

Idiosyncratic Risk on Stock Performance in Indonesia Stock Exchange

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ABSTRACT

In this paper, we present the relation between idiosyncratic risk and Indonesia's stock performance using asset pricing models. We use a unique data set containing daily returns of 80 Indonesia equity of KOMPAS100 index on a 7-year period to measure stock performance. We formed portfolios based on market capitalization and book to market value. We found that idiosyncratic risk positively correlates with the excess stock return, specifically in the portfolio of second-tier Size and portfolio with highest and lowest book to market value.

Keywords: *Stock Performance, Stock Exchange, Asset.*

1. INTRODUCTION

1.1 Background

The behavior of stock price in every country is different that showed the significant relation of idiosyncratic risk to excess market return from [1–3]. Each exchange has a different character, risk profile, knowledge, industries, and regulation. There are two analyses used in stock investment, technical and fundamental analysis. Different types of the investor will result in a different type of analysis. Long-term investors choose firm-specific valuation rather than rely only on market valuation [4].

It is crucial for the stakeholder to manage the Indonesian stock exchange risk, whether investors, financial institutions, government, or stock exchange management. There are two risks when investing in stocks or other financial assets, systematic and unsystematic risk. Systemic risk is rewarded that is a keystone of investment analysis. In the long run, forbearing risk compensation is expected that they cannot diversify away. Such risk is inherent in the economic system and may relate to real business activity or inflation. In contrast, portfolio risk measurement begins with a systematic portfolio risk evaluation because the systematic risk is usually part of most changes and long-term portfolio values [5].

In the article, reference [6] mention there is another factor other than market factor need calculated as explained in CAPM. They argue that small-capitalization companies give more returns than big-capitalization companies in the stock market. The other factor included in the Fama-French calculation is the value factor. They argue that a high book-to-market company likely to give a more significant return to the investor than a low book-to-market company.

The unsystematic risk or known as idiosyncratic risk found also plays a critical role capital market. Reference [3] rejected the hypothesis idiosyncratic risk negatively related to a mutual fund in the UK. In line with the [3], the stock market in ASEAN, based on a study from [1], found a positive relationship between idiosyncratic volatility and return of the stock in Malaysia, Singapore, Thailand, and to some extent Indonesia, except for the Philippines.

Meanwhile, reference [2] found a negative relationship between idiosyncratic volatility and stock returns in 23 most developed countries. These articles showed the pros and cons of the importance of idiosyncratic risk to measure as the total risk in the investment.

1.2 Problem Identification

The investor expects a high return in investing in the stock market. The investor needs to manage the risk in stock investment. To manage the risk, the investor can separate the risk into systematic and idiosyncratic risks. In popular belief, idiosyncratic risk can be eliminated by diversifying the portfolio. While sometimes, the firm-specific risk became the main factor in the price in stock investment.

Risk

The possibility that an investor will receive a return on an inappropriate investment from the expected return is an understanding of the risk. Thus, the risk not only includes poor results or a lower than expected return rate or what is referred to as a downside risk but also if it has a higher return than expected or good results or referred to as upside risk. Investors must measure and consider both when measuring risk [4].

The risk management role has become more essential when financial markets have evolved over the previous few centuries. Risk can never be prevented altogether. Generally speaking, the objective is to take intelligent risks rather than minimize risk. Measurable risks can be better managed. Most investors only risk because they expect to compensate for higher yields. However, risk measurement is required to decide how to balance risk and return [7].

Idiosyncratic Risk

There are two types of risk to an equity position in individual stock investment, unsystematic risk or idiosyncratic risk and systematic risk [8]. The Capital Asset Pricing Model (CAPM) notes that only systematic risk is taken into account because all investors have a market portfolio. Although investors do not own an ultimately diversified portfolio for some reason, most of the moment. In this sense, some writers claim a positive relationship between unique danger and anticipated stock returns [3].

Conflicts between systematic market risk measures and determinants of fundamental risk (business and other risks) or special risks may be expected by some people. The relationship between systematic risk market size and accounting variables used to measure idiosyncratic risk factors, such as business, financial, and last but not least, liquidity risk, has been examined in several studies [9].

The idiosyncratic risk is the portion of risk unexplained by the market factor.

Portfolio

Portfolio analysis is one of the most commonly used statistical methodologies in empirical asset pricing. Its

objective is to examine the cross-sectional relation between two or more variables. The most frequent application of portfolio analysis is to examine the ability of one or more variables to forecast future stock returns. The general approach is to form portfolios of stocks, where the stocks in each portfolio have different levels of the variable or variables posited to predict cross-sectional variation in future returns and to examine the returns of these portfolios [10].

