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Estimation and Determinants of the Stock Price Haircuts on the IDX

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ABSTRACT: This study aimed to investigate the stock price haircut, so called estimating and determining the stock price haircut on the Jakarta Stock Exchange for the period of 2018 - 2021. Document. This study used 30 shares from the LQ-45 Index. The calculation of the haircut used Merton method, namely Distance to Default. Determining the stock price haircut used multiple regression. The results of this study state that the Debt to Equity Ratio, Liquidity and the Covid-19 Era significantly effect the stock price haircuts.

KEYWORDS: Haircut Price, Determinant Haircut, LQ45 Stocks, Distance to Default, Debt to Equity Ratio, Cash Ratio, Stock Liquidity, Multiple Regression Panel Method.

I. INTRODUCTION

The stock price on the stock exchange becomes a benchmark for several parties in carrying out transactions on the stocks. If the fund owners want to buy stock in large quantities, the fund owners always ask for discounts. Meanwhile, the parties who are only ordinary shareholders can buy the stocks on the market at market prices such as on the stock exchange. If there is a discount, there is also a need to understand how much the discount is.

The Indonesia Stock Exchange (IDX) requires all securities companies to report daily MKBD (Adjusted Net Working Capital) before making transactions on the stock exchange in accordance with Financial Services Authority Regulation / OJK No. 52 /POJK.04/2020 Concerning Maintenance and Reporting of Adjusted Net Working Capital. The submission of the MKBD is in the context of the size of the transactions to be carried out by the securities companies. The contents of MKBD submitted are all the stocks of the securities companies. Yesterday's stock prices (closing prices) are of course the same with the today's stock price, they could also go up or down. Usually the price used is yesterday's price by subtracting the fair values which becomes a decrease. The need for yesterday's price to be decreased is in the context of risk management by the Indonesia Stock Exchange (IDX), so the IDX does not experience excesses of the securities company transactions.

A reduction in the stock price from the yesterday's stock price for the purpose of underwriting the stock is better known as haircut price and is also often used in several stock exchanges in the world. Haircut price is very important for the IDX and also securities companies to state the amount of each transaction to be carried out. The haircut price is widely used by various parties, so the investors and securities companies have prudence in the executed transactions. The benefits of having a haircut value can also increase market liquidity as well as to maintain a conducive stock market and the transactions run regularly, fairly, and efficiently.

Haircut price estimation is an interesting discussion for academics and practitioners as well as the government as a decision maker. Haircut Price estimation can be done using the Option method and the Merton method, Manurung (2007). Zanah (2022) estimated the stock price haircuts using the Merton model known as Distance Default. Zannah (2022) also tested the influences of the cash ratio and debt to equity ratio on haircuts on the stock prices on the stock exchange.

This study is still very limited, so this study used price haircuts data calculated by Zannah (2022) and improved the existing data. The data period of this study is for 2018 to 2021. Along this period, there was the Covid-19 pandemic and it was applied as the dummy variable in the model.

II. THEORY REVIEW

Stock prices haircuts can be estimated using relative, discounted and contingent claim approaches (Koller *et. al*., 2020 and Ohlson, 1990; 1995). The relative approach is carried out by comparing the stock price ratio with other variables and also among

comparable companies. The discounted approach determines stock prices by discounting the future earnings or dividends to obtain today's value, Gordon (1962). The contingent claim approach is an approach to calculate the stock prices that uses options on the future information. Many parties often use the relative approach and discounted approach.

Further, stock prices can be expressed in the form of a rate of return using the form of a market model with the formula as follows:

$$E(R_i) = \alpha + \beta * R_m + \varepsilon \quad (1)$$

In the above equation (1), α represents the company's fundamental value and β * Rm is called market sentiment and ε is the error term or often called idiosyncratic error.

Subsequently, Sharpe (1964), Lintner (1965) and Mossin (1966) as academics introduced the Capital Asset Pricing Model (CAPM) with the formula as follows:

$$E(R_j) = Rf + \beta_j * [E(Rm) - Rf] + \varepsilon \quad (2)$$

where Rf is the risk-free interest rate, βj is the market risk of the j-th stock and Rm is the market rate of return and ε = error term or Idiosyncratic risk or noise trading.

