

DEBT TO EQUITY RATIO, DEGREE OF OPERATING LEVERAGE STOCK BETA AND STOCK RETURNS OF FOOD AND BEVERAGES COMPANIES ON THE INDONESIAN STOCK EXCHANGE

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ABSTRACT

This research examines three factors that may have relationships with returns on stock investment. The factors tested under this research are three types of risk associated with a company's capital structure, company's business risk, and market risk of the company's stock.

A company's capital structure is measured by debt to equity ratio, a company's business risk is measured by degree of operating leverage, while the market risk of the company's stock is measured by stock beta. This research focuses on the food and beverages (F&B) industry. The sample firms are F&B firms that are listed on the Indonesian Stock Exchange in the period of 2003-2008.

The results show that there is a positive relationship between debt to equity ratio and stock return; however this result is insignificant statistically. A similar result is found between the degree of operating leverage and stock return. There is a positive significant relationship between the stock beta and stock return. The result also shows that debt to equity ratio, degree of operating leverage, and stock beta all together do not have a significant influence on the stock returns of food and beverage companies on the Indonesian Stock Exchange during 2003-2008.

Keywords: debt to equity ratio, degree of operating leverage, stock beta, stock return.

INTRODUCTION

In investing, there are two things which always become the focus of investor's attention, one is risk and the other is return. Investors always try alternative investments that provide highest returns with a certain level of investment risk. Keown, Martin, Petty and Scott (2005, p193) divide risk into two types, which are

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firm specific or company-unique risk and market-related risk. Company-unique risk might also be called diversifiable risk, because it can be diversified away. This diversified risk is the result of factors that are unique to the particular firm. Market risk is non-diversifiable risk; it cannot be eliminated, no matter how much we diversify.

According to Bhandari (1988), a natural proxy for the risk of common equity of a firm is that firm's debt to equity ratio (DER). An increase in DER of a firm increases the risk of its common equity. The other company risk associated with business operation is measured by degree of operating leverage (DOL). Another risk that investors need to be concerned about is the market risk. The market risk has a strong correlation with a movement of share price of a company or group of companies because of investor expectation of change in expected gain that will be received from such shares.

Based on the explanations above the purpose of this thesis is to test some risk factors that may have influences on stock return. The factors tested under this thesis are three types of risk associated with,

- (1) Company's capital structure, measured by DER;
- (2) Company's business risk, measured by DOL; and
- (3) Market risk of the company's stock, measured by stock beta.

DER and DOL are proxies for a firm's specific risk (diversifiable risk) whilst stock beta is a proxy for market risk (non diversifiable risk)

PROBLEM STATEMENT

The issues that are covered in this thesis include:

1. Are there any relationships between DER, DOL, stock beta and return on stock in the food and beverages industry on the Indonesian Stock Exchange during 2003 – 2008?
2. Do DER, DOL and stock beta, together, affect return on stock in the food and beverages industry on the Indonesian Stock Exchange during 2003 – 2008?

THEORITICAL FOUNDATION

Debt to Equity Ratio

According to Ross, Westerfield and Randolph (2002, p80), DER is a proxy for estimating the level of leverage of a company. A company with high DER may provide higher returns to its shareholders, in line with the risk that is faced by the company compared to other companies with lower DER.

$$\text{Debt to Equity} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

According to Werner and Jones (2004, p480), DER shows a proportional relationship between debt and equity. A lower DER means that total debt is relatively lower compared to total equity.

The DER of a company are evaluated from a few perspectives, namely (1) the DER of comparable companies, (2) At which business stage the company is in (new companies tend to have more debt), (3) Company's policy that considers the optimum level of debt financing.

According to Bhandari (1988), a natural proxy for the risk of common equity of a firm is that firm's (DER). An increase in the DER of a firm increases the risk of its common equity, measuring risk in any reasonable way. Though it does not follow that, cross-sectionally, the common equity of a higher DER firm always has higher risk and DER is expected to be positively correlated to the risk of common equity across firms. Therefore, DER is proposed as an additional variable to explain the expected common stock returns.

