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THE RELATIONSHIP OF FINANCIAL FACTORS IN ASSET PRICING: THE CASE OF INDONESIAN MARKET

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Abstract

Purpose of the study: The study shows how the financial factor of *Leverage* affects the empirical model of asset pricing together with other financial factors, i.e. *Size*, *Book to Market*, *Operating Profit*, and *Investment*. The contribution of *Leverage* in asset pricing will be tested, and its effect will be shown in the excess return of the asset.

Methodology: The methodology used in this paper is based on the Fama and French model of asset pricing with additional factors added in the model. Data processing follows the Fama-Mc Beth procedure. Data comes from the Indonesian Stock Market, which consists of more than 500 stocks for ten years period of observation.

Main Findings: The financial factor of *Leverage* affects the empirical model of asset pricing together with, i.e. *Size*, *Book to Market*, *Operating Profit*, and *Investment*. All the financial factors in the model are stationary around their mean, or they are non-stationary due to unit-roots. All the independents' variables have P-Value less than 10%.

Implications: This study will be useful for financial investors in building an effective portfolio stock investment. By applying this model to their portfolio investment, the investors could effectively manage their portfolio return. On the management side, managing their financing structure, e.g. *Leverage* is the objective of the firm to maximize returns of the firms.

Novelty/Originality of this study: The empirical research with the involvement of the financial factor of *Leverage* has not been performed in Indonesia. The *Leverage* as the single factor of asset pricing has been considered as a significant financial factor for asset pricing, however, how the *Leverage* contributes to asset pricing compares to other financial factors has not examined yet.

Keywords: *financial factors, asset pricing, Indonesian market, Leverage, diversified portfolio, Factors model.*

INTRODUCTION

Based on IDX Fact Book 2017, Indonesia's economic situation has improved, especially since the second half of 2016, including portfolio investment in the capital market. It has led to a significant increase in trading shares in the Indonesian stock market in terms of the value, volume, and frequency of transactions. The average daily market value of shares increased from IDR 5,76 trillion in 2015 to IDR 7.50 trillion in 2016. The average daily trading volume, in terms of a number of shares, grew from 5,928 million to 7,827 million, and the average daily trading frequency changed from 222,000 to 264,000 times during the same period of the year. The three leading indicators of capital operations also reached a record level in the history of the Indonesian stock market in 2016, with operating volumes reaching IDR 189 trillion on November 11th, with a total trading volume of 36.05. Billions of shares on October 27th and the trading frequency of 433,674 times on November 11th. Market capitalization also increased by 18.09% in 2016, from IDR 4,872.70 trillion in 2015 to IDR 5,753.61 trillion on December 30th, 2016. According to the *Indonesia Economic Quarterly: Learning more, growing faster* (2018), Indonesia's Economic Situation in the first quarter of 2018 stays at a robust pace, it is because supported by significant Investment. The facts show that Indonesia is one of the emerging markets that has made significant progress in addition to other emerging markets. It is the main reason why stocks play a crucial role in the investment strategy of the Indonesian stock market. The asset pricing model, i.e. stock pricing shows how the financial factors contribute to the return of the asset.

The term "asset pricing" is defined as the expected return which can be modeled as a linear function of several fundamental financial factors or values, where sensitivity to change in each financial factor is represented by a particular beta factor. A researcher previously presented a series of asset pricing models, namely Sharpe's initial model Sharpe1964 to calculate capital prices by using Capital Asset Pricing Model (CAPM), initiation of Ross 1976 regarding Arbitrage Pricing Theory, the Fama-French model (Fama 1992, Fama 2012, Fama2015) and a four-factor model of Carhart 1997 and Fletcher 2017.

Among others, CAPM is the most common and useful asset pricing model. Under the Efficient Market Hypothesis (EMH), CAPM has some assumptions that investors are rational, the market is efficient, and there is unlimited arbitrage. Rational investors are the investors who would make the decision that result in the most optimal level. An efficient market is that share prices reflect all the information, and unlimited arbitrage is a condition that investors can take profit from a temporary difference in share prices. Those assumptions lead to the state that the only way investors could obtain a higher return is by purchasing riskier assets.

The equation in CAPM itself reflects only the risk around the asset, i.e. risk-free rate, volatility or systematic risk of shares or portfolios, and market risk premium which calculates from the difference of expected market return and the risk-free rate. The fundamental and technical aspects which are reflected in the price of the asset are omitted. However, some scholars found that pricing the asset relates to another financial factor involved in the asset other than just risks, e.g. Banz 1981, Basu 1983, Bhandari 1988, Fama 1992, and Fama 2015.

