ASSET GROWTH AND EQUITY RETURNS IN THE STOCK EXCHANGE OF THAILAND

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Abstract

This research aims to examine the effect of asset growth on the equity returns in the Stock Exchange of Thailand in different economic stages and industry group portfolios. Data of this study comprise the listed common stocks in the Stock Exchange of Thailand between January 1996 and December 2014 and exclude financial firms. The 35 economic stage and industry-based portfolios are constructed and tested the asset growth effect on equity returns controlled by market risk, firm's size, and book-to-market equity value factors. The results show that both positive and negative asset growths and the equity returns in alternative economic periods and industry groups occurred. Furthermore, this study finds that the asset growth significantly and statistically explains the equity returns only in 10 of 35 tested cases. This evidence suggests that asset growth is a non-systematic risk in asset pricing.

Keywords: asset growth; equity returns; thailand; economic stages; industry groups

Introduction

The study of asset pricing has been the focus of many previous researchers since the publications of papers by Sharpe (1963, 1964), Lintner (1965), and Black (1972). These scholars worked on developing the capital asset pricing model. They explain that market risk refers to the pricing factor of equity returns. Later, other factors including asset growth were investigated in order to explain equity returns.

Previous literature on the examination of the relationship between asset growth and equity has received much attention. There is inconsistent evidence on the relationship between asset growth and equity returns published in the literature on the relationship between asset growth and equity returns. Most published papers show a negative relationship between equity returns and alternative measures of company investment such as investment in equity, retained earnings, and sale growth (Lakonishok et al., 1994; Carlson et al., 2004; Broussard et al., 2005). Later, Cooper et al.)2008), employing the concept of asset growth as the company investment measure, investigate the relationship between asset growth and equity returns in the United States between 1968 and 2003. They contend that asset growth significantly and negatively explains future equity returns.

Consistent with Cooper et al.)2008), Gray and Johnson (2011) report that the total asset growth is negatively related to equity returns in Australia's financial market. Using the data for the period 1983 to 2007, Gray and Johnson (2011) in their results show that asset growth is a non-systematic risk. Furthermore, they propose that the asset growth effect is attributable to mispricing. Using developed market data, the results documented in Cooper et al. (2008) and Gray and Johnson (2011) reveal that firms with higher external financing and making capital investment and acquisitions, later on operate much less efficiently, and experience lower stock returns. Conversely, firms that have divesture, share repurchase and debt retirement activities, subsequently report good operating performance and high stock returns.

Similar to the results from the U.S. (Cooper et al., 2008) and Australian markets (Gray and Johnson, 2011), Yao et al. (2011) test the effect of asset growth on stock returns using data on nine Asian equity

markets, namely Japan, China, Hong Kong, Taiwan, South Korea, Malaysia, Singapore, Thailand, and Indonesia. The specific period involved are the years 1981 and 2008. They find that asset growth exerts a significantly negative effect on equity returns in all markets except for Taiwan.

On the other hand, decomposing the operating asset growth according to its financing sources, suppliers or bondholders and stock investors, Cao (2016) show that not all types of asset growth imply negative future returns. Using the U.S. market data for the period 1968 to 2012, this study states that the asset growth financed by suppliers is positively associated with future performance and returns. Vo (2014) finds that - using data from the Ho Chi Minh City stock exchange during the period between 2008 and 2012 - asset growth wields no significant effect on stock returns in Vietnam's market.

This study attempts to revisit some of the conflicting findings reported to date and offer out-of-sample evidence. It is motivated by the recommendations of Lo and MacKinlay (1990) who argue that empirical findings should be examined out-of-sample to ensure that any findings reported are not a product of data snooping. The test bed of this study is the East Asian financial crisis of 1997-98 and the Subprime crisis that erupted in the U.S. in 2007. These events supply a set of useful economic circumstances providing the potential to clearly present out-of-sample evidence for the relationship between asset growth and equity returns. The data set of this study is not investigated in existing studies with appropriate scope (for example, for the United States see Cooper et al., 2008 and Cao, 2016); for Australia see Gray and Johnson, 2011; for Asia see Yao et al., 2011; for Vietnam see Vo, 2014). Among the limited number of published studies on this topic, to the best my knowledge, there is only one study by Yao et al. (2011) which employs data from Thailand.

Furthermore, there is evidence that economic stage and industrial sector affect the financing and capital investment of firms. Bega et al.'s (2000) study produces evidence that economic stage and industrial sector influence stock returns. They suggest that the breadth of industry classifications used and the period studied could have significantly affected the results and interpretation. This study employs the economic stage and

sector-based methodologies to offer greater potential added value on this topic.