Degree of Operating Leverage

Garrison and Noreen (2003) define operating leverage as the degree of response of earnings to changes in sales revenues. It expresses the possibility of a more than proportional increase on operating earnings with respect to a raise in sales, working as an amplifier.

DOL is a function of a company's capital structure, fixed costs and total costs. As has been mentioned by Damodaran (2001, p202): "A firm that has high fixed costs relative to total costs is said to have high operating leverage. A firm with high operating leverage will also have higher variability in operating income than would a firm producing a similar product with low operating leverage. Other things remaining equal, the higher variance in operating income will lead to a higher beta of a firm with a high operating leverage".

Moyer, McGuigan, and Kretlow (1981) also associate risk with operating leverage, demonstrating this relationship based on the following rationale; if the DOL is the firm's earning response to changes on the sales level, the higher the DOL of a firm, the higher the change in the operating earnings for a given change on sales will be. Hence, *ceteris paribus*, the higher the DOL of a firm, the higher the operating risk level. In practice, the risk of installed capacity becomes perceptible when instead of an increase in revenue volume, a decrease is observed. In this case, the operating leverage mechanism acts inversely, amplifying losses. For a high DOL structure, a growth in revenue may result in high operating gains, in the same way that a reduction in revenue may lead to large operating losses.

$$DOL = \frac{\% \text{ Change in Operating Profit}}{\% \text{ Change in Sales}}$$

According to Martikainen (1993), considering the association between operating leverage and systematic risk of stocks, between risk and stock returns, and between systematic risk and stock returns, it should be logical to infer an association between the DOL and stock returns. Besides, considering the positive theoretical relationship between systematic risk and operating leverage, one should expect a positive relation between stock returns and operating leverage for a given firm.

Beta

Systematic risk or undiversified risk is also called market risk. This risk has a relationship with market conditions in general, for example a change in macroeconomic conditions, interest rate risk, political risk, inflation risk, foreign exchange risk and market risk. These risks affect all companies and therefore cannot be eliminated with diversification. The parameter used to estimate systematic risk is beta.

According to Houston and Brigham (2004, p189) “Beta coefficient, a measure of market risk, which is the extent to which the returns on a given stock move with the stock market”. Scott, Martin, Petty, and Keown (2005, p199) define beta as “Beta, a measure of the relationship between an investment’s return and the market’s returns. This is a measure of the investment’s non diversifiable risk.”

Beta is used to calculate the return on investment in stocks compared to market return. Beta is also used to measure the sensitivity of individual stock returns with the market return in general. In summary, it can be concluded that:

- Company with beta = 1, indicates that the risk of investment is equal to average market risk. The stock price fluctuates in line with the market fluctuation.
- Company with beta > 1, indicates the risk of investment is higher than the average market risk.
- Company with beta < 1, indicates the risk of investment is lower than the average market risk.

It can be concluded that beta is a tool to measure volatility of the systematic risk of stocks. The beta of stocks can be measured using historical data as well as subjective estimation. Historical beta can be calculated using historical data from the market, i.e stock returns and market returns.

Systematically, according to Bodie (2005, p166), beta can be calculated using the following formula:

$$\beta = \frac{N \sum XY - (\sum X) (\sum Y)}{N \sum X^2 - (\sum X)^2}$$

X = Market Returns (R_m)

Y = Stock Returns (R_i)

N = number of observations

β = Stock Beta

RESEARCH METHOD

An investor needs to consider the risk and return factors of investing in stocks. Those factors will encourage investors to find the best methodology that can give the best explanation of the relationship between risk and return. One of the commonly used approaches is the Capital Asset Pricing Model (CAPM) that considers beta (β) that represents market risk. Beta shows volatility of a relationship between individual stock returns and market returns (Composite Index). The higher the beta, the higher the risk of stock price fluctuation compared to composite index.

