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Analysis of the Effect of MAX Return on Expected Return in Indonesian Stocks Exchange

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ABSTRACT: *This study aims to analyze the influences of MAX returns on the expected returns of stocks listed in the KOMPAS 100 Index of the Indonesia Stock Exchange from 2012 to 2021. The control variables in this study were the market beta, market capitalization, book-to-market ratio, short-term reversal, and idiosyncratic volatility. This study used a quantitative approach with the technique of purposive sampling. The samples are companies listed and settled in the KOMPAS100 Index of the Indonesia Stock Exchange from 2012 through 2021. The samples used in the study consisted of 45 companies. The data in this study was panel data, consisting of time series and cross-section. This study had 1 model using a cross-section regression technique. This study showed a significant negative influence between the MAX and expected returns. Hence, investors on the Indonesia Stock Exchange preferred buying stocks that experienced extremely positive returns in the hopes of getting high returns. However, they had a small probability and a higher risk level. Thus, it could be concluded that investors in the Indonesian Stock Exchange tended to buy stocks like a lottery.*

Keywords:*MAX Return, Expected Return, MAX effect, market anomaly.*

I. INTRODUCTION

The concept of capital market efficiency continues to be an interesting topic of discussion among financial researchers and practitioners. Several studies empirically prove the truth of the efficient marketing concept known as EMH (Efficient *Market hypothesis)* (Kasdjan et al., 2017). According to the EMH theory, real investors do not get unfair returns from stocks because stock prices fluctuate and reflect perfect information. According to this theory, predicting future prices based on past prices is impossible.

Although the concept of an efficient market states that stock prices will fluctuate randomly and cannot be predicted, in reality, some patterns occur in the stock market. This becomes the basis for individual and institutional investors to calculate the expected rate of *return.The expected return* is the profit or loss anticipated by investors on an investment whose historical rate of return has been known (Martin, 2017). It is calculated by multiplying the potential outcomes by the odds and adding up the results. *The expected return* determines whether an investment has a positive or negative average net return. Given its potential return in different scenarios, its value is calculated as an investment's expected value (expected *value). Expected returns* are usually based on historical data and are not guaranteed for the future. However, *an expected return* can be a reasonable basis for estimating the expected return on investment. Therefore, *the expected return* is a weighted average of long-term historical returns.

Besides calculating *the expected return,* investors can also calculate stock returns realized with *MAX return.MAX return* is the highest *return value* achieved by the investment during the investment period (Bali et al., 2011). *MAX return* is a concept used in financial analysis to evaluate investment performance. *MAX return* provides information about how much maximum profit can be obtained from an investment during the investment period. The higher the *MAX return value,* the greater the possible profit that can be obtained from the investment. So, the level of *MAX return* is influenced by stock returns. In the stock market, there are cases where a stock experiences *an extreme return,* affecting *the MAX return.Extreme return* is a return on investment that is very high or very low compared to the average return on investment in general. *Extreme returns* usually occur when significant changes occur in the market, such as economic turmoil or drastic political changes. *Extreme Return* can be an important indicator for investors in making investment decisions because itcan provide information about the level of risk and potential benefits of an investment. However, keep in mind that *extreme returns* only sometimes occur regularly, and there is no guarantee that *extreme returns* will continue to occur in the future. Therefore, *extreme returns* can be considered a market deviation that breaks the EMH theory.

This deviation is referred to as a market anomaly. According to Kasdjan et al. (2017), market anomalies are unexpected occurrences or events that allow shareholders to achieve an abnormal return on equity. The existence of anomalies in the capital market can be caused by several things, such as imperfections in the market structure, considerable strength from deviant behavior by trading investors (behavioral *finance),* and capital market theoretical references used by investors in implementing investment strategies that are inadequate and can lead to errors and inconsistencies in capital market assessments (Reilly in Yanuarta, 2012).

According to Alteza (2007), there are four types of market anomalies known in the economics literature: firm anomalies (firm *anomalies),* seasonal anomalies (seasonal *anomalies),* event anomalies (event *anomalies),* and accounting anomalies (accounting *anomalies).* A market is considered abnormal if the formation and repetition of predictable patterns or changes occur at a certain point in time. At a certain point, stock price movements follow a pattern and are no longer random,so anomalies cause investors to make predictions.

