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Irrelevance of Market Risk in Indonesia Stock Market

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Abstract

This paper examines the effect of beta as proxy of market risk to stock return. In Capital Asset Pricing Model (CAPM) and various other finance theories, it is widely assumed that stock return is expected by investors as compensation for assuming risk. What kind of risk is being compensated? Based on Portfolio Theory, only market risk of the stock is being compensated. This is because stock's individual risk has been diversified away in a fully diversified portfolio, and thus only market risk remains. Thus, stock return, as compensation for investor, is only depends on market risk. The widely used measurement for market risk of a stock is its beta. However, in this paper we show that there is no relation between beta and stock return in Indonesia stock market. The absence of beta – return relation is valid both in CAPM setting where beta is the only predictor and in Fama – French Three Factors Model where the predictors are beta, size, and Price to Earning Ratio (PER). In contrast, size and PER are related to stock return in the way predicted by the model.

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1. Introduction

The most popular method to calculate stock expected return is Capital Asset Pricing Model (CAPM) as proposed by Sharpe (1964) and Lintner (1965). The main tenet of CAPM is that stock generate return for its investors as compensation for assuming risk. The higher the risk, the higher also expected return. However, not all the stock risk is compensated. Stock total risk consist of individual risk and market risk. Individual risk can be easily removed through diversification. Diversification is done by forming portfolio consisting of several unrelated stocks. According to Evans and Archer (1968) and Elton and Gruber (1977) ten to twenty stocks in portfolio is enough to remove individual risk. In a well diversified portfolio, the amount of individual risk is insignificant. Investor who owns such portfolio only assumes market risk. Logically all investors will hold a fully diversified portfolio as there is no reason not to. Thus in stock market, only market risk remains. This is the amount of risk compensated by stock expected return. In CAPM, the amount of market risk of a stock depends on its beta (β) value. It follows then that expected return of each stock depend on its beta, and nothing else. Any other parameters like company profitability, liquidity, size, etc are part of individual risk, and thus should have been diversified away and plays no role in the stock expected return. Is this result plausible?

Fama and MacBeth (1973) found positive and linear relation between beta and stock return, supporting CAPM. However, Fama and French (1993) found that other than beta, Price to Book Value (PBV) and size also affect expected return. On the one hand this result support CAPM because it found that beta affect expected return. On the other hand the finding that PBV and size also affect expected return is contrary to CAPM, which predics that no other parameter will affect expected return. Furthermore, Carhart (1997) found that beta, PBV, size, and momentum affect expected return. Although the finding of Fama and French (1993) and Carhart (1997) are in contrast to CAPM prediction, the similarity of those findings are that beta is positively affect expected return. It supports the notion of CAPM that investors are compensated for assuming market risk. However, several research in developing market found that CAPM cannot explain the stock return. Firmansyah (2016) found negative relation between beta and stock returns while Debt to Equity Ratio (DER) and Price to Earning Ratio (PER) are positive to stock returns. Akdeniz, Salih, and Aydogan (2000) found that while Price to Book Value (PBV) and size affects expected return, beta has no relation with expected return in Turkey stock market. Susanti, Grace and Ervina (2020) found negative relation between beta and expected return in Indonesia stock market during 2020 Covid affected market. Hendrawan (2010) found that running CAPM equation to Indonesian stocks yield much higher risk free rate (Rf) than the actual value (10.36% as compared to actual rate of 0.76%) and much lower market premium (Rm – Rf) compared to actual market premium (-22.31% as compared to actual market premium of 2.56%). Note that negative number of market premium does not make sense in CAPM as risk in the market is always higher than the risk free rate, and thus must yield higher return. Coffie (2014) found that the effect of beta is not significant to stock return in majority of stocks in Marocco and South Africa stock markets. Strugnell, Gilbert, and Kruger (2011) found that while size and PER affect stock return, beta has no effect on stock return in South Africa market. Rouwenhorst (1999) examined stock returns cross section from twenty emerging stock market including Indonesia. It was found that while PER, size, and momentum affects stock returns, beta does not affect stock return. Some papers do find that in several emerging market beta correlates positively with expected return as predicted by CAPM. Mumo (2017) found positive relation between beta and expcted return in Kenya stock market. Al-Rjoub, Yousef, and Ananzeh (2010) found that beta can explain stock return in Egypt, Jordan, Marocco, and Saudi Arabia stock market while PER, PBV, and size have no relation with stock return. Sheu, Wu, and Ku (1998) found that beta relates positively with stock return in Taiwan

stock market. It is interesting to confirm whether beta has any explanation power to stock return in Indonesian market as suggested by several research. In case it does not, the result will suggest that CAPM is not valid in Indonesian market. Various research related to stock in Indonesian market that use CAPM will be affected. It will thus necessary to find other method that can appropriately measure stock abnormal return. In addition to directly measure the effect of beta to stock return, this research will also use Carhart four factors model to examine the stock return. In Carhart four factors model, stock return is a function of market risk, value, size, and momentum. The result might provide more complete insight on the relation between beta and stock return. Research Problems are (1). Is there any relation between beta and stock return? & (2). Is there any relation between beta, PER, and size, to stock return?