Asset Pricing Model

Investors commonly use asset pricing to evaluate risk and determine premium risk or expected portfolio return. After reference [11] published the research, reference [12] introduced Capital Asset Pricing Model (CAPM). Covariance between stock return and market return, or infamously called the bet, is the only factor explaining all portfolio return in the model. Thus according to [12], beta is the only factor that can reduce systematic risk while unsystematic risk can be decreased by diversification factor.

Sharpe's first step was to simplify the covariance structure of stocks with a one-factor model follow (1).

$$R_t - R_{ft} = \alpha + \beta[R_{mt} - R_{ft}] + \epsilon_t \quad (1)$$

where R_t = return on stock during time t ; β = beta excess market return; R_{mt} = market return at time t ; R_{ft} = risk free rate at time t

The development of the Fama-French Three-Factor Model continues from time to time. Many factors are trying to be added to the model. From reference [13], who was adding momentum factor that explains stock performance will continue its good performance in the previous year. Furthermore, much more development of Fama-French, including the development of the model by Fama and French themselves that known as the Fama-French five-factor model. They are adding profitability and investment factor to calculate excess return in the portfolio.

According to the Empirical Asset Pricing book written by [10], the Fama-French risk model is often used to assess whether a portfolio or security produces an average return that is not due to sensitivity to risk factors.

To measure idiosyncratic risk, the researcher follows [3] literature using a regional version of the Fama-French three-factor model. Fama-French's three-factor model includes the differential dynamics of small-capitalization stocks compared to big capitalization stocks (SMB) and high book-to-market stocks compared to low book-to-market stocks (HML).

2. METHODS

2.1 Data and Sample

The research will use all the data from the Bloomberg data platform. The stocks sample using monthly returns in 10 years of time, from January 1, 2012, to December 31, 2018, is limited to stocks whose ever listed in the KOMPAS100 Index. KOMPAS100 Index is the index formed by Kompas, the largest and most read newspaper in Indonesia. Stocks need to have high liquidity and big market capitalization and have good fundamentals and performance to be listed in the KOMPAS100 Index. The data used in this research include stock price, return, market capitalization, book to market ratio, and others needed in this research. The sample of stocks used for this research, the member of the current KOMPAS100 Index from February to July 2019. In KOMPAS100 Index, we choose members who have already listed since 2012. Thus, there are 80 chosen of 625 stocks listed in IDX. Stocks will not be classified per industry but will be classified as portfolios with a combination of small and big market capitalization, low, medium, and high book to market.

The risk-free rate will be used as the average rate of three-month treasury bills. Three-month Treasury bills used as the data is the reference interest rate that has been used by the government in government budget reference rate. Thus the free rate return follows the reference rate in the government budget. The model's market return will be used Jakarta Composite Index (JCI) that shows all stock members' return in IDX. JCI return used is monthly and yearly return from 2012 to 2018. Both risk-free rate and JCI return are taken from Bloomberg.

2.2 Portfolio Making Steps

This research will elaborate on steps to a formed portfolio. The process detail will form 5 portfolios from all 80 stocks, with each portfolio containing 16 stocks that separated based on market capitalization and 5 big portfolios formed from all 80 stocks, with each portfolio containing 16 stocks that separated based on the book to market equity. Each portfolio formed another portfolio by grouping the sample stock data based on [6] to find the value of Small minus Big (SMB) and High minus Low (HML) on each portfolio. We do panel data regression with yearly data on each big portfolio. The excess return of stock became the dependent variable, while the excess market return will show the same number for all big portfolios Listing and numbering.

When listing facts, use either the style tag List signs or the style tag List numbers.

2.3 Research Steps

Since idiosyncratic risk measurement will be used in Capital Asset Pricing Model, systematic risk is well explained in CAPM, where only one factor is used to measure the excess return. The residual from a multi-factor model could represent omitted factors. Thus it is difficult to consider these residuals as only showing an idiosyncratic risk. After we get the idiosyncratic risk value, we will follow steps to calculate Fama-French three-factor model to find beta, market, Size, and value factor and idiosyncratic risk one by one as independent variables while expected return minus risk-free return as a dependent variable.

The main step is to collect secondary data that needed to evaluate the stock performance. Research-er used secondary data from the Bloomberg data platform. Bloomberg data platform is one of the most reliable platforms which can present accurate and trustable data. Data collected are monthly and yearly stock return and JCI performance data, while monthly data for 3-month treasury bills. After all the data collected, the next step is to prepare independent variables.