Fama and French (1993) introduced a three-factor model with the formula as follows:

$$E(Rj) = Rf + \beta j * [E(Rm) - Rf] + \gamma * SBM j + \lambda * HMLj + \varepsilon \quad (3)$$

where SBM is the difference between the rate of return of small stock portfolio and large stock portfolio with the same weighted average of book value to market value. HML is the difference each month between the average rate of return on portfolios in the high BE/ME group and the average rate of return on low BE/ME portfolios.

Carhart (1997) introduced a four-factor model that uses a variable as a fourth factor, namely Momentum (introduced by Jagadesh and Titman) with the formula as follows:

$$E(Rj) = Rf + \beta j * [E(Rm) - Rf] + \gamma * SBM j + \lambda * HMLj + \delta * Mom + \varepsilon \quad (4)$$

where Mom is momentum.

Fama and French (2015) introduced the five-factor model with the formula follows:

$$E(R_j) = R_f + \beta_j\{E(R_m) - R_f\} + \gamma_j SMB + \delta_j HML + \phi_j RMW + \partial_j CMA + \varepsilon \quad (5)$$

ε is error term or idiosyncratic risk or noise trading for equation.

Meanwhile, the six factor model that introduced by Roy and Shijin (2018) has the formula as follows:

$$E(R_j) = R_f + \beta_j\{E(R_m) - R_f\} + \gamma_j SMB + \delta_j HML + \phi_j RMW + \partial_j CMA + \vartheta LBR + \varepsilon \quad (6)$$

III. METHODOLOGY

In conducting this study, there were 2 methods applied, firstly, estimating the stock price haircuts using Merton method, namely Distance to Default (DD). The estimation of Distance to Default applies the formula as follows:

$$DD_{i,t} = \frac{E\{F(t) - d^*)}{\sigma_F} = \frac{Ln(F(t)/D) + (r - (0.5 * \sigma_F^2) * (T - t)}{\sigma_F \sqrt{T - t}}$$

Where,

d* = *Short term debt + (0.5*long term debt).*

F(t) = Total company assets.

σF = The volatility of the company's asset which is estimated from the volatility of the company's stock price.

The value of the probability to default can be calculated by applying the formula as follows:

$$PD(t) = P[F(t) \leq D] = N(-DD) = N\left[-\frac{Ln(F(t)/D) + (r - (0.5 * \sigma_F^2) * (T - t)}{\sigma_F \sqrt{T - t}}\right]$$

The value of PD (t) is the haircut price of the stocks submitted by the securities companies to the IDX.

This model applied in this study can be written as follows:

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$$HCP_{i,t} = a_0 + b_1 CR_{i,t} + b_2 DER_{i,t} + b_3 Liq + \varepsilon$$

$HCP_{i,t}$ = Stock haircut price of the company i in the period of t.
$CR_{i,t}$ = Current ratio of the company t in the period of t.
$DER_{i,t}$ = Debt to equity ratio of the company i in the period of t.
a_0 = Intercept.
b_1, b_2, b_3 = Regression coefficient.

The estimation of the regression coefficient uses a data panel model. Based on Judge (1982), Wooldrige (2002), Biorn (2017) and Sul (2019) stated that the sample selection was not random, the model used was the fixed effect of the data panel model. So this study uses the fixed effect of the data panel mode.

Operationalization Variables

Based on the previous description, this study will use the variables of Cash Ratio, Debt to Equity Ratio and Stock Liquidity as well as the Covid period as dummy variable that affect stock price haircuts. The operationalization of these variables will then be elaborated as follows:

Cash Ratio

Based on White (2003), the cash ratio is the company's ability to pay the company's liabilities. The formula for this ratio is as follows:

$$CSR_{i,t} = \frac{Cash\ of\ the\ company\ i\ in\ the\ period\ t}{Total\ liability\ of\ \ the\ company\ i\ in\ the\ period\ t}$$

The ratios are always compared to the proportionate companies of the same industry in order to analyze the company's liquidity.