This paper examines the recent development of the financial factors model in asset pricing with an empirical approach of the Indonesian stock market. Even though there are some studies regarding this subject, e.g. Zarina 2011and Bergbrant 2016 for Indonesian case, i.e. Sutrisno2016, this study expands the possibility of adding a new financial factor in the asset pricing. The fundamental of Leverage which investigated previously by Bhandari_1988 as a financial factor contributes to the expected return of the stock has never been reinvestigated simultaneously with other financial factors in a model of asset pricing. Thus, this paper examines the collaboration of financial factors with the Leverage adds in the model to test the anomaly return.

The factors of Leverage as measured in the debt-equity ratio will be added in the empirical model of Fama_2015 to furnish other financial factors of beta, Size, B/M, profitability, and Investment. These financial factors are used to investigate the performance of the Indonesian stock market and how asset pricing empirically represented by those factors referenced by the model of Fama_2015 five-factors. Even though there are some studies regarding this matter, i.e. Zarina_2011 and Berbrant_2016, however, their reviews are incomplete yet in the sense of financial factors. They only used four financial factors, i.e. *Size*, *B/M*, and *momentum* instead of a recent financial five-factors model of Fama-French in their empirical model.

Previously, the financial factors, i.e. *Beta*, *Size*, and *B/M*, are used as proxies in the model. These proxies are measured by market risk, market capitalization, and book value to link with the expected return. In this study, additional financial factors of *Profitability*, *Investment*, and *Leverage*, which measured by operating profitability, change in the total asset, and total debts respectively are added in the model. For *Leverage*, this factor has never been used in any study yet, while it combines with other financial factors in the asset pricing model. By having all these independent variables, this study examines the fundamental of the firms in conducting portfolio investment, i.e. asset pricing.

LITERATURE REVIEW

The classic asset pricing model is based on the EMH, and the most used one is CAPM by Sharpe_1964. In these models, the expected return of the asset solely determined by the risks of the asset itself. Investors are assumed to be rational, the price of the asset is reflected by the information available, and there is unlimited arbitrage. If there is a deviation between the price of the asset and the information open, the arbitrager will limit the deviation. By having these assumptions, the only way for the investors to gain wealth is by buying higher-risk assets to generate a higher return for their portfolios. Within this model, the only factor that contributes to asset pricing is the risk associated with the stock itself. The price of the stock is determined by risk-free rate, risk premium, and beta. The risk premium is the excess return of the asset and beta is a measurement of the volatility of the asset compared to the market.

While the CAPM does not believe in fundamental or technical factors in predicting the asset pricing, many scholars investigate that there are some anomalies that cannot be explained by CAPM. Banz_1981 found that *Size* of the firm had a negative link to the asset pricing. The lower the capitalization of the firm, the higher the return. Further, Lakonishok 1986 believed that beta and risk of the firm had no links at all to asset return, only *Size* affected. Basu_1983 found that *earning price ratio (E/P)* had a significant relationship to asset return with any size of the firms. Thus E/P has a more substantial effect than Size to asset return. The higher the E/P, the higher return of the asset. Bhandari_1988 investigated that *Leverage*, which measured by debt to equity ratio, links positively to asset return.

Book to market ratio (B/M) found to be linked in a positive direction with the expected return (Rosenberg_1985). Further, they suggested that not only *B/M*, which has a significant link to the asset return but ratios which measure yield can be used as well, e.g. *E/P* and *dividend-price ratio*. *B/M* was found to be significant in determining the asset return as well by Chan 1991. While conducting their study, they did not only use *B/M* as the proxy but *Size*, *earnings yield*, and *cash flows* as well, however, *B/M* seemed to have the most significant impact on asset return.

All the factors mentioned above, i.e. *Size*, *earning/price*, *book/price*, and *Leverage* seem to be redundant in explaining the expected returns (Fama_2012). They believe that those factors are the scaled version of price. Thus, they extract those variables into *B/M* and *Size* only which to be more represented in valuing stock return. The explanation confirms the three-factor Fama and French model in Fama_1992, which consists of factors of risk or *beta*, *B/M*, and *Size*.