One of the event anomalies (event *anomalies)* is *MAX effect.* A recent study by Bali et al. (2011) shows that extreme positive returns play a role in *the cross-sectional* pricing of US stocks. After measuring a stock's extreme return as the maximum daily return over the previous month (MAX), Bali et al. (2011) documented a clear negative relationship between month t MAX and month t+1 stock returns. The MAX effect is statistically and economically significant, with portfolios taking *long* (short*)* positions in low (high) MAX stocks generating risk-adjusted returns of over 1% per month.

Several recent studies have examined the potential impact of "gambling" and speculation on stock *returns.* For example, studies by Kumar (2009) find that individual investors tend to favor stocks with high volatility and high *skewness* and low prices, such as lottery stocks, which generate significant negative *returns* for those stocks. This phenomenon is in line with the cumulative prospect theory (Cumulative *Prospects Theory)* proposed by Tversky & Kahneman (1992) and explained by Barberis& Huang (2001), which shows that errors in valuing stocks that have a slight tendency to produce extremely positive *returns.* Several other studies have also shown that investors tend to focus too much on flashy stocks, such as stocks with unusual trading volumes and extreme daily *returns, increasing the tendency to play the "gamble* ."Other studies by Brunnermeier et al. (2007) show that investors tend to make decisions by cutting assumptions about future trends to increase current returns. Brunnermeier& Parker (2005) also noted that this decision led to a preference for lottery stocks and non-diversified portfolios. The study from Bali et al. (2011) finds that stocks with extreme maximum daily returns in the previous month generate low monthly returns in the following month, which is known as the *MAX effect.*

Research on the effect of *MAX return* on *expected return* is important, especially in Indonesia, because the results can provide useful information for investors in making investment decisions in the Indonesian capital market. By knowing the relationship between *MAX return* and *expected return,* investors can calculate the level of risk and potential profit from an investment and determine the right investment strategy. In addition, the results of this study can also provide input for Indonesian capital market managers in increasing market efficiency. As far as the researcher knows, only a few studies explore the *MAX effect phenomenon* in the Indonesian context. Many studies have examined how culture affects economic outcomes (Guiso et al., 2006, 2009). Therefore, it is important to examine whether *the MAX effect* is common in Indonesia, namely a country with a different cultural and social background, where gambling is not directed as a social behavior due to very strict regulations, social stigma, and religious prohibitions. Investment strategies based on understanding other markets may not work here due to different social backgrounds. The second reason a study in the Indonesian context is necessary is that, in contrast to the other markets studied so far, the shareholding pattern in the Indonesian market is mixed. Institutional investors dominate this market for *large-cap stocks* and individual investors for *small-cap stocks,* so examining the MAX phenomenon on a heterogeneous investor base may be interesting. Therefore, this study is relevant for domestic investors, foreign investors, and investment managers.

The KOMPAS100 Index, LQ45 Index, IDX30 Index, and IDX80 Index are four stock indexes managed by the Indonesia Stock Exchange (IDX) to measure stock market performance in Indonesia. Each of these indices has different characteristics and is suitable for reference in measuring the performance of different stock markets. For this study, the KOMPAS100 index was chosen as the variable to be used as the sample. The KOMPAS100 index is the result of a collaboration between the Indonesia Stock Exchange (IDX) and Kompas Gramedia. According to Nanna Sugiyanto et al. (2021), the KOMPAS100 index was chosen because it has a large market capitalization and good liquidity. Based on the total IDX market capitalization, the KOMPAS100 index represents around 70-80 percent. The KOMPAS100 index contains 100 stocks covering all sectors/industries traded on the IDX and is updated every semester.