Debt to Equity Ratio

According to White (2003), this ratio is an indicator of company leverage and looks into the company's ability to pay its debts. The formula for this ratio is as follows:

$$DER_{i,t} = \frac{Debt\ of\ the\ company\ i\ in\ the\ period\ of\ t}{Total\ equity\ of\ the\ company\ i\ in\ the\ period\ of\ t}$$

This ratio is expected to have a value of 2 times, but if the funding sequence theory is used, the value of this ratio can be up to 99 times. This 99 times figure states that the debt is 99 and the equity is 1.

Stock Liquidity

Stock liquidity ratio in this study is calculated using the formula as follows:

$$Liq_{i,t} = \frac{Volume\ \ of\ stock\ transaction\ i\ in\ the\ period\ of\ t}{Total\ Volume\ of\ stock\ transaction\ in\ the\ period\ t}$$

This ratio is expected to have a negative correlation with the stock price haircut on the IDX.

Covid-19

In this study, there is a variable included to differentiate between the Covid-19 period and the non-Covid-19 period, as the period of this study is in the year of 2018 to 2021, where the years of 2020 and 2021 are the COVID-19 period. The Covid-19 period in 2020 and 2021 is given a value of 1, whereas the non-Covid-19 period is given a value of 0.

Data Source

This study uses the data of short-term and long-term debt obtained from the companies' financial statements selected as sample. The stock price and stock liquidity data were obtained from the IDX. The Current Ratio (CR) and Debt to Equity Ratio (DER) are also obtained from the company's financial statements. The stock price haircuts data obtained from the study done by Zannah (2022).

IV. RESULTS AND DISCUSSION

The analysis was carried out and also became a discussion, starting with descriptive analysis and continuing with causality analysis.

Statistic Descriptive

This subsection will discuss data behavior or often called Descriptive Statistics of this study.

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	Haircuts	DER	CDR	Liquidity
Minimum	0.0000	0.0000	0.0419	0.0001
Maximum	0.6062	8.5100	450.9151	0.0574
Median	0.0211	0.4750	1.2476	0.0078
Average	0.1193	0.7539	15.5969	0.0107
Stdev	0.1628	1.1203	57.8272	0.0104
Skewness	1.2839	4.4778	6.3293	2.5145
Kurtosis	0.4884	25.1737	43.1105	7.2779
Jarque Berra	64.5079	2859.3657	8845.4441	217.9535

Refer to the data of Table 1 above, it can be previewed that the minimum stock price haircuts is zero, the maximum value is 60.62%, the median value is 2.11%, and the average value is 11.93% followed by the standard deviation value of 16.28%. The median figure states that the haircut values of most stock prices are below 2.11% or quite small. The stock price discounts on the IDX are still quite small and can even be predicted precisely. If we compare the stock price haircuts before and during the Covid-19 pandemic, the stock price haircuts during the Covid-19 pandemic are higher and the differences are significant. These results also state that the values do not exceed 10%, Manurung (1995).

Debt to Equity ratio (DER) has the minimum value of 0%, the maximum value is 8.5 times; the median value is 0.475 times, and the average value is 0.7539 times followed by the standard deviation value of 112.03%. This describes that the variations of the ratios are quite high and most of the ratios are still at the levels below 0.7539 times.

The company's cash to debt ratio (CDR) has the minimum value of 4.19%, the maximum value is 45.000%, the median value is 124.76%, and the average value is 1559.68% followed by standard deviation value of 5782.72%. The figures show that there are variations in CDR data which are quite high or very varied.

The stock liquidity ratio on the stock exchange has the minimum value of 0.01%, the maximum value is 5.74%, the median value is 0.78%, the average value is 1.07% followed by the standard deviation value of 1.04%. The stock liquidity data on the stock exchange appears to have very little variations and are below 1%. The figures indicate that the stock price discounts will be small during the period of the study.

The previous description shows that the Covid-19 pandemic has also increased the value of haircuts, stock prices, DER, CDR and company liquidity.

Causality Analysis

In this analysis, the discussion looks for the causalities of several variables that affect the haircuts of the stock prices on the IDX. The estimation results of the fixed effects of the data panel model are shown in the equation (1) below.