2. Literature Review

When an investor hold stock instead of cash, the investor is exposed to risk as the stock price in the future cannot be ascertained perfectly. Without the compensation of a positive expected return, no one will be willing to own a stock as it means exposure to risk without any compensation. The higher the risk, the higher also compensation demanded by investor leading to positive relation between risk and return. The idea of positive relation between risk and return demands quantification of risk if the idea is to be developed into a theory. Markowitz (1952) in Modern Portfolio Theory suggested that the variance of stock return is used as proxy of stock risk. Furthermore, any two stocks with less than perfect return correlation can be combined into a portfolio to reduce the total variance and thus reduce the risk. This risk reduction is achieved without reduction of expected stock return. The breakthrough of the Modern Portfolio Theory is to show that combining stocks into portfolio reduces risk. Given certain number of stocks, an efficient frontier in a return-variance diagram can be formed by calculating all possible combination of those stocks. Efficient frontier represents combination of stocks whereby a particular level of return will have the lowest possible risk. Any investors will want to have portfolio in the efficient frontier, albeit with different return and risk levels according to individual preferences.

CAPM (Sharpe, 1964; Lintner, 1965) can be seen as further improvement of Modern Portfolio Theory. CAPM introduces a risk free rate where investors are assumed to be able to either invest or borrow. In the return-variance diagram, this risk free rate is located in a certain point in the y-axis where the variance is zero. Combining the risk free rate point and efficient frontier will result in security market line that is originating from risk free rate and tangential to efficient frontier. The point where security market line touch efficient frontier is called market portfolio. All investors portfolio will consist of combination of market portfolio and risk free rate. Thus in this setting all investors will hold the same type and proportion of stocks. In CAPM setting, all investors hold market portfolio. The meaning of risk thus differs from risk in Modern Portfolio Theory. In CAPM, a stock risk is defined as additional variance the stock add to market portfolio variance. This type of risk is called market risk, and represented as the stock beta. Related to the notion that investors are compensated from assuming risk in the form of return, the risk being compensated here is the market risk. Beta is thus positively related to stock return. Additionally, other than market risk, investors assume no additional risk from a particular stock. If stock return variance is seen as total stock risk, then the total stock risk consist of market risk and individual risk. Individual risk is risk related to a particular company like the risk of fire, death of CEO, etc. In market portfolio, the stocks are totally diversified and thus individual risk is no longer relevant. What is left is the market risk and thus market risk is the only variable that affect stock return. This prediction is confirmed by Fama and MacBeth (1973) that found beta is positively and linearly related to stock return, and that there is no other variable that affect stock return. Fama and French (1993) found that other than beta,

Book to Market Ratio and size are also related to stock return. The finding is the base of the Fama-French Three Factors Model. In this model, Book to Market ratio and size are proxy for other type of risk that is distinct from market risk. High Book to Market ratio indicates that a stock price is depressed, and considered to experience a value risk. Low sized company is considered riskier than high size company, and considered to experience a size risk. Investors are compensated by assuming the value risk and size risk in addition to the market risk, thus beta, value, and size are all affects stock return. Lakonishok, Shleifer, and Vishny (1994) also found that stocks with high Book to Market Ratio yield higher return compared to stocks with lower Book to Market Ratio. However, the risk of stocks with high Book to Market ratio is not higher compared to stocks with lower Book to Market Ratio. Lakonishok, Shleifer, and Vishny (1994) thus argued that higher return of high Book to Market ratio stocks is not due to higher risk, but due to underpricing as result of investors behavioral bias.

Carhart (1997) found that other than beta, Book to Market Ratio, and size, momentum also affects stock return. The result is in agreement with the seminal work of Jegadeesh and Titman (1993) that stock price exhibits momentum characteristic. A stock whose price is increasing tends to keep increasing in the next period, while a stock with decreasing price tends to keep decreasing. Jegadeesh and Titman (1993) explained the phenomena as the result of delayed investor reaction. Information about a stock is not reflected in the stock price at once as assumed in Efficient Market Hypothesis, but in stages. This is due to behavioral bias of anchoring. Thus, it takes time for information to be fully reflected in the stock price, creating momentum effect.

3. Hypothesis

The goal of this paper is to check the relationship between beta and stock return. The relationship is tested using beta alone and in combination with two more factors from Fama-French Three Factors Model namely size and PER. Thus the following hypotheses are used.

