ANALYSIS OF ASSET GROWTH ANOMALY ON CROSS-SECTION STOCK RETURNS: EVIDENCE FROM INDONESIA STOCK EXCHANGE

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ABSTRACT

Assorted types of market anomalies occur when stock prices deviate from the prediction of classical asset pricing theories. This study aims to examine asset growth anomaly where stocks with high asset growth will be followed by low returns in the subsequent periods. This study finds that an equally-weighted low-growth portfolio outperforms high-growth portfolio by average 0.75% per month (9% per annum). The analysis is extended at individual stock-level using fixed-effect panel regression in which asset growth effect remains significant even with controlling other variables of stock return determinants. This study also explores further whether asset growth can be included as risk factor. Employing two-stage cross-section regression in Fama and Macbeth (1973), the result aligns with prior studies that asset growth is not a new risk factor; instead the anomaly is driven by mispricing due to investors' behavior.

Keywords: *Asset Growth Anomaly, Asset Growth Effect, Stock Returns*

1. INTRODUCTION

Building on the analysis of modern portfolio theory by Markowitz (1952), academic literatures have developed theories for asset pricing. The well-known one is capital asset pricing model (CAPM), developed independently by Treynor (1961), Sharpe (1964), Lintner (1965), and Mossin (1966). The model argues that in a portfolio that has been well-diversified the return of an asset is a function of its non-diversifiable risk (systematic risk) represented by beta (β).

In order for such model to correctly price an asset a sufficient platform is needed in relation to the clarity of the market. It is efficient market hypothesis (EMH), claiming that market is efficient because it reflects all relevant information. The hypothesis can be characterized in three forms: weak form (impossibility to make prediction based on historical information), semi-strong form (all publicly available information are immediately reflected on current market prices), and strong form (asset prices reflect all information including private information).

Several empirical studies have challenged the proposition of efficient market that it is impossible to predict return. Some studies show stock returns are predictable such as the finding of weak

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returns correlation over short periods in Conrad and Kaul (1988), serial correlation of momentum property over 3-12 months period in Jegadeesh and Titman (1993), and reversal patterns over long periods in DeBondt and Thaler (1985). Such findings are known as market anomalies: factors or information beyond relevant information that seemingly predict abnormal returns. Under the perspective of CAPM, anomalies observed in stock markets cannot be explained by market beta.

Large empirical studies have examined these market anomalies that are associated with cross-section stock returns, such as size effect (Banz, 1981; Keim, 1983; Reinganum, 1983), neglected-firm effect (Arbel and Strebel, 1983), liquidity effect (Amihud and Mendelson, 1991), and leverage effect (Bhandari, 1988). There are also persisting calendar effects such as January effect (Keim, 1983; Ritter, 1988) and day-of-the-week effect (French, 19880; Keim and Stambaugh, 1984). Anomaly is also found in relation with how stock is valued by investors in the market, in which stock returns are negatively correlated to price-to-earnings (Basu, 1983) and positively correlated to book-to-market (Stattman, 1980; Fama and French, 1992).

Under the presence of these anomalies it is perplexing whether abnormal returns as the result of easily accessible statistics are suspected as violation of an efficient market. However, Fama and French (1993) argued that the existence of anomalies does not mean that a market is inefficient; rather market anomalies are manifestation of risk premiums. Their findings led into the subsistence of Fama-French three-factor model, in which size and value (by book-to-market) are incorporated as risk premiums in addition to existing market risk premium.

A specific type of anomaly that becomes the main interest in this study is known as asset growth effect. Titman, Wei, and Xie (2004) found that firms exercising capital expenditures that make their assets grow exhibit low return on their stocks in the following period, while divesting firms with contracting assets are inclined into higher return on their stocks. Stock prices are considered as function of present value of future cash flow. Firms realizing investment should be expected to generate higher earnings and cash, improving its future prospects and reflect such projection into current stock prices. An efficient market should have captured decision of the firms in making real investments but the reality evidently shows a fundamental bias in the market.

The impact of asset growth on stock return has been explained in some empirical works, but through disaggregated components of assets. From the investing side, Hirshleifer, Hou, Teoh, and Zhang (2004) shows that net operating asset has negative correlation with stock return. From the financing side, Pontiff and Woodgate (2008) found negative correlation for debt issuance, stock issuance, stock repurchase, and merger on stock return. But the use of total asset growth as means in examining stock return started with Cooper, Gulen, and Schill (2008).