First, the researcher needs to find idiosyncratic risk to be calculated in the Fama-French three-factor model. Capital Asset Pricing Model used to find the R^2 of the model. The excess market return of each stock was calculated to become the dependent variable, while the IDX market return minus the risk-free rate became the independent variable. The residual of the model will become the idiosyncratic risk of each company.

Sample stock data, separated into 5 portfolios based on the Size of market capitalization. To prepare independent variables of 5 portfolios, the data need to be constructed to form a portfolio based on the Size and value of 5 portfolios. There will be 6 portfolios formed as a combination of Size and value portfolio. Risk-free rates need to be collected and decided and also the market rate.

The average return of each portfolio needs to be calculated. After we found the average return, the next step is to calculate the Small minus Big (SMB) average return and High minus Low (HML) average return.

After all data were collected, the next step is data analysis. The first step of data analysis uses descriptive statistics, then calculates the t-test and F-test to test the data variable. From the data analysis result, we can conclude the hypothesis using panel data regression to find each portfolio variable's significance. This methodology to estimates idiosyncratic risk employed by the current literature., it can only be specified that the residuals from a multi-factor regression estimate idiosyncratic risk in that model's framework.

2.4 Statistics Analysis

We use statistical analysis to found the significance of idiosyncratic risk to excess market return. The two regression used is linear regression and panel data regression.

Linear Regression

Linear regression use to oversee relationship between dependent variable (y) with several independent variable ($x_1, x_2, x_3, \dots, x_n$) in linear. This regression will result in R-square, a statistical measure representing the variance proportion for a dependent variable explained by an independent variable or variables in a regression model. In this regression, the model will be used CAPM follow (2).

$$R_t - R_{ft} = \alpha_t + \beta[R_{mt} - R_{ft}] \quad (2)$$

Equity with both portfolios was separated into 5 portfolios. This construct follows two factors in the Fama French three-factor model with size factor and value factor. Size factor separates stocks based on market capitalization while value factor split stocks with book to market.

2.5 Market Capitalization Portfolio

Each market capitalization portfolio was split into 16 stocks each portfolio. P1 is the smallest market capitalization in Kompas100, while P5 is the group with the most significant market capitalization.

Table 1. Market Cap Portfolio Panel Data Regression

MarketCap	P1	P2	P3	P4	P5
Rm-Rf	2.15 (0.00)***	2.05 (0.00)***	1.24 (0.00)***	1.22 (0.01)**	0.91 (0.01)**
SMB	-0.23 (0.43)	0.42 (0.08)*	0.55 (0.11)	-0.35 (0.4)	0.13 (0.45)
HML	-0.14 (0.52)	0.00 (0.99)	-0.5821 (0.01)**	1.87 (0.96)	-0.01 (0.94)
Idiosyncratic	0.57 (0.64)	0.59 (0.47)	0.13 (0.78)	-1.35 (0.04)**	0.70 (0.13)

Where R_t = return on stock during time t ; β = beta excess market return; R_{mt} = market return at time t ; R_{ft} = risk free rate at time t

The model notes that only systematic risk is taken into account because all investors have a portfolio of markets; thus, we use it to find the idiosyncratic risk by differentiating the Rsquare of the CAPM follow (3).

$$Idiosyncratic_{i,jt} = 1 - R^2 \text{ of CAPM} \quad (3)$$

Panel Data Regression

Regression of data panel used for many purposes. Controlling for individual heterogeneity is one of the advantages of using panel data. Data from the panel suggest heterogeneous countries, states, firms, or individuals. Data panel mixed time series and cross-section data, therefore, produce more degrees of freedom. To process the data, need certain statistics models. Three regression models commonly use to process panel data, pooled least square, fixed-effect model, and random effect model (Baltagi, 2005) follow (4).

$$R_{i,j,t} = \alpha_i + \beta_{m,j}R_{m,t} + \beta_{smb,j}R_{smb,t} + \beta_{hml,j}R_{hml,t} + Idiosyncratic_{i,jt} \quad (4)$$

where $R_{i,jt}$ = the time t excess return on stock portfolio; β = beta; $R_{m,t}$ = market excess return at time t , estimated as the return of the market index return minus the risk free rate; $R_{smb,t}$ = difference of small capitalization market return and big capitalization market return; $R_{hml,t}$ = difference of high book-to-market value return stocks and low-to-book value return; $Idiosyncratic_{i,jt}$ = residual of CAPM.

