. The result of this study was in line with research conducted by (Aji & Atun, 2019).

# CONCLUSION

Based on the proposed model with a signaling theory approach, the result of this study could prove that leverage, liquidity, and firm size can significantly improve firm value. However, this study could not prove that firm size can strengthen the leverage and liquidity effect on firm value. The regression results showed that firm size had a negative interaction with leverage and liquidity effect on firm value. Based on the findings, the limitation of this study is that we only use two independent variables that affect firm value and are limited to one company sector as the sample. We suggest future work to develop the research by adding more variables, the number of samples, and more

research periods to explain the firm value. This study provides several practice implications both for companies and investors. First, our research proves that leverage and liquidity have a significant effect on increasing firm value. Company management needs to maintain the level of the company's leverage, and liquidity consistently because these factors will be considered by investors to make investments. Although firm size can improve firm value, management also needs to well maintain and manage assets well because the firm size could weaken the leverage and liquidity effect on firm value. Second, although leverage and liquidity were proven can improve firm value, investors need to consider these factors and their risks in making investment decisions. The last, this research contributes to the field of science by confirming the Signaling theory regarding the relationship between leverage and liquidity o firm value which is expected to add references for further research.

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