All this time, the dilemma of asset growth and stock return is associated with two types of explanation: risk-based and investor's behavior. The former explanation is related with classical conception in finance about systematic risk. Firms with limited investment choices may seem riskier than firms that have converted their investment choices into true investment. Because return is merely compensation for risk, firms who put their investment into realization generate lower return. Anomaly can also be explained through investors that may overreact on firms' announcement of investment decision. As investors expect firms will always throttle with high growth, there comes mispricing in which stock return in the following period is basically correction for the real value of investment.

As an emerging market, stock market in Indonesia may arguably be less efficient. Many empirical tests have been performed using traditional model like CAPM, but analysis of anomalies is merely found in handy, limited into size and book-to-market effect either as specific variables or from Fama-French three-factor model (Amanda and Husodo, 2014). This study aims to examine whether the asset growth anomaly is also found in Indonesian market that is dynamic and still developing in nature. This relationship will be examined through portfolio analysis on aggregate level and analysis on individual stock level.

2. Literature Study

The negative correlation between asset growth and stock returns can be traced back into some previous studies. Several initial works documented the effect of investing and divesting activities into stock returns. It is found that the impact of investing activities such as acquisition (Asquith, 1983), equity offerings (Loughran and Ritter (1995), Pontiff and Woodgate (2008)), debt offerings (Spiess and Affleck-Graves, 1999), and bank loan announcement (Billet, Flannery, and Garfinkel, 2006) has negative impact on stock returns. Whilst the impact of divesting activities has been positive towards stock returns, such as spinoff restructuring (Cusatis, Miles, and Woolridge, 1993), stock buyback (Lakonishok and Vermealen, 1990), debt repayments (Affleck-Graves and Miller, 2003), and dividend initiations (Michaely, Thaler, and Womack, 1995). The determination of stock return by paying attention to asset growth using total asset growth instead of its components began with Cooper, Gulen, and Schill (2008) using stocks listed in NYSE, Amex, and NASDAQ, then followed by Gray and Johnson (2011) in Australian stock market and Muangsri (2010) in Thai stock market.

There are two sorts of explanation underlying the asset growth anomaly in cross-section stock returns: risk-based and mispricing. Risk-based factor identifies the relation between the extents of risk embed in the change of total assets of the firm, which is characterized by two concepts: growth options model and optimal investment model. The other is mispricing explanation driven by irrational investors' behavior in the market.

2.1. Risk-Based Asset Growth Effect

Berk, Green, and Naik (1999) developed *growth options model* in which firms have two types of assets: existing cash-flow-generating assets and options to make positive net present value (NPV) of investments in the future. Investment is attractive when the overall outlook of risk is low and the firm becomes more valuable. However, in making the investment there is lowered average risk for the next post-investment periods that lead into lower average returns. In the contrary, when the firm loses its assets its value will subsequently drop therefore the average risk will increase.

The model infers that firms that do not exercise its growth options to realization of investment in assets will look riskier than those making investments. Risk is in turn compensated by return therefore the return for riskier firms will be higher.

Another possible explanation of asset growth anomaly derives from *optimal investment model*. Developed by Lam and Wei (2011), the model assume two periods in which firm makes investment I_{i0} in period 0 and incur investment adjustment cost. The firm's capital is $K_{i1} = I_{i0} + (1 - \delta) K_{i0}$, in which δ is capital depreciation rate. The investment adjustment cost is $C(I_0, K_0) = (\lambda/2) (I_{i0}/K_{i0})^2 K_{i0}$. Consequently, the higher λ means the higher level of investment friction. The operating profit of the firm is given by ΠK_{it} (t=0 and t=1), in which Π is marginal productivity of capital. Following this information, the free cash flow of the firm can be identified for period 0 and period 1. The free cash flow of the firm for the period 0 is $K_{i0} - I_{i0} - (\lambda/2)\,(I_{i0}/K_{i0})^2 K_{i0}$ and for the period 1 is $\Pi K_{i1} + (1 - \delta)\, K_{i0.}$

The objective of the firm is to maximize the present value of free cash flow is a follow.

$$\max \Pi K_{i0} - I_{i0} - \frac{\lambda_i}{2}\left(\frac{I_{i0}}{K_{i0}}\right)^2 K_{i0} + \frac{1}{R_i}[\Pi K_{i1} + (1-\delta)K_{i1}] \quad (1)$$

With Ri as the discount rate, the first-order condition of the optimal investment of the firm is given by following equation.

$$R_i = \frac{\Pi + 1 - \delta}{(1 + \lambda I^*_{i0} / K_{i0})} \quad (2)$$

What should be noted from the attributes of above equation is that the left-hand side is the cost of capital and the right-hand side is the marginal cost of investment. Hence, the optimal level of investment will be achieved when the cost of capital equals the marginal return on investment. Holding Ð (profitability) and ä (depreciation) constant, in an optimality condition firms with higher investments are those with lower discount rates. Therefore, there exists negative relationship between investment and return.