From the panel data test, the result of the P4 portfolio is pooled least square regression. The researcher is trying to find whether the model is significant by several tests from the Stata test result. The researcher can explain that this portfolio's data model is significant to determine stock excess return, as the F test value is smaller than alpha 0.05 with $prob > F$ less than 0.0317.

In a portfolio formed of market capitalization, we found that idiosyncratic risk significantly relates to stock performance in portfolio 4. Corporate action and fundamental analysis play an essential role in managing risk in this portfolio. The investor needs to examine companies specific risk mitigate the risk carefully. The uncertainty inherent in a company, such as a new competitor in the market or any strike inside the company, will directly hit the stock's movement in portfolio 4 rather than other portfolios. The investor who owns the clear information regarding the company in this portfolio will benefit a lot rather than invest in other portfolios, especially portfolios with small market capitalization. Idiosyncratic or firm-specific risk in P4 has a robust significant relation with their excess return.

3. RESULTS AND DISCUSSION

In this research, the portfolio's construction is based on market capitalization and book to market

Significant relation with their excess return. Some of the highlights of the idiosyncratic risk of the company listed in the portfolio will explain later. The portfolio whose most of the members known as second tier stock or stocks with a market capitalization below blue chip's

stock showed that their shares were affected most by idiosyncratic than other portfolios including the most extensive portfolio on Size or blue chip's stock.

3.1 Book to Market Portfolio

Each BEME portfolio construction separates 16 stocks portfolio. P1 portfolio contains 16 stocks portfolio with the lowest value of the book to market.

Table 2. BEME Portfolio Panel Data Regression

MarketCap	P1	P2	P3	P4	P5
<i>Rm-Rf</i>	0.72 (0.01)**	1.17 (0.00)***	1.58 (0.01)**	2.19 (0.00)***	2.04 (0.00)***
<i>SMB</i>	0.16 (0.48)	0.5583 (0.10)	0.75 (0.28)	-0.26 (0.06)*	0.09 (0.66)
<i>HML</i>	0.30 (0.22)	0.16 (0.21)	-0.76 (0.03)**	-0.39 (0.00)***	0.10 (0.75)
<i>Idiosyncratic</i>	0.69 (0.09)*	1.07 (0.10)	1.40 (0.11)	-0.53 (0.28)	1.14 (0.09)*

P1 based on BEME based on table 2 showed that data model in this portfolio significant to determine stock excess return, as the F test value smaller than alpha 0.05 with prob>F less than 0.0211.

From the panel data test, the result of the P5 portfolio is pooled least square regression. The researcher is trying to find whether the model is significant by several tests from the Stata test result below. The researcher can explain that this portfolio's data model is significant to determine stock excess return, as the F test value is smaller than alpha 0.01 with prob>F less than 0.0002.

BEME based portfolios are attractive as 1 per book to market ratio or price to book value is one of the common factors used by most traders at the moment. Besides PE ratio, most of the traders believe that low PBV value determines the share price is undervalued. However, this is in line with Fama and French, who believe that high book to market value will likely give more returns than stock with low book to market value. With two portfolios in BEME that are significant with idiosyncratic risk, both highest and lowest book to market portfolios, the investor needs to watch the stock's fundamental factor. The idiosyncratic risk affected the movement of the stock in both P1 and P5. Thus, investors must watch the stock's fundamental factor to mitigate the risk of investing in the stock market.

4. CONCLUSIONS

Only in portfolio 4 based on the market has a robust significant relation with excess return. P4 stock has the second biggest Size in Kompas 100 sample. While P5 as the blue-chip stock has no significant relation with idiosyncratic risk, we can say P4 is the second tier stock in the stock investment. However, the regulator classification of blue-chip and second-tier stock in the Indonesia Stock Exchange has never been define.

The book to market portfolio showed a different result. Three portfolios have significant relation with the excess stock return. The smallest and biggest book to market value has the idiosyncratic risk significant to its excess stock return. However, we can see that there are weak relationships between idiosyncratic risk with the excess stock return. Thus we cannot just eliminate the exposed of idiosyncratic risk by only diversify the portfolio.

However, after we conduct CAPM and get the idiosyncratic result, we find empirical evidence that idiosyncratic risk is showed and priced only 2 portfolio negative relations to expected returns. Thus, idiosyncratic risk cannot be eliminated by managing a well-diversified portfolio. We conclude that idiosyncratic risk positively correlates with the excess stock return, specifically in the second-tier Size portfolio. Furthermore, idiosyncratic risk has a more significant relation to a portfolio based on a book to market ratio, although only weak relation.

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