Buy past winners and sell recent losers is another stock valuation method, introduced by Jegadeesh 1993, which is another standard stock valuation, called *momentum.* Many scholars use it as a complementary tool (Chan_1996). Bicer_2006, besides applying technical and fundamental approaches, he uses momentum as well. Narayan 2016 Uses the momentum strategy for Islamic stocks. In Korea, momentum can only be explained by idiosyncratic risk (Pyo, 2013). Bornholt 2014explores some technical approaches to momentum. They believe that early-stage momentum strategy persistently produces more substantial profits, while other technical methods are less effective: late-stage and pure momentum

strategies as mentioned in Frazzini 2014 use the momentum strategy in combination with Fama-French three-factor and liquidity as another modification of stock valuation.

Kaplan 1995observes that *transaction values* and *forecast cash flow* link to the expected return and the discount rate outperforms Size and B/M. Carhart_1997 adds *momentum* as an additional factor in the Fama-French three-factor model. He finds that stocks with higher returns last year have higher average expected return next year, but not in years after that. Fama-French three-factor transforms itself as open to being modified to best fit the condition of the research. In the developed countries, all of the studies above prove the significant relation of factors to the expected return of stocks. However, not all those factors are contributed significantly to other regions of countries. The study of Foye 2013 shows that in developing countries, especially in Eastern European countries, a proxy of earning is best explained by *net income over cash flow* from the operating activities (*NI/CFO*) rather than a book to market. They propose the use of *NI/CFO* instead of a book to market for the alternative of doing the expected return of stocks of Fama-French three-factor.

In 2012, Fama and French added momentum to their three-factor model to investigate the international asset pricing model. Their work shows that momentum works well in advanced countries, except for Japan. From the global perspective, it looks that this four-factor model does not similarly affect global, regional or local. However, this scope is beyond this research that focuses only locally. The works of Fama-French four-factor, the addition of momentum into Fama-French three-factor, performs well in some countries, i.e. Central Eastern Europe (Zaremba 2014) and India (Balakrishnan 2016).

The modification or extension of the Fama-French three-factor continues to be found. Further, they complete their model by adding two more fundamental factors, i.e. *profitability* and *Investment;* both are measured by the operating profitability and change of asset, respectively. Operating profitability as revenues minus cost of goods sold, minus selling, general, and administrative expenses, and minus interest expenses all divided by book equity. Change of asset is the difference of total asset in year *t-2* and *t-1*and then divided by total asset at *t-1*. However, the factors of *profitability* and *Investment* have been done separately before Fama and French come out with their five-factor. The contribution of Novy Marx 2013 and Aharoni 2013 respectively believes that *profitability* and *Investment* support the prediction of average expected returns. After accommodating those new factors in their model, however, the empirical model of Fama_2015 is still incomplete. It fails to capture the low average returns on small stocks (with high Investment and low profitability).

As mentioned that *Size*, *earning/market price*, *book price/market price*, and *Leverage* seem to be redundant in explaining the expected returns. *Earning/market price* can be omitted due to the scaled-up of the price. However, the combination of *Size* and *book price/market price* are still can be used as the representation of the model. The *Leverage* used in the model was measured by the ratios of *asset/market price* and *asset/book price*. The combination of *asset/market price* and *asset/book price* was represented by the *book price/market price*. Thus, the Leverage if measured by *asset/market price* and *asset/book price* would be redundant, and the finding of Bhandari_1988 regarding the relationship of *asset/market price* and the average return could not be proven.

This study examines the *Leverage* from another measurement, instead of from the *asset/market price*, it is measured from the *debt/equity*. By having this approach, this study suggests that the portion of debt would matter to the asset pricing and it could reflect the risk of the firms which is not yet reflected in the systemic risk of beta.

DATA

This study is based on data of the firms listed in the Indonesian Exchange Market (IDX) from the period of 2005 to 2016. The firms listed in Indonesian Exchange Market are always more from one period to another. There were 347 firms listed in 2005, but then the numbers were soaring to 558 firms in 2016

The data of the firms consist of adjusted closed monthly prices, the numbers of stocks outstanding, stocks price index, book value, operating income, interest rates, total assets, liabilities, and equities. The period of observation is from July 2005 to June 2015. The risk-free rate is the Bank Indonesia Rate.

Size is the ratio of the market capitalization of a firm to the market capitalization of IDX while market capitalization of a firm at year t is taken from the number share of outstanding in December of year t-1 and market equity of a firm for June year t.