2.2. Mispricing-Based Asset Growth Effect

Mispricing concept is related to the projection of investors towards the value of stocks with growing assets. As investors believe that stocks with growing investments will keep growing in the foreseeable future, they may overestimate the true value of the investments or the firm itself (Lam and Wei (2011), Lipson (2009)).

Titman, Wei, and Xie (2004) states the idea of *overinvestment*: investors are likely to overreact into investment decisions of a firm without fully considering the existence of agency problem of overinvestment. The nonlinearity of objective between managers and shareholders of the firm may result into negative NPV investments that are mis-judged by investors.

Baker and Wurgler (2002) assessed the relation between market timing and capital structure, in which firms tend to make external equity financing when their stock market values are high relative to book and past market values, and to repurchase equity when their stock market values are low. Should investors not take into consideration such management opportunism in financing behavior, there exists a negative relation between external financing translated into change of total assets with subsequent stock returns that leads into mispricing due to *market timing in financing decision.*

Lakonishok, Shleifer, and Vishny (1944) pointed out that investors may engage in *extrapolation bias*: excessively extrapolating from firms' growth in the past in their investment decision. Similarly explained in the earlier subchapter about the growth stock, firms with historical high growth tend to be overvalued therefore the earnings in the following periods for such stock are consequentially lower due to price correction.

3. Methodology

This study utilizes data from publicly listed firms in Indonesia Stock Exchange within the observation period of 2010 – 2014. Firms listed prior to 2010 or delisted within observation period should not be included. The sample will not include financial firms as the nature of assets observed as capital investments, not financial investments. This method is also consistent with prior studies such as in Fama and French (1992) and Cooper, Gulen, and Schill (2008).

The sample also will only include firms that publish accounting reports within the observation period. Both market data (e.g. adjusted closing price, market capitalization, Jakarta Composite Index/IHSG) and accounting data (e.g. total assets, book value of equity) are retrieved from Thomson Reuters Eikon. The number of stocks included in the sample is 283 publicly listed firms in Indonesian within five years observation period. Therefore sample comprises of 1415 firm-year.

In order to achieve research objective mentioned initially, author intends to examine stock return in two levels: aggregate and individual, by following procedures in Gray and Johnson (2011). In addition, this study also will examine whether asset growth anomaly is due to risk-based concept or mispricing caused by investor behavior. Therefore, different research models are used in order to achieve the examination on different objectives.

3.1. Examination of Asset Growth Anomaly in Aggregate Level

When cross-section anomalies are found in the capital market, past empirical studies commonly tested those anomalies using portfolio analysis. This analysis is to explore whether asset growth can predict the behavior of stock returns. If this is the case, investors may have used them in order to generate excess returns. Therefore, the first hypothesis in this research is as follows.

H1: In aggregate portfolio level, subsequent stock returns where asset growth is low are higher than subsequent stock returns where asset growth is high.

Following the procedure in Gray and Johnson (2011), aggregate examination is performed by creating several portfolios containing stock sample in observed periods. The creation of portfolio is conducted annually in which the classification is based on annual asset growth level:

$$AG = \frac{\text{Total Asset}(t) - \text{Total Asset}(t-1)}{\text{Total Asset}(t)} \quad (3)$$

After the value of asset growth is computed, there will be positive *AG* and negative *AG.* Stocks with positive *AG* are divided into five portfolios cut-crossed in equal-interval quintile. Stocks with negative *AG* are put into two portfolios with median as interval cut-cross point. Each portfolio is reconstructed each year in all observed periods. Every year there are seven portfolios, listed from lowest to highest asset growth value: *Negative 1, Negative 2, Positive 1, Positive 2, Positive 3, Positive 4,* and *Positive 5*.