Investors also need to consider the company capital structure that consists of debt and equity used by the company to finance its assets. The use of debt may result in a higher tax shield which in turn results in higher net income. However, the use of debt will also be deemed as risky, which will increase the investor's expected returns on the company.

Data collection and analysis method

In this research, data required are stock prices of food and beverage companies listed on the Jakarta Stock Index during 2003 – 2008. From each stock, the data required is the closing price at each end of year during 2003 – 2008.

The annual financial report of each company during 2003 – 2008 is also required. All data is obtained from the Indonesian Stock Exchange.

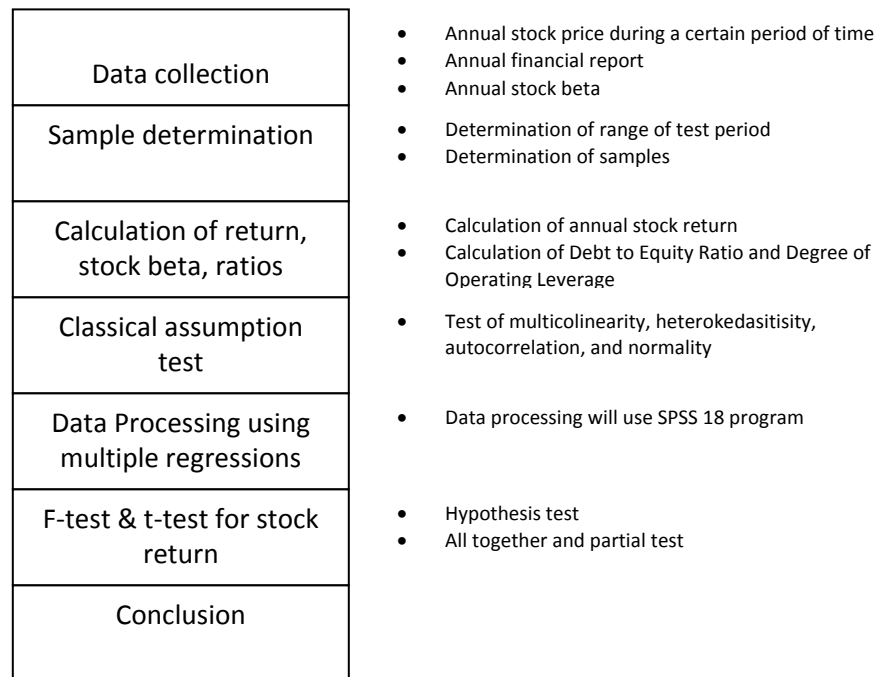


Figure 1. Data collection and analysis framework

Population and Samples

Population for this research are food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008, (i.e 18 companies). Amongst this population, 6 companies have negative equity and therefore have been excluded. As a result the samples used in this research total 12 companies.

Hypothesis

This research is conducted with an initial estimation that there is an influence of independent variables on dependent variables. The hypotheses that will be tested in this research are as follow:

1. H_0 : There is no influence of DER, DOL and Stock Beta all together on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008.
 H_1 : There is an influence of DER, DOL and Stock Beta all together on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008. DER, DOL, and Stock Beta all together are expected to have a significant and positive relationship with stock return.
2. H_0 : There is no partial influence of DER on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008.
 H_1 : There is a partial influence of DER on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008. DER is expected to have a significant and positive relationship with stock returns.
3. H_0 : There is no partial influence of DOL on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008.
 H_1 : There is a partial influence of DOL to the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008. DOL is expected to have a significant and positive relationship with stock returns.
4. H_0 : There is no partial influence of stock beta to the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008.
 H_1 : There is a partial influence of stock beta on the stock returns of food and beverage companies listed on the Indonesian Stock Exchange during 2003 – 2008. Stock beta is expected to have a significant and positive relationship with stock returns.