Book equity for June of year *t* is the book equity at the end of the fiscal year ending in year *t-1*, and market cap is at the end of December of year *t-1*. Operating income data of June year *t* is taken from the end of year revenue of year *t-1* which consists of revenues minus cost of goods sold, minus selling, general, and administrative expenses, minus interest expense. Thus, this number is divided by book to equity. Operating income data of each firm is taken from the IDX Annual Report. Data of Investment of June year *t* is taken from the change in a total asset of year *t-2* and *t-1* divided by a total asset of year *t-1*. Data of Leverage is taken from the IDX Annual Report by extracting the liabilities and equity data of each firm listed in the market. The Leverage of June year *t* is taken from liabilities and equity of a firm for the end of the fiscal year of *t-1*. The returns are taken from July of year *t* to June of *t+1*.

The sample taken for this study is based on Fama French (Fama_1992, Fama_2012, Fama_2015), which is not included the financial sector firms. The financial firms tend to have higher Leverage than non-financial firms, and it has a different

meaning. The higher Leverage in non-financial firms indicates distress. The firms with negative equity are excluded from the study. The firms involved in the study should have a total asset for year *t-2* and *t-1* to be considered in the study. The last requirement of the firms to be included in the study is that the firms must have an operating profit and book value of year *t-1*.

METHODOLOGY

The model of Fama-French (Fama_2015) will be the base for this study. The five factors include the *Market Beta*, *Size* of stocks or market capitalization of stocks, *B/M* ratio, *Operating Profitability*, and *Investment*. However, this study adds *Leverage* as a further factor to the model. The *Market Beta* is taken from the historical data, the S*ize* of stocks or market capitalization of stocks, *B/M* ratio, *Operating Profitability*, *Investment*, and *Leverage* data are taken from the fundamental data of the firms, which are taken from the financial statement of the firms listed in Indonesian stock exchange.

The model construction of the factors for the Indonesian stock exchange is as follows. The *Market Beta* is constructed as *RM – RF* (market factor) and is calculated based on the difference of market return and the risk-free rate. The Afterward of *Size* is represented by market capitalization of the firms listed on the Indonesian stock exchange. The market capitalization of each stock is calculated by a number of shares outstanding multiplied by the end of year market price. The number shares outstanding are stated in the firm annual report or otherwise is calculated from the information of *Earning Per Share (EPS)* and the *Net Income (NI)* of each firm. The numbers share of outstanding is found by calculating the *EPS* divided by *NI*. The market capitalization is divided into five groups, from small to big. Each year, the firms in the market are allocated in those groups. Thus, the *Size* is constructed by *SMB* or *Small Minus Big* which is estimated by the difference of average excess return of small size portfolio of stocks lies in the 20^{th} percentile, and big size portfolio of stocks lies in the 80^{th} percentile of the market.

Chan_1991 and Roosenberg_1985 show that *B/M* has a link to the excess return of the stocks. The factor of *B/M* is represented by the book value and market value of each firm in the market. Each year, the firms in the market are allocated into five groups of high book to market ratio to low book to market ratio. Book value is taken from the equity reported in the annual report of each firm listed in the Indonesian stock exchange. The market capitalization of each firm represents market value. Therefore, the *B/M* is constructed by *HML* or *High Minus Low* which is estimated by the difference of average excess return of high *B/M* portfolio of stocks lies in the 80^{th} percentile and low *B/M* portfolio of stocks lies in the 20^{th} percentile of the market.

The factor of *Operating Profitability* is represented by revenue minus cost of goods sold, minus selling, general and administrative expenses, minus interest expenses and all divided by book equity of each firm in the market. Profitability is a good predictor of asset excess return Novy_Marx_2013. Each year, the *Operating Profitability* of the firms in the market are allocated into five different groups of robust operating profitability to weak operating profitability. Thus, the factor of *Operating Profitability* is constructed by *RMW* or *Robust Minus Weak* and estimated by the difference of excess return of robust *Operating Profitability* portfolio of stocks lies in the 80^{th} percentile and weak *Operating Profitability* portfolio of stocks lies in the 20^{th} percentile of the market.

The factor of *Investment* is represented by the difference of total assets of the firms two years ago to the total asset of a year ago divided by a total asset of a year ago. According to Novy_Marx_2013, the Investment is contributed to the excess return of an asset, and further Fama_2015 shows that firms with higher book equity, which are higher Investments tend to have lower in expected return. Each year, the *Investment* of the firms is allocated into five different groups which represent firms with conservative investments that have fewer assets to firms with an aggressive investment that has more assets. Thus, the factor of Investment is constructed by *CMA* or *Conservative Minus Aggressive*, since the conservative firms usually have higher expected return than aggressive firms and estimated by difference excess returns of a traditional *Investment* portfolio of stocks lies in the 20^{th} percentile and dynamic investment portfolio of stocks lies in the 80^{th} percentile of the market.