In each portfolio monthly stock return is computed in each year. In order to know whether asset growth is negatively correlated with stock return, comparison of monthly stock return is made between two portfolios: *Negative 1* and *Positive 5*. Research model used in this aggregate examination on portfolio is independent t-test, as both sample groups are independently correlated and changing in each observed year period. The calculations will require different formulas for different assumption of equal variance. Hence, after inter-sample variances are observed, the samples with equal variances will be calculated using Student t-test while the samples with unequal variances will be calculated using Welch t-test.

This part of analysis will also divide stocks into three groups based on their market capitalization: big stocks, small stocks, and micro stocks. Big stocks are

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those making up 90% of total market capitalization, small stocks with 7% market capitalization, and micro stocks of 3% market capitalization. This procedure follows the idea of Grey and Johnson (2011) that states the importance of stock-grouping analysis.

3.2. Examination of Asset Growth Anomaly in Individual Stock Level

Examination of total asset growth effect on stock returns in individual level is performed using panel regression between *total asset growth* (*AG*) one-year as independent variable on yearly stock return as dependent variable. Some control variables are also presented accordingly following Grey and Johnson (2011).

$$R_i = \beta_0 + \beta_1 AG + \beta_2 LOG\ MV + \beta_3 BM + \beta_4 RET12 + \beta_5 NOA + \beta_6 ACCRUALS + \varepsilon_i \quad (4)$$

The dependent variable R_i is lagged one-year to the independent and control variables, in which asset annual return at time *t* is regressed into independent and control variables at time *t – 1.* The independent variable is only *AG* that is percentage of annual total asset growth.

The control variables are derived from Fama-French three-factor model. *LOG MV* is proxy for size as natural logarithm of market value of a stock (stock price multiplied by outstanding shares volume) and *BM* is book-to-market value (book value of equity per market value of equity). *RET12* represents control variable for momentum property, which is buy-and-hold return in twelve months prior to portfolio formation. The other two control variables are alternative proxies for asset growth. *NOA* is net operating assets: total assets excluding financial assets (e.g. marketable securities) subtracted by total liabilities excluding financial liabilities (e.g. notes payable, bonds), while *ACCRUALS* are net accrued assets: accrued assets (e.g. accounts receivables, prepaid expenses) subtracted by accrued liabilities (e.g. accounts payables, accrued income).

In this regression, it is expected that the regression coefficient of variable AG (â1) is negative in order to support the following second hypothesis:

H2: In individual stock level, there is negative effect of total asset growth to the subsequent stock returns.

3.3. Examination of Asset Growth Anomaly as Risk-Based Factor

In order to identify whether the cause of asset growth anomaly is risk-based factor or due to investor behavior, two-stage cross-sectional regression (2SCR) model can be applied following Fama and Macbeth (1973). The first regression is used to estimate factor beta then the second regression is performed to identify the validity of each factor beta as risk factor.

The first stage is to conduct time-series regression with this model:

$$R_{p,t} - R_f = \alpha_p + \beta_{p,MRP}(R_{m,t} - R_{f,t}) + \beta_{p,SMB} SMB_t + \beta_{p,HML} HML_t + \beta_{p,AG} AGfactor_t + \varepsilon_{p,t} \quad (5)$$

$R_{p,t}$, $R_{m,t}$, and $R_{f,t}$ is return of asset *p,* portfolio, and risk-free asset in period *t.* SMB (small minus big) and HML (high-minus-low) are size and book-to-market factors based on Fama and French (1992). $AGfactor_t$ is factor-mimicking portfolio based on total asset growth. This model is basically derived from Fama-French three-factor model but enhanced with an asset-growth factor.

Estimation of factor betas in Equation

(5) for the first-stage regression needs to follow independent steps different from previous regression and statistical tests in the previous sub-analysis. Therefore, a separate test asset is needed with a construction of new portfolios. The test asset used in this part of analysis is the construction of portfolios based on cross-sorting stocks on firm size, book-to-market, and asset growth. Following the procedure in Gray and Johnson (2011), stocks are categorized into three parts based on each characteristic with 30th and 70th percentiles as the cutoff points; resulting into 18 portfolios from 2 x 3 x 3 sorting procedure. Monthly return is computed for each portfolio every year in the observation period. Thereby, the excess return of portfolio that is the dependent variable $R_{p,t} - R_f$ can be obtained. Monthly market risk premium, $R_{m,t} - R_f$, is computed by subtracting monthly market return (IHSG return) to the monthly risk-free rate (SBI rate).