Variables Measurement

Stock returns that are used in this research are obtained by calculating the annual closing stock price at the end of each year. The formula to calculate annual stock return is as follows:

$$R_i = \frac{P_i - P_{i-1}}{P_{i-1}}$$

R_i = Stock Return at year i
 P_i = Stock price at year i
 P_{i-1} = Stock price at $i-1$ period

DER is calculated using the proportion of total debt to total assets. The formula to calculate DER is as follows:

$$\text{Debt to Equity} = \frac{\text{Long Term Debt}}{\text{Total Equity}}$$

DER represents the capital structure of a company, which can be used to analyze the risk of default of certain debt.

DOL is calculated using the proportion of change in EBIT to change in sales. The formula to calculate DOL is as follows:

$$DOL = \frac{\% \text{ Change in Operating Profit}}{\% \text{ Change in Sales}}$$

A company with high operating leverage means that the company's operating income is sensitive to change in sales. A higher variance of operating income means a higher beta.

Stock beta is calculated using linear regression between individual stock prices and the Jakarta Composite Index. Stock beta is used to measure the relationship between stock return and market return. Beta represents systematic risk that cannot be eliminated by diversification. However, to have a more accurate beta calculation, the author applies beta obtained from Bloomberg in this research.

Research model

To find out the influence of independent variables, i.e DER, DOL, and Stock Beta to dependent variable, i.e stock return, the hypothesis test will be using multiple regression analysis as follow:

$$R_i = b_0 + b_1 \text{DER}_i + b_2 \text{DOL}_i + b_3 \beta_i + \varepsilon \quad (1)$$

Where,

R_i = Stock return company i
 DER = Debt to Equity Ratio
 DOL = Degree of Operating Leverage
 B = Stock Beta
 ε = error term

The t-test of each coefficient regression will be conducted to test using the t-test whether the coefficients are statistically different to zero

F-Test

The F-test is used to test the validity of the research model. The hypothesis that are used are:

- $F_{\text{calculated}} > F_{\text{table}}$ then H_0 rejected, means that the research model is valid
- $F_{\text{calculated}} < F_{\text{table}}$ then H_0 accepted, means that the research model is not valid

RESEARCH RESULTS AND ANALYSIS

The results of the descriptive statistics calculation for independent variables (DER, DOL, and Beta) and dependent variables (stock return) of 12 food and beverage companies for 2003-2008 periods are as follow:

Table 1. Descriptive Statistics

| | Mean | Std. Deviation | N |
|--------|--------|----------------|----|
| Return | .3492 | 1.06343 | 65 |
| DER | .5805 | .54192 | 65 |
| DOL | 1.3680 | 3.11381 | 65 |
| Beta | .5852 | .45627 | 65 |

The mean of return is 0.3492. This implies that investors who held the F&B stocks listed in IDX during 2003-2008 got an average return on investment of 34.92%. The mean of DER is 0.5805. This implies that F&B companies had an average DER of 0.5805 during 2003-2008. The mean of DOL is 1.3680. This implies that F&B companies had an average DOL of 1.3680 during 2003-2008. The mean of Beta is 0.5852. This implies that F&B companies had an average Beta of 0.5852 during 2003-2008.

Based on the ANOVA table above, F resulted in 0.381 with a significance level of 0.767. The significance level is higher than the probability figures ($\alpha = 0.05$).

Table 2. ANOVA

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|------|-------------------|
| 1 | Regression | 1.332 | 3 | .444 | .381 | .767 ^a |
| | Residual | 71.044 | 61 | 1.165 | | |
| | Total | 72.376 | 64 | | | |

Hence the (H_0) is accepted. This shows that the independent variables (DER, DOL, and Beta) together do not have a significant impact on the stock return. In other words, the research model is not valid.