The factor of *Leverage* is represented by the debt-equity ratio. The higher the debt-equity ratio, the higher the expected returns of the common stocks (Bhandari_1988). The Leverage of the firms is allocated into five different groups, which are from the portfolio of excessive Leverage to a portfolio of subtle Leverage. So, the factor of *Leverage* is represented by *EMS* or *Excessive Minus Subtle* and estimated by the difference of average expected return of the portfolio in the 80^{th} percentile or excessive *Leverage* portfolio of stocks and average expected return of the portfolio in the 20^{th} percentile or subtle *Leverage* portfolio of stocks.

The regression model is as follow:

$$R_{it} - RF_t = a_i + b_i(RM_t - RF_t) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_iEMS_t + r_{it} \ldots\ldots(1)$$

In this equation,

R_{it} = a return on stock *i* for period *t*;

RF_t = a risk-free rate;

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RM_t = a return on the value-weight (*VW*) market portfolio;

SMB_t = a return on a diversified portfolio of small stocks minus the return on a diversified portfolio of big stocks in term of capitalization;

HML_t = the difference between the returns on diversified portfolios of high and low *B/M* stocks;

RMW_t = the difference between the returns on diversified portfolios of stocks with robust and weak profitability;

CMA_t = the difference between the returns on diversified stocks portfolios of conservative and aggressive investment stocks;

EMS_t = the difference between the returns on diversified portfolios of stock with excessive and subtle Leverage, and

e_{it} = a zero-mean residual.

b_i, s_i, h_i, r_i, c_i, and e_i = coefficients of each factor, respectively.

If the sensitivities to the six factors b_i, s_i, h_i, r_i, c_i, and e_i capture all variation in expected returns, the intercept a_i is zero for all securities and portfolios *i*. The excess return is calculated by the difference in the monthly return of each stock and the risk-free rate. The risk-free rate is taken from the BI rate for the period of observation up to July 2016. Afterward, the BI 7-Day (Reverse) Repo rate or BI repo rate is used. For this study, the adjustment of the BI repo rate has been made by taking the last BI repo rate of the month.

The regression follows the classical assumption tests, e.g. *multicollinearity* and *heteroscedasticity*. The *multicollinearity* is the test to determine the correlation among the independent variables. High collinearity between independent variables will disturb the relationship of the independent variables and dependent variable. The remedial *multicollinearity* is done by transforming the variables into log natural. The *heteroscedasticity* is the test to the absent of homoscedasticity, which describes the case where the variance of errors is not the same for all observations. The remedial of the heteroscedasticity is by transforming the variables into log natural.

The study evaluates the adjusted R^2 of the portfolios built to test which portfolios with higher excess return and better suitable in the Indonesia market. The higher the adjusted R^2 shows the better portfolio stock investment in Indonesia market. Then, the investigation followed by the effect of diversification of portfolio investment. The portfolio diversifications are performed by making the combination of the factor of *Size* and other financial factors to figure out the effect of the financial factor and portfolio diversification in a portfolio's excess return.

DISCUSSION / ANALYSIS

The statistical summary of the asset pricing factor is shown in Table 1 below. The mean of monthly market factor is -6.4%, while the mean of monthly excess return for factor of *Size (SMB),book to market(HML), operating profitability(RMW), Investment(CMA)*, and *Leverage(EMS)* are 2.8%, -1.5%, 4.4%, -0.7%, and -0.5% respectively. The highest standard deviation is for *a book to market* factor, which is 9.2% and the lowest is for *investment* factor, which is 4.7%.

Table 1: Statistical Summary of Asset Pricing Factor

	RM-RF	*SMB*	*HML*	*RMW*	*CMA*	*EMS*
Mean	-0.064	0.028	-0.015	0.044	-0.007	-0.005
Median	-0.048	0.026	-0.011	0.036	-0.006	-0.001
Maximum	0.287	0.253	0.323	0.310	0.095	0.146
Minimum	-0.480	-0.109	-0.313	-0.102	-0.201	-0.203
Std. Deviation	0.084	0.059	0.092	0.061	0.047	0.051

The correlation between factors is shown in Table 2. *Size*, *Investment*, and *leverage* factors have a negative correlation to the *market* factor, while *the book to market* and *operating profitability* have a positive correlation to the *market* factor. *Book to market* and *leverage* factors have a positive correlation to the *size* factor, and *operating profitability* and *investment* factors have a negative correlation to *the size* factor. *Investment* and *leverage* factors have a negative correlation to *book to market* factor, and *operating profitability* factor has a positive correlation to *book to market* factor. *Investment* and *leverage* factors have a negative correlation to *operating profitability* factor. The *investment* factor has a negative correlation to *the leverage* factor.