This study uses ten years to measure stock market performance over a long period covering various periods. One of the important reasons why the 10-year timeframe was chosen is to measure the stock market's long-term performance. Stock market performance in the short term may not always reflect stock market conditions in the long term. By considering the long period of 10 years, a more accurate picture of the performance of the stock market can be obtained. In addition, a span of 10 years can also cover various economic periods. In 10 years, there may be changes in different economic conditions, such as recession, economic growth, and others. This period is important because economic conditions can affect stock market performance. By covering various economic periods in the analysis, a more comprehensive picture can be obtained regarding the influence of economic conditions on stock market performance. This study focuses on the KOMPAS100 index as a reference for the performance of the Indonesian stock market in the 2012-2021 period. KOMPAS100 is a stock index managed by PT Kompas Cyber Media (Kompas Gramedia Group) that measures the performance of stocks listed on the Indonesia Stock Exchange (IDX) that meet specific criteria. Therefore, analyzing the long-time span (10 years) of this index can provide a more accurate picture of the performance of the Indonesian stock market. In addition, long periods also make it possible to analyze phenomena that may only occur in the long term, such as the effect of *MAX return* on *expected returns* to be studied. Long-term analysis can also determine the consistency of these phenomena and how these phenomena may affect stock market performance in the long term. Overall, a long period span of 10 years was used in the study to measure the stock market's long-term performance, cover diverse economic periods, and allow the analysis of phenomena that may only occur in the long term that are relevant to the KOMPAS100 index.

II. THEORITICAL REVIEW

According to Reilly et al. (1999), to test *Semi Strong Forms Efficient Market, The hypothesis* states that the market quickly reflects new public information, and researchers need to have a way to measure how the

market responds. Assuming that stock *returns* equal market *returns*, *return anomaly* is calculated by subtracting stock *returns* from market *returns* for the same period.Thus, the abnormal *return* is the difference between the actual *return achieved by the investor and the return* expected by the previous investor. The abnormal *return value* can be positive or negative, depending on whether *the return* received by investors is greater or less than previously expected. If the abnormal *return* is positive, it means that *the return* investors receive is greater than expected. Conversely, if the abnormal *return* is negative, *the return* investors receive is smaller than previously expected.

Abnormal *returns* occur when new information about a company or industry enters the market. This information can affect the company's shares' value, causing changes in stock *returns.* If changes in stock *returns* are different from those expected by previous investors, then abnormal *returns* occur. Stock market anomalies occur when these abnormal *returns* are inconsistent with the efficient market theory, which states that stock prices always reflect the information available in the market.

According to Jogiyanto (2010), realized stock return is the actual profit obtained by investors from a stock investment and is usually used as a benchmark for company performance and the basis for calculating the expected profit in the future. Meanwhile, Tandelilin (2010) states that the expected rate of return is the expected profit in the future and is inherently uncertain. Ross et al. (2015) state that the expected rate of return is the expected profit from investing in risky assets, and the return expected by investors must match the costs incurred by the company.

Bali et al. (2011) found a significant negative relationship between the highest daily return during the previous month and the return for the following month, referred to as the MAX effect. This effect is still significant and negative even though it has been controlled by size, *book-to-market,skewness,* momentum effect, short-term reversal, and liquidity. Bali et al. (2011) also note that the previously documented negative relationship between idiosyncratic volatility and future stock returns is inverse. The cause of the MAX effect in the US stock market, according to Bali et al. (2011), may be caused by less diversified investors with strong desire for lottery-like stocks. Meanwhile, Fong (2014) it finds that the MAX effect in the US stock market mainly occurs when investor sentiment is high. In addition, the MAX anomaly is mainly caused by the poor performance of high MAX stocks rather than the high returns of low MAX stocks. In other words, if the stock market has problems in doing *short selling,* the MAX effect will be stronger because investors cannot capture abnormal *returns* from *shorts selling* high MAX shares.

The KOMPAS100 index is an index of 100 companies with high liquidity. KOMPAS100 is included in the *liquidity sub category co-branding.* This means that KOMPAS100 is an index that classifies stocks based on high trading liquidity and large market capitalization, supported by good company fundamentals and working with other parties (in this case, the Kompas Gramedia Group).According to the IDX Stock Index Handbook v.1.2 published by the Indonesia Stock Exchange in 2021, KOMPAS100 posted *a return* of -5.5% for one year. -10.2% for three years and 22.3% for five years (Indonesia Stock Exchange, 2021). The shares included in KOMPAS100 have gone through an evaluation process. The evaluation period for this indicator is every semester.in January and July are evaluation period months that determine which constituents are included in the composition of the KOMPAS100 index.