The equation (1) reflects that CDR, DER, Liquidity and Covid-19 influence the haircuts of the stock prices as follows:

$$HC_{i,t} = 0{,}12 - 0.0000384\ CDR_{i,t} - 0.0533\ DER_{i,t} + 2{,}537\ LIQ_{i,t} + 0{,}0292\ Covid_t$$
$$\qquad\qquad\qquad\quad (-0{,}432) \qquad (-5{,}230) \qquad (4{,}291) \qquad (4{,}552)$$

R^2 = 95,23%.

F = 52,02

Equation (1) shows an R^2 of 95.23% which means that the variations in the independent variables (CDR, DER, LIQ, and COVID-19) can explain the variations in the haircut variable of 95.23%, the rest is explained by other variables (outside the four independent variables). The value of F = 52.02 states that model (1) is shown to be significant and means that the model can be used.

The debt to equity ratio significantly influences the stock price haircuts and the effect is negative. This means that the higher the DER ratio, the smaller the value of the stock price haircuts and this is not in line with the expectations where the effects must be positive. This explains that the greater the company's debt, the higher the haircuts. The company's high debt makes the stock price haircuts become smaller, which means that the other parties believe in the company and that the company's going concern will run well.

Stock liquidity at the IDX has a positive influence on the stock price haircuts and is significant based on the significant level of 1%. The positive empirical results are not in accordance with the expectations where the effects should be negative which means the more liquid, the haircuts are getting smaller. The obtained results are different from the expectations. It can be

explained that the higher the stock liquidity, the greater the possibility of the expected discounts. The expected amount of discounts are due to the certainty that the desired liquidity will occur.

The equation above also shows that the Covid-19 variable has a very positive and significant effect on the error rate of 1%. The Covid-19 that occurred also caused the stock price haircuts increased because the investors would ask for a bigger price discounts. Such condition proves that this study also finds that the cash to liabilities ratios have not significant influence on the stock price haircuts on the IDX.

V. CONCLUSION

Based on the previous descriptions, it can be concluded that:

a. The discounts on the stock prices on the IDX obtained by calculating the distance default that produces generally small value
   below 10%.
b. The determining variables of the stock price haircuts are the Debt to Equity Ratio (DER), Stock Liquidity as well as in the Covid-19 pandemic period.

VI. ACKNOWLEDGMENT

We are very grateful to various parties that have contributed to the process of accomplishing this study, especially the IDX as the source of secondary data used according to the analysis period of this study. We do hope that there will be more studies done in the field of the stock price haircuts. It is quite important to enrich the existing perspective on this topic.

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ATTACHMENT

Dependent Variable: HC?
Method: Pooled EGLS (Cross-section weights)
Date: 09/05/22 Time: 14:55
Sample: 2018 2021
Included observations: 4
Cross-sections included: 30
Total pool (balanced) observations: 120
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.120041	0.009828	12.21405	0.0000
CSR?	-2.84E-05	6.58E-05	-0.432100	0.6668
DER?	-0.053291	0.010189	-5.230006	0.0000
LIQ?	2.356990	0.549242	4.291348	0.0000
COVID	0.029201	0.006414	4.552494	0.0000
Fixed Effects (Cross)				
_1--C	-0.081457			
_2--C	-0.080309			
_3--C	0.041976			
_4--C	-0.108608			
_5--C	-0.046336			
_6--C	-0.061538			
_7--C	-0.042791			
_8--C	-0.141230			
_9--C	-0.152035			
_10--C	-0.115682			
_11--C	-0.148342			
_12--C	0.013234			
_13--C	0.000892			
_14--C	-0.145117			
_15--C	0.303977			
_16--C	0.195344			
_17--C	0.070073			
_18--C	0.097007			
_19--C	-0.154344			
_20--C	0.208640			
_21--C	-0.005928			
_22--C	-0.027908			
_23--C	0.067287			
_24--C	-0.198271			
_25--C	0.498044			
_26--C	-0.110994			
_27--C	-0.149201			
_28--C	-0.135843			
_29--C	0.006425			
_30--C	0.403036			

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.952293	Mean dependent var	0.171667
Adjusted R-squared	0.933986	S.D. dependent var	0.352118
S.E. of regression	0.094666	Sum squared resid	0.770702
F-statistic	52.01977	Durbin-Watson stat	2.446073
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.722776	Mean dependent var	0.119323
Sum squared resid	0.873855	Durbin-Watson stat	2.624965