Several other portfolios are to be constructed to estimate other risk premiums predicted by the model. Portfolios are to be constructed by cross-sorting size and book-to-market (BM) to obtain *SMB* and *HML*. Gray and Johnson (2011) states that asset-growth premium is considered as BM neutral because asset growth is related to size less than to book-to-market. Henceforth, portfolios are further constructed by cross-sorting asset growth (AG) and book-to-market to obtain *AGfactor.*

Factor betas obtained in the first-stage regression is utilized as the independent variable in the second-stage regression. The model for the second-stage regression is as follows.

$$R_{p,t} - R_f = \lambda_0 + \lambda_1\beta_{p,MRP} + \lambda_2\beta_{p,SMB} + \lambda_3\beta_{p,HML} + \lambda_4\beta_{p,AG} + v_p \quad (6)$$

The purpose of this second stage regression is to estimate $ë_{4.}$ When the value is greater than zero and statistically significant asset growth anomaly is caused by risk factor. Otherwise, it is explained by mispricing due to investor behavior. The third hypothesis will be as follows.

H3: Asset growth anomaly is caused by risk factor, not due to mispricing.

4. Results and Analysis

For the sake of aggregate level analysis, stocks are divided into three categories based on market capitalization. Big stocks are those making up 90% of total market capitalization, small stocks with 7% market capitalization, and micro stocks of 3% market capitalization. This procedure results into portfolio groupings in which the proportions of big stocks, small stocks, and micro stocks are around 25%, 15%, and 60% of total numbers of stocks, respectively. Size grouping are necessary because of the existence of abundant numbers of stocks with very low market capitalization. Small stocks also tend to be less liquid due to high transaction costs. Table 1 below shows descriptive statistics that explain all observations.

Table 1 Descriptive Statistics for All Variables

	AG	*MV*	*BM*	*Ret12*	*NOA*	*ACCRUALS*
All Stocks						
Mean	0.279	10,481	0.983	0.210	-0.208	0.145

Median	0.109	1,381	0.645	0.015	0.685	0.058
Std. Dev	1.896	30,896	2.628	0.811	4.068	0.605
Big Stocks						
Mean	0.415	29,800	0.858	0.633	0.714	0.102
Median	0.069	10,381	0.510	0.350	0.719	0.042
Std. Dev	2.754	48,292	1.269	1.16	0.449	0.231
Small Stocks						
Mean	0.525	3,870	0.922	0.226	0.294	0.263
Median	0.109	3,720	0.450	0.000	0.743	0.065
Std. Dev	4.335	1,982	1.609	0.691	2.772	1.413
Micro Stocks						
Mean	0.224	1,099	1.126	0.175	-0.759	0.149
Median	0.082	384	1.019	0.000	0.616	0.066
Std. Dev	0.998	3,468	3.271	0.857	5.087	0.306

The degree of asset growth (*AG*) subtly varies across size categories. Assets grow by average 42% and 53% respectively for firms in big and small groups, while assets for firms in micro group only grow by average 22.4%. In terms of size, micro stocks generally have tiny market capitalization (*MV)*, only Rp 1.1 trillion in average. On the other hand, small stocks and big stocks are Rp 3.87 trillion and Rp 29.8 trillion in average value.

The value of book-to-market (*BM*) ratio is slightly increasing towards smaller stock group, from 0.86 for big stock group to 1.13 for micro stock group. Value stocks (stocks with high book-to-market ratio) and growth stocks (stocks with low book-to-market ratio) should jointly present in each size group. But there is a leniency in which big stocks and small stocks that generally have higher asset growth also have lower book-to-market ratio. This may indicate that stocks with high asset growth are also "growth" stocks based on Fama-French three-factor model because they have low book-to-market ratio.

Variable *RET12* shows that the momentum property of big stock is distinctive in comparison to other size groups. The average twelve-month buy-and-hold returns before portfolio formation for big stock group is 63.3%. Meanwhile small and micro groups have 22.6% and 17.5%, in average, respectively.

NOA and *ACCRUALS* are also presented as alternative proxies for asset growth. The value of *NOA* is monotonically declining towards the smaller size group. The smallest group of stocks tends to hold less operating assets than operating liabilities, indicating less solvency or heavy reliance on debt financing. *ACCRUALS* show the degree of short-term operating asset over short-term operating liabilities. Small stock has the highest average value (26.3%) over the other groups.