III. METHOD

This study uses a quantitative research approach. In this study, the secondary data used came from *databases* and annual reports of registered companies. They settled on the KOMPAS100 index on the Indonesia Stock Exchange for the period 2012-2021 as well as literature studies originating from journals, books, and

previous research related to research. The samples used in this study amounted to 45 companies with 5,400 observations.

Researchers will test the hypotheses that have been developed using the following model:

This model is used to test the hypothesis, namely, to test the effect of *MAX return* on *expected return.* This influence will be calculated through *firm-level cross-sectionalregressions.Firm -level cross-sectional regressions* were performed to measure the *cross-sectional relationship* between *MAX return* and *expected returns* using the Fama& MacBeth regression (1973) and taking into account the control variables market beta, market capitalization, *book-to-market ratios, short -term reversals,* and *idiosyncratic volatility* as follows:

$$\boldsymbol{R_{i,t+1} = \lambda_{0,t} + \lambda_{1,t}MAX_{i,t} + \lambda_{2,t}BETA_{i,t} + \lambda_{3,t}SIZE_{i,t} + \lambda_{4,t}BM_{i,t} + \lambda_{5,t}REV_{i,t} + \lambda_{6,t}IVOL_{i,t} + \varepsilon_{i,t+1}}$$

Where Ri,t+1 is the realized *return from stock i in month t+1. Predictive* regression *cross-sectional* was performed with the previous month's values of MAX, BETA, SIZE, BM, REV, and IVOL.

The first step in conducting data analysis is to perform descriptive statistical analysis. The descriptive statistics used in this study aim to find the mode, *mean,* maximum, minimum, and standard deviation values for each variable in this study. After performing descriptive statistics, the next step is to select a panel data regression model. In conducting the selection test the regression model aims to test the selected regression equation model has the right estimate and avoids bias. In the panel data there are three models, namely *common effect* (pooled *least square), fixed effect,* and *random effect.* In choosing between the three panel data models, in this study the Chow test, Hausman test, and LM were carried out. After testing the selection of the panel data regression model, the next step is to test the classical assumptions. In carrying out the Classical Assumption Test, it is divided into the normality test and the heteroscedasticity test.

IV. RESULTS AND DISCUSSION

The significant test results were carried out to see the relationship between variables and answer research questions. The significance test will determine whether the research hypothesis will be rejected or accepted. In the Determination Coefficient Test or model feasibility test, the value of *adjusted* R^2 in the first model shows a value of 47.5405%, and this can be interpreted that the independent variable *MAX return* and the control variable are market beta (BETA), market capitalization (SIZE), *book-to-market ratio* (BM), *reversal* (REV), and *idiosyncratic volatility* (IVOL) can explain the dependent variable, namely *expectedreturn* of 47.5405%. In comparison, other variables outside the model influence the remaining 52.4595% of *expectedreturn.*

Table 1 Significance Test Results

Dependent Variable	**Independent Variable**		**Control Variables**				
			BETA	**SIZE**	**BM**	**REV**	**IVOL**
Expected return	**MAX Return**		TS+	S+	TS+	S+	S−
	S−						

The control variable in the model, BETA, shows a *probability value of* 0.3034 or more than 0.05, the SIZE variable has a *probability value* of 0.0033, the BM variable has a *probability value of* 0.0567, the REV variable has a *probability value* of 0.0000, and the IVOL variable has a *probability value of* 0.0000. It can be concluded that the control variables BETA and BM have no significant effect individually on *expectedreturn.* Meanwhile, the other variables, namely SIZE, REV, and IVOL, have a partially significant effect on *expectedreturn.*