Table 2: Correlation of Asset Pricing Factor

	RM-RF	*SMB*	*HML*	*RMW*	*CMA*	*EMS*
RM-RF	1	-0.256	0.188	0.200	-0.039	-0.158
SMB	-0.256	1	0.051	-0.364	-0.056	0.024

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HML	0.188	0.051	1	0.221	-0.081	-0.284
RMW	0.200	-0.364	0.221	1	-0.215	-0.065
CMA	-0.039	-0.056	-0.081	-0.215	1	-0.173
EMS	-0.158	0.024	-0.284	-0.065	-0.173	1

The stationarity test using *Kwiatkowski, Philips, Schmidt, and Shin* (KPSS) test is shown in Table 3. The time series of the factors are stationary around their mean, or they are non-stationary due to unit-roots. All the independents' variables have P-Value less than 10%.

Table 3: *Kwiatkowski, Philips, Schmidt, and Shin* (KPSS) Stationary Test

Lags	P-Value	t-stat	Lags	P-Value	t-stat	Lags	P-Value	t-stat
RM-RF			SML			HML		
0	0.1000	0.0800	0	0.0353	0.1636	0	0.1000	0.1171
1	0.1000	0.0750	1	0.0710	0.1347	1	0.0930	0.1228
2	0.1000	0.0700	2	0.0924	0.1231	2	0.0989	0.1196
3	0.1000	0.0646	3	0.1000	0.1138	3	0.1000	0.1099
4	0.1000	0.0611	4	0.1000	0.1042	4	0.1000	0.1006
5	0.1000	0.0601	5	0.1000	0.0985	5	0.1000	0.0958
6	0.1000	0.0600	6	0.1000	0.0959	6	0.1000	0.0910
7	0.1000	0.0594	7	0.1000	0.0946	7	0.1000	0.0893
8	0.1000	0.0592	8	0.1000	0.0940	8	0.1000	0.0898
RMW			CMA			EMS		
0	0.0724	0.1339	0	0.1000	0.0877	0	0.1000	0.0239
1	0.0759	0.1320	1	0.1000	0.0856	1	0.1000	0.0345
2	0.0554	0.1341	2	0.1000	0.0887	2	0.1000	0.0405
3	0.0551	0.1433	3	0.1000	0.0967	3	0.1000	0.0430
4	0.0545	0.1436	4	0.1000	0.0932	4	0.1000	0.0435
5	0.0512	0.1454	5	0.1000	0.0868	5	0.1000	0.0420
6	0.0496	0.1464	6	0.1000	0.0798	6	0.1000	0.0429
7	0.0551	0.1432	7	0.1000	0.0781	7	0.1000	0.0443
8	0.0591	0.1411	8	0.1000	0.0774	8	0.1000	0.0473

The regression shows that the coefficient of intercept has a negative relationship with the monthly excess returns of stocks; the value is -0.0104. The asset pricing factor of debt (*EMS*) is -0.0767 and has a negative relationship as well to the monthly excess returns of stocks. Other asset pricing factors have positive relationships with the monthly excess return of the stocks. Their values are 0.0017, 0.2287, 0.3285, 0.3300, and 0.0543 for market factor (RM-RF), capitalization of stocks (*SMB*), book value (*HML*), net income (RMW), and total asset (*CMA*). This regression has *an R* square close to 40% and the adjusted R-square of 32%.

The summary of the average monthly excess return of each portfolio is shown in Table 3. It consists of the average monthly excess return of 25 portfolios of Size and *Book to Market* (*B/M*), 25 portfolios of *Size* and *Operating Profitability* (*OP*), 25 portfolios of Size and *Investment* (*INV*), and 25 portfolios of *Size* and *Leverage* (*LEV*). Most portfolios have positive average monthly excess returns except for portfolios of high *B/M* and high *INV*. The R^2 of the regression is 0.3600, and the adjusted R^2 is 0.3223.