4.1. Aggregate Level Analysis

Analysis of asset growth anomaly in aggregate level is performed by dividing stocks into several portfolios based on annual asset growth in the previous year. The analysis is then performed by analyzing the difference of average monthly returns between portfolio with the most negative asset growth (*Negative 1*) and portfolio with the most positive asset growth (*Positive 5*). The statistics summary for difference t-test of return differentials between *Negative 1* and *Positive 5* portfolios are described in Table 2 below.

Table 2 Statistics Summary for Difference T-Test

	Average Monthly Returns				
	Negative 1	*Positive 5*	Spread	t-statistic	t-critical
All	2.63%	1.88%	0.75%	5.640**	1.658
Big	4.08%	2.95%	1.13%	5.112**	1.658
Small†	3.68%	1.83%	1.85%	1.008	1.663
Micro	2.27%	1.55%	0.72%	3.960**	1.658

**Statistical significance at 5% level
**Small stocks are tested using Welch t-test because the variance equality test (not presented in the report) shows statistical significance of different inter-samples variances

Asset growth premium is 0.75% per month in average, which is around 9% per annum. This indicates that asset growth premium is economically and statistically significant. Fama and French (2008) and Gray and Johnson (2011) brought the importance of assessing stock return anomaly across different size grouping. Sorting into different size categories, asset growth premium is stronger within big stocks group, which is 1.13% per month or 13.56% per annum. Asset growth premium for micro stock group is 0.72% per month or 8.64% per annum, close to the value without size groupings. This reaffirms that micro stocks are numerous and may essentially drive the whole market. Incongruously, asset growth premium in small stocks group is substantially large but does not produce statistical significance. This may be affected by higher volatility possessed by stocks in the sample group.

For the first step analysis, there happens to be a finding of asset growth anomaly particularly in the big stocks group. Therefore the results support the first hypothesis that stocks with lower asset growth will subsequently have higher stock returns in aggregate level.

4.2. Individual Stock-Level Analysis

For the second sub-part of analysis, Table 3 summarizes the regression results using fixed-effect panel regression. The major interest of this research is significant effect of asset growth to the subsequent yearly stock returns (p-value = 0.0154). The coefficient of AG (0.1027) implies that 100% increase in asset growth results into 10.27% decrease in the next annual stock return. This affirms the existence of asset growth anomaly in Indonesia not only in the aggregate portfolio level, but also in individual stock level.

Table 3 Regression Statistics Summary

Variable	Hypothesis	Coefficient	p-value
Intercept		-26.6677	0.0154**
AG	(-)	-0.1027	0.0006*
LOGMV		0.9690	0.0130**
BM		0.1541	0.0090*
RET12		-0.2761	0.0061*
NOA		0.0486	0.1032

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ACCRUALS	-0.0410	0.7500
Adjusted R-squared	0.1070	
Prob. (F-stat)	0.0000	

*Statistical significance at 1% level
**Statistical significance at 5% levelThe regression employs White's heteroscedasticity-consistent standard errors in order to generate robust results

The extent in which asset growth is statistically significant is also higher in comparison to other possible determinants of cross-section stock returns highlighted by control variables in the model. The statistically significant control variables are *LOGMV, BM,* and *RET12* but none of them have higher degrees of statistical significance than that in *AG*. The other control variables, *NOA* and *ACCRUALS,* are not statistically significant therefore they are incapable in replacing *AG* as a proxy for asset growth.

In conclusion, the result of individual stock level analysis using panel regression evidently supports the second hypothesis in which asset growth has negative effect on cross-section stock returns in the individual stock level.

4.3. Exploring the Inclusion of Asset Growth as Risk-Factor

Up to this point it is identified that there exists a considerable asset growth effect in Indonesian stock market, whether in portfolio level or in individual stock level. This study attempts to find further whether the predictability power of asset growth is due to risk estimation by rational investors or due to mispricing caused by irrational behaviors of investors.

In order to examine whether asset growth is a risk-based factor it is intriguing to apply two-stage cross-section regression (2SCR) used in Fama and Macbeth (1973). The first step is regressing excess return of each test asset to its factor loading. The result of the first-stage time-series regression is given in the following Table 4.