Table 3. Regression Analysis Result

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-------|------------|-----------------------------|------------|---------------------------|------|------|-------------------------|-------|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .205 | .235 | | .869 | .388 | | |
| | DER | .067 | .282 | .034 | .239 | .812 | .780 | 1.282 |
| | DOL | .040 | .043 | .118 | .928 | .357 | .997 | 1.003 |
| | Beta | .086 | .335 | .037 | .258 | .798 | .779 | 1.283 |

a. Dependent Variable: Return

For the DER constant, with the value of t calculated $< t$ table ($0,239 < 1,9983$) then H_0 is accepted. Thus, it means that there is no influence of DER on stock return. Since the value of the DER coefficient is positive, then it means that if the value of DER is increasing then the value of the stock return is increasing, however it is insignificant. This result is in line with the previous research performed by Bhandari (1988) that there is a positive relationship between DER and stock return. An increase in DER of a firm increases the risk of its common equity. With a higher degree of risk, the expected return is also higher.

However there is a difference between this research and research performed by Bhandari, whereby this research concludes that there is no significant influence between DER and stock return whilst the research performed by Bhandari suggests the opposite.

For the DOL constant, with the value of t calculated $< t$ table ($0,928 < 1,9983$) then H_0 is accepted. Thus, it means that there is no influence from DOL to stock return. Since the value of the DOL coefficient is positive, then it means that if the

value of DOL is increasing then the value of stock return is also increasing, however, it is insignificant, so it can be concluded that stock return is not influenced by DOL. This result is in line with the research performed by De Medeiros (2006) on the influence of DOL on stock returns of firms listed on the Brazilian Stock Market. There is evidence that there is a positive relationship between DOL and Stock Return. The conclusion of research performed by De Medeiros was in accordance with the theoretical relationship between stock price and DOL that should be positive, based on the association between risk and stock returns.

Theoretically, considering the association between operating leverage and systematic risk of stocks, between risk and stock returns, and between systematic risk and stock returns, it should be logical to infer an association between the DOL and stock returns (Martikainen, 1993). In addition, Lev (1974) concludes that when the DOL increases (decreases), the volatility of stock returns also increases (decreases).

However there is a difference between this research and research performed by De Medeiros, whereby this research concludes that there is no significant influence between DOL and stock return whilst the research performed by De Medeiros suggests the opposite.

For the Beta constant, with the value of $-t$ calculated $< -t$ table ($0,258 < 1,9983$) then H_0 is accepted. Thus, it means that there is no influence between Beta and stock return. Since the value of t -calculated is positive, then it means that if the value of Beta is increasing then the value of stock return is increasing. This condition is in line with CAPM theory that considers beta (β) that represents market risk. CAPM theory suggests that the return of a particular stock is positively related to its beta, that is the higher the beta, the higher the return.

From the above Model Summary, it can be concluded that the value of determination coefficient (R^2) simultaneously is 0.018. This means that 1.8% of stock return is affected by independent variables DER, DOL and Beta. The remaining 98.2% is affected by other variables that are not included in this research.

CONCLUSIONS

Based on the research that has been conducted, it can be concluded that:

1. There is a partial positive correlation between DER and stock return of food and beverage companies on the Indonesian Stock Exchange during 2003-2008. However, with a level of significance of 5%, the influence of DER to stock return is insignificant.
2. There is a partial positive correlation between DOL and stock return of food and beverage companies on the Indonesian Stock Exchange during 2003-2008 in partial. However, with a level of significance of 5%, the influence of DOL to stock return is insignificant.
3. There is a partial positive correlation between stock beta and stock return of food and beverage companies on the Indonesian Stock Exchange during 2003-2008.

However with a level of significance of 5%, the influence of stock beta to stock return is insignificant.

4. DER, DOL, and stock beta all together with a level of significance of 5%, do not have a significant influence on the stock return of food and beverage companies on the Indonesian Stock Exchange during 2003-2008.

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