Table 4: Regression Results

	Coef.	*Std. Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.0104	0.0092	-1.1229	0.2641	-0.0287	0.0079	-0.0287	0.0079
RM-RF	0.0017	0.0689	0.0248	0.9803	-0.1349	0.1383	-0.1349	0.1383
SMB	0.2287	0.1024	2.2326	0.0278	0.0255	0.4318	0.0255	0.4318

HML	0.3285	0.0642	5.1129	0.0000	0.2010	0.4559	0.2010	0.4559
RMW	0.3300	0.1019	3.2382	0.0016	0.1278	0.5321	0.1278	0.5321
CMA	0.0543	0.1217	0.4459	0.6566	-0.1871	0.2957	-0.1871	0.2957
EMS	-0.0767	0.1146	-0.6691	0.5049	-0.3040	0.1506	-0.3040	0.1506

The average excess monthly return for each asset pricing factors can be seen in Table 5. It shows that the excess return is quite significant and has a positive value, as well as the factor of *Size* and *Operating Profitability*. However, the value of R^2 and adjusted R^2 of the regression is low; the study further investigating the effect of portfolio diversification on the excess return. To do that, the study makes the diversification by combining the factor of *Size* with other factors of asset pricing. The results of the diversification can be seen in Table 6.

Table 5: Average Monthly Excess Return Based on Asset Pricing Factors

	RM-RF	SMB	HML	RMW	CMA	EMS	R-RF
Average monthly return	-0.0645	0.0275	-0.0152	0.0442	-0.0069	-0.0048	0.0054

For 25 portfolios of *Size* and *Book to Market (B/M)*, the market capitalization of stocks does not have any influence on the excess return of the portfolios. The findings show no specific pattern for the portfolio's excess return. However, the book value of stocks has no a tendency to portfolios, high book value tends to create negative excess returns for portfolios, or high book value tends to have smaller excess returns compared to low book value. This pattern applies to the 25 portfolios of *Size* and *Leverage* as well. The portfolio of stock contains firm with high debt tends to have low excess returns and vice versa.

Other diversified portfolios, i.e. 25 portfolios of *Size* and *Investment* and 25 portfolios of *Size* and *Operating Profitability* have no specific pattern in the average monthly excess returns. Thus, the net income and assets of firms have no particular link to the excess return of stocks. The capitalization of shares has no specific connection to the excess return as well.

Table 6: Portfolio Average Monthly Excess Return

	Low	2	3	4	High
Panel A: Portfolio 25 SIZE/BM					
Small	0.011	0.011	0.009	0.046	-0.035
2	0.015	0.011	0.049	0.007	-0.023
3	0.011	0.016	0.010	0.011	-0.022
4	0.047	0.010	0.016	0.011	0.043
Big	0.004	0.010	0.011	0.014	-0.020
Panel A: Portfolio 25 SIZE/OP					
Small	0.073	0.074	0.101	0.043	0.064
2	0.016	0.076	0.048	0.095	0.068
3	0.075	0.016	0.073	0.072	0.069
4	0.047	0.070	0.016	0.071	0.048
Big	0.097	0.070	0.070	0.016	0.074
Panel A: Portfolio 25 SIZE/INV					
Small	0.025	0.023	0.026	0.047	-0.005
2	0.016	0.024	0.048	0.027	-0.006
3	0.024	0.016	0.023	0.024	-0.006
4	0.047	0.023	0.016	0.023	0.047
Big	0.026	0.024	0.023	0.017	-0.006
Panel A: Portfolio 25 SIZE/LEV					
Small	0.030	0.026	0.030	0.044	0.000
2	0.016	0.028	0.048	0.032	0.000
3	0.029	0.016	0.027	0.027	0.000

4	0.049	0.028	0.016	0.025	0.047
Big	0.033	0.028	0.027	0.015	0.000

Table 1 shows that mean of monthly market factor is -6.4%, while the mean of monthly excess return for factor of *Size (SMB)*, *book to market (HML)*, *operating profitability (RMW)*, *Investment (CMA)*, and *Leverage (EMS)* are 2.8%, -1.5%, 4.4%, -0.7%, and -0.5% respectively. During the period of observation, this finding shows that the portfolios of stocks built based on market capitalization and net income have a positive excess return, while portfolios of other factors have a negative average monthly excess return. The negative sign for the excess return could be caused by the period of observation, which includes the economic crisis during the year of 2008. After the economic crisis, the Indonesian market shows an uptrend pattern of the market. The market capitalization and the volume of the transaction have increased. This phenomenon could be represented by the monthly average excess return of the portfolios build by the factors. Most of the firms in the market have gained profit, and the price of stocks higher, however, fundamentally, the book value of the firms has not been in line with the trend of the market. The investment and leverage factors seem to have a similar pattern in average monthly excess returns.