Cross-section regression results *fixed effects,* the *t- statistics value* (Prob.) on the *MAX return variable* shows 0.0376. So, it can be concluded that the *MAX return variable* significantly affects *expected return* at the 95% confidence level or α 5%. While the coefficient value on the *MAX return variable* is -0.003153 which is negative, which means that issuers with a high *MAX return will have an expected* low *return and vice versa.*

The results of this study are in accordance with the results of research Bali et al. (2011), which show a negative and significant effect between *MAX return* and *expected variables returns* on the NYSE and Amex exchanges. These results indicate that stocks with extreme positive *returns* or high *MAX returns also have a high level of risk.* So, it can be said that investors tend to buy or have a preference for stocks like "lottery," which have positive extreme *returns* even though they have a very small probability or can be called very risky. Thus, investors must be prepared to take higher risks if they want to invest their funds in these stocks. Due to higher risk, investors must also be satisfied with a lower rate of return, which is called *expected return.* The probability of a high gain occurring is also lower because there is a higher probability that the stock will incur a loss. Thus, even though there is a high probability of profit, investors must be prepared to take higher risks and accept lower returns (expected *return)* in the long run.

Based on the results of the BETA control variable regression test in the model, the *t- statistics value* (Prob.) on the BETA control variable shows the number 0.3034 and a coefficient value of 0.000356. So, in this model, the BETA control variable is not significant to *the expected return* at the 95% confidence level or 5% *alpha.* While the coefficient value on the BETA variable is positive, companies with high BETA levels will affect *the expected* high *return or vice versa.* However, this positive relationship is not significant.

The results of research on this model are different from the results of studies Bali et al. (2011) which show a negative but not significant effect between beta and *expected return.* This study's results indicate that stocks with a higher market Beta are not significantly riskier than those with a lower market Beta. However, there may still be a bit of a visible positive effect, meaning stocks with higher market Beta may be slightly riskier than stocks with lower market Beta. However, this effect is not statistically significant, so it cannot be relied upon as a basis for making investment decisions.

The results of research on this model are different from the results of studies Bali et al. (2011) which show a significant negative relationship between *reversal* and *expectedreturn.* The results of this study indicate that stocks that experience *a reversal* tend to provide higher returns for investors compared to stocks that do not experience *a reversal.Reversal* can occur for various reasons, such as changes in market conditions, the company's fundamentals, or other factors. If *a reversal occurs,* the stock price will move in the opposite direction to the previous one, leading to higher returns for investors.

The results on this model differ from those of Bali et al. (2011), which show a negative but not significant relationship between *idiosyncratic volatility* and *expected return.* The results of this study indicate that investors on the Indonesia Stock Exchange tend to buy stocks that have high volatility in the hope of getting high *returns even though they are very risky.* In addition, the results of this study also show stocks that have an *idiosyncratic level Higher volatility* tends to provide lower returns for investors compared to stocks that have *idiosyncratic levels* lower *volatility.'*

V. CONCLUSIONS

From the results of the analysis, it can be concluded that there is a significant negative effect between the independent variable *MAX return* and *the expected return,* so that there is *a MAX effect* on the Indonesia Stock Exchange. This shows that the higher the *MAX return value,* the lower the *expected value* expected *returns.* This study also indicates that investors in the Indonesia Stock Exchange tend to buy stocks with extremely positive stock returns in the hope of getting similar *returns even though they have a very small probability.* Therefore,

the implication is that investors must be more careful in choosing stocks with a high *MAX return* rate because this can indicate higher risk and not commensurate with the expected *return.*

VI. SUGGESTIONS

Based on the results of the research that has been done, the researcher provides several suggestions

This study only examines companies listed on the KOMPAS100 index, besides that the sample period in this study is 10 (ten) years. So, it is hoped that future researchers will expand the research sample or conduct broader research, such as the JCI, regarding the relationship between *MAX return* and *expected return.* In addition, the researcher recommends that future researchers add other control variables, such as the level of illiquidity, market capitalization, *reversal,* and *idiosyncratic volatility* which significantly affect *expected return*.Othersuggestion for future researchers interested in examining the effect of *MAX return* on *expected return* is to add analysis methods such as *univariate portfolio analysis* to describe more clearly the relationship between *MAX return* and *expected return.*

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