Table 4 Statistics Summary of First-Stage Regression

Variable		Average Coefficient	p-value
Intercept	α_p	0.01134	0.0013**
$R_{m,t} - R_{f,t}$	$\beta_{p,\ MRP}$	0.01227	0.0318**
SMBt	$\beta_{p,\ SMB}$	0.01529	0.0069*
HMLt	$\beta_{p,\ HML}$	0.01332	0.0043*
AGfactor	$\beta_{p,\ AGfactor}$	-0.00919	0.0006*
Adjusted R-squared			0.63647
Prob (F-stat)			0.00139

*Statistical significance at 1% level
**Statistical significance at 5% level

The individual effect of each factor beta is significant that indicates asset returns are function of sensitivity to market risk premium, size premium, value premium, and asset growth premium. All factor betas from the firs-stage regression are derived to be put as independent variables in the second-stage regression. The result of the second-stage regression is given in the following Table 5.

Table 5 Statistics Summary of Second-Stage Regression

Variable	Average Coefficient		t-stat	t-critical
Intercept	λ_0	0.00113	2.28571**	1.67100
$\beta_{p,\ MRP}$	λ_1	0.01227	1.24838	1.67100
$\beta_{p,\ SMB}$	λ_2	0.01523	1.92369**	1.67100
$\beta_{p,\ HML}$	λ_3	0.01323	1.74998**	1.67100
$\beta_{p,\ AGfactor}$	λ_4	-0.00919	-1.24997	-1.67100

**Statistical significance at 5% level

From the second-stage regression, the regression coefficient of market risk beta (λ_1) is not statistically significant. In the other hand, the coefficient of size beta (λ_2) and value beta (λ_3) have statistical significance. This is relevant and consistent to general findings in empirical finance, such as in Fama and French (1992).

In the end of the day, the major interest in this two-stage cross-section regression is the coefficient of asset growth premium (λ_4) that is not statistically significant. Therefore, there is no strong evidence to accede the alternate third hypothesis in which asset growth anomaly is caused by risk factor. The null hypothesis is not rejected that shows the asset growth anomaly is merely anomaly in capital markets.

5. Conclusions

Financial market should function efficiently therefore asset prices already reflect all relevant information and behave in an unpredictable manner. In this efficient market, the efforts of investors in seeking excess returns should be fruitless in which those seeking higher returns should expect to bear higher risks. However, empirical literatures have challenged such theoretical notions with the findings of several factors successfully predicting stock returns, most notably of all are size, book-to-market ratio, momentum property, and calendar effects. These factors are then known as market anomalies. Some of these factors have been incorporated as risk factors augmenting classical asset pricing model, for instance is the contemporary Fama-French three-factor model (Fama and French, 1992).

Another anomaly has recently been reported that is known as asset growth anomaly. The relationship between asset growth and cross-section stock returns has been documented by several studies such as in Cooper, Gulen, and Schill (2008) and Gray and Johnson (2011). The literatures found higher growth in total assets will be followed by lower stock returns in the subsequent periods.

This study examines whether asset growth anomaly is also present in Indonesian stock market. The main findings of this study confirm prior studies that asset growth is negatively related to stock returns. Within 2010 – 2014 observation periods, an

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equally-weighted portfolio of low asset-growth outperforms a portfolio of high asset-growth by 0.75% per month, equating to 9% per annum. Of particular interest, the asset growth effect is strongest amongst the largest Indonesian stocks. Big stocks group make up only around 25% of total firms listed in Indonesia Stock Exchange but hold 90% of all total market capitalization. The asset growth premium for big size group portfolios is 1.13% per month or 13.56% per annum.

This study also examines whether the asset growth anomaly remains in the individual stock level. Using fixed-effect panel regression, the coefficient of asset-growth variable is negative and statistically significant when regressed to the subsequent yearly stock returns, suggesting their negative relationship. The effect of asset growth is still strong even after controlling with other variables recognized as determinants of stock returns.

The examination also explores further of the possibility of asset growth to be included as risk factor. This aims to test whether the negative relationship is caused by rational conception in which higher asset-growth stocks are deemed less riskier or only by mispricing from investors who overestimate those stocks. This study finds no supporting evidence for the inclusion of asset growth as additional risk factor. Using two-stage cross-section (2SCR) in Fama and Macbeth (1973), asset growth is not a significant factor loading. This finding aligns with the conclusion of Gray and Johnson (2011) and Cooper, Gulen, and Schill (2008) that asset growth anomaly is caused by mispricing from investors' irrational behaviors.

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