The excess return of the small size portfolio is positive and higher than the excess return of big stocks. The highest standard deviation is for the book to market factor, which is 9.2% and the lowest is for investment factor, which is 4.7%.

According to Fama_2015, B/M is a noisy factor since it contributes to the factor of *Size*, and it also adds to the factor of *Investment*.

$$\square/\square = ((\sum\square(\square - \square\square))/(1+\square)\hat{}\square)/\square ....(2)$$

If *M* is market price, *B* is book value, *Y* is total equity earning, and *r* is expected the return. Thus, according to the equation above and by making all the variables fix in the equation except for *M* and *r*, the factor of *B/Mratio* would have negative relationship with the factor of *Size* which is the market value of the stock and positive relationship with the factor of *Investment* which is the book equity of the stock. The *B/M ratio* and *Investment* would have a negative relationship with *expected return (r)*, and the factor of *Size* would have a positive relationship with *the expected return*.

However, from Table 2 - correlation of asset pricing factor - the factor of *B/M* has a positive relationship with the factor of *Size* and has a negative association with the factor of *Investment*. This study uses the period from 2005 to 2016, which was the economic crisis that has occurred in the Indonesian market. This could be a reason behind the results found. This anomaly should be investigated further.

In Table 2, for the factor of *Leverage*, it has a negative correlation with the factor of *B/M*. Since this is the new factor added to the model, there is no evidence from another empirical model that shows the result yet. Thus, for the Indonesian stock market, the factor of *Leverage* has a negative correlation with the factor of *B/M*, similar to the factor of *Investment*.

The excess return of the diversified portfolios combination based on the factor of *Size* is mostly positive and quite high. The effect of high *B/M* and high *Investment* provide a negative value of the diversified of the portfolios, even though the coefficient of regression for the factor of B/M and Investment are both positives. The diversification sure has a specific effect on the excess returns of diversified portfolios. This occurrence is better to investigated further to know how the relationship of the asset pricing factors contributes to the impact of excess returns of diversified portfolios.

CONCLUSION

The study shows that the financial factor of *Leverage* affects the empirical model of asset pricing together with other financial factors, i.e. *Size*, *Book to Market*, *Operating Profit*, and *Investment*. The contribution of *Leverage* in asset pricing is shown in the excess return of the asset. The effect of each asset pricing factor is different from the findings of Sutrisno_2016. This study shows that all the financial factors used in the model are statistically significant. Each financial factors affect differently to the monthly excess return of the portfolios.

The empirical evidence of the asset pricing factors in the Indonesian stock market show quite different from the previous studies. Sure, there is always a difference between the emerging and advanced markets in terms of the characteristic of the markets. Even, among the emerging markets itself. The period of observation might influence the results of the study as well.

The effect of the asset pricing factors to the excess returns is also different for stock portfolio investment in general and the diversified ones. Even though this study only has performed the diversified stock portfolio investments based on the combination of a factor of *Size* with other factors of asset pricing. It is quite useful to investigate further for a different combination of diversified stock portfolios investment.

It is good to know which of the factors contributes more than others. As we know from this study that all the factors are statistically significant to the dependent variable; however, the magnitudes of the factors are not clear enough. By knowing the magnitude of the factors in asset pricing, it would assist the investors in weighting their asset in their portfolio. The magnitude of the factor leads to a higher portfolio return of stocks. Another suggestion is to rebalance the portfolio of

stocks more often. Since the stocks are fluctuating and dynamic, it is better to have more frequent rebalancing to have a better representative of the model. The more rebalancing is performed, the more the return of the portfolio of stocks close to the objective. However, it is interesting to consider how frequent the portfolio needs to rebalance since if the investor rebalancing their portfolio, it is related to the cost their born. Thus, by considering the return of the portfolio of stocks and the rebalancing cost, it leads to a more efficient portfolio of stocks.

LIMITATION AND STUDY FORWARD

This study covers only ten years of observation from 2005 to 2016, and it does not cover the different economic conditions of the Indonesian market. By having a more extended period, the effect of the change in the economic situation might be analyzed better.

Further study by having more scenarios of factors than just the combination of Size and other factors might be more interested since the application could be further useful. The frequency of rebalancing should be considered as well to reach the highest return of the portfolio of stocks.

Based on the value of R^2 and adjusted R^2 of the regression, it is interested in finding out how the diversified portfolio can improve those values. This further study could be done to satisfy the curiosity regarding the impact of diversified stock portfolio investment on the excess return of the portfolio.

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