H1: There is relation between beta and stock return

H2: There is relation between beta, PER, size, and momentum to stock return

4. Method

Sample used in this research is stocks in Indonesian stock market that are included in KOMPAS100 index. KOMPAS100 index is a stock index that consists of one hundred stocks that are chosen based on liquidity and market capitalization. The use of stocks in KOMPAS100 index is important to exclude inactive stocks from sample. Inactive stocks are stocks with low transaction volume in long period. There are quite several such stocks in Indonesia market, thus necessitates a process to exclude such stocks. Stocks of a company that experience negative net income in a particular year is also excluded as negative net income will result in negative PER, which has no real meaning. The period used in this research is from 2016 to 2020, with the data used is yearly data. The stock return is calculated from April to the March the following year instead of January to December period that is usually used. Thus 2016 stock return is the return of stock from 1st April 2016 to 31st March 2017. The reason of using March to April period is because the release of financial report that is done every end of March. Thus for example 2015 financial report is released in end of March 2016. If the effect of financial report data to stock return is to be calculated, then the stock return calculation must be started after the release of the financial report. Stock return is calculated as the total of percentage increase of stock price and dividend yield. Thus stock return is the total of capital gain and dividend gain. Data of stock PER, market size, and beta are from S&P Capital IQ. Data of stock price are from investing.com.

Variables used are calculated as follow:

$$Stock\ Return\ (t) = \frac{Price\ (t) - Price\ (t-1)}{Price\ (t-1)} + \frac{Div\ (t)}{Price\ (t-1)}$$

$$PER\ (t) = \frac{Price\ (t)}{EPS\ (t)}$$

$$Size\ (t) = \log Price\ (t) \times Outstanding\ Shares$$

Equation used are as follow:

1. Stock Return (t+1) = α + β beta (t) + ε
2. Stock Return (t+1) = α + β1 beta (t) + β2 Size (t) + β3 PER (t) + ε

5. Result

After excluding stocks from companies with negative net income, total number of data is 432. The regression result is as follow

Regression 1:

Dependent Variable	Independent Variable	R square	Standardized Coef	t sig
Stock Return	Beta	1.1%	0.104	0.076

Table 1: Regression result of beta to stock return

Table 1 shows that under 95% confidence level there is no relation between beta and stock return, while the R square value is low at 1.1%. If 90% confidence level is used, then there is relationship between beta and stock return. The coefficient is positive, as predicted by CAPM.

Regression 2:

Dependent Variable	Independent Variable	Adjusted R square	Standardized Coef	t sig	F sig
Stock Return	Beta	5.4%	0.785	0.433	0.00
	PER		-0.144	0.012	
	Size		-0.18	0.003	

Table 2: Regression result of beta, PER, and size to stock return

Table 2 shows that under Fama-French Three Factors Model beta is not significant to stock return, even in 90% confidence level. In the contrary, the other two factors are significant in 95% confidence level, with negative coefficient as predicted by the model. Adjusted R square value is in 5.4%, much higher compared to regression 1. To confirm the result, additional regressions were made to check the relationship between size and stock return, and between PER and stock return. The result is as follow:

Dependent Variable	Independent Variable	R square	Standardized Coef	t sig
Stock Return	Size	3.7%	-0.2	0.001

Table 3: Regression result of size to stock return

Dependent Variable	Independent Variable	R square	Standardized Coef	t sig
Stock Return	PER	2.5%	-0.158	0.007

Table 4: Regression result of PER to stock return

Table 3 and table 4 show that individually, seize and PER is significantly related to stock return. The coefficient is negative, as predicted by Fama-French Three Factors Model. The result supports the result of regression 2.

6. Discussion

It is shown that beta has no relation with stock return in Indonesia stock market. At best, the relation is weak although the coefficient sign is positive as predicted by CAPM. The reason might be because majority of Indonesia investors are not fully diversified. In an under-diversified portfolio, stock individual risk is not fully eliminated. Thus, investors bear both individual and market risk of the stock. Individual risk might dominate the market risk rendering market risk to be barely related to stock return. In the contrary, both size and PER are negatively related to stock return. The result is as predicted by Fama-French Three Factor Model. Indonesian investors see both size and PER as risk factors. Small size companies are regarded as riskier compared to big size companies, thus investors demand higher return. Smaller companies are deemed risky as they have higher probability to default, experience liquidity problem, and less stable. Low PER companies are also regarded as riskier compared to high PER companies. Low PER company can suggest that company is experiencing a problem and thus valued lower by market. Investors demand higher return as compensation for bearing the risk, and thus negative relation between stock return and both size and PER. It is interesting to note that individually beta is still positively related to stock return in 90% confidence level. The relation disappears when size and PER are added to the independent variables. It might suggest that size and PER are part of the individual risk bore by investors. The future research is to find the appropriate proxy for stock individual risk. The proxy shall correlate positively with stock return both individually and in conjunction with size and PER. The proxy will then be a better measurement for stock risk in Indonesia market

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