To fill the gaps not covered by previous studies, the objective here is to: firstly, examine the averages of asset growth and equity returns in the Stock Exchange of Thailand in alternative economic periods and industry groups; and secondly, find the effect of asset growth on equity returns in the Stock Exchange of Thailand in varied economic periods and industry groups. Most previous studies concerning the effect of asset growth on equity returns employ data from developed markets such as the U.S. (Cooper et al., 2008) and Australia (Gray and Johnson, 2011). It should be noted that the published studies on the effect of asset growth and equity returns in the emerging markets is scarce. Additionally, the evidence for asset growth in emerging markets is ambiguous. To the best of this author's knowledge, there is only one published paper (Yao et al., 2011) investigating the Thai market. This study focuses on the Stock Exchange of Thailand (SET), which is an emerging market and ranked in the world's top 25 of in terms of market capitalization. As of August 2016, the Stock Exchange of Thailand had 649 listed companies with a combined market capitalization of US$442 billion (World Federation of Exchanges, 2016). This study is organized as follows: Section 2 describes the methodology; Section 3 presents the results and discussion of this study; and Section 4 presents the conclusion and a summary of the main themes covered here.

Methodology

Data of listed stocks in the Stock Exchange of Thailand from January 1996 to December 2014 are collected from DataStream database. The stocks in financial firms are excluded from this study since financial sector employs different accounting practices from other sectors To investigate the average asset growth and average equity returns in the Stock Exchange of Thailand in alternative economic periods, in accordance with the study by Grey and Johnson (2011), the asset growth and equity returns are calculated as shown below.

The asset growth (AG_t) of month t is measured as the following model:

$$AG_t = \frac{TA_T - TA_{T-1}}{TA_{T-1}} \qquad (1)$$

Where asset growth (AG_t) of the company t at month t is calculated from the change of total assets of year T (TA_T) from total assets of year T-1 (TA_{T-1}) divided by total assets of year T-1 (TA_{T-1}). The total assets at June of year T is used for the year T.

The equity returns, R_t, of company i at month t are calculated in model (2) here:

$$R_t = \frac{RI_t - RI_{t-1}}{RI_{t-1}} \qquad (2)$$

Where RI_t refers to the monthly return index of stock i at the end of month t. The month return index is measured from the changes in price and dividend. The return index is collected from the DataStream database.

The 35 portfolios sorted by economic periods and industry groups are constructed employing the following steps. Firstly, the equity data between January 1996 and December 2014 are sorted into 5-period portfolios according to economic period; pre-Southeast Asian crisis (January 1996 to June 1997), Southeast Asian crisis (July 1997 to December 1999), post-Southeast Asian crisis (January 2000 to June 2007), Subprime crisis (July 2007 to December 2008), and post-Subprime crisis (January 2009 to December 2014). Subsequently, the stocks in each period's portfolios are organized into 7-industry portfolios by industry groups listed on the Stock Exchange of Thailand (SET): Agro and Food Industry (AGRO), Consumer Product (CONSUMP), Industrials (INDUS), Property and Construction (PROPCON), Resources (RESOURC), Services (SERVICE), and Technology (TECH). Consequently, this procedure produces 35 economic stage and industry-based portfolios in total. Then, the average of monthly asset growth and equity weighted equity returns in each portfolio are calculated.

To investigate the effect of asset growth on equity returns, the cross-sectional framework is employed to identify whether asset growth is

significant in regressions at the individual firm level. In the cross-sectional regression analysis, the general framework devised by Fama and MacBeth (1973), and Fama and French (1992) is used. The CAPM concept has been challenged by Fama and French (1992). They reported on the role of size and book-to-market equity ratio in the cross-section of expected stock returns, and showed that: firstly, the cross-section of average stock returns is not fully explained by the CAPM beta; and secondly, stock risks are multidimensional. Importantly, they found that the three factors that explain 95% of the variability of stock market returns are market risk, firm size and book-to-market equity ratio. Therefore, this study examines the effect of asset growth on equity returns controlled by risk, size of firm, and book-to-market equity ratio. The 35 portfolios sorted by economic periods and industry groups are tested by model (3):

$$R_t = a + b_1EMKT_t + b_2SIZE_t + b_3BM_t + b_4AG_t + e_t \qquad (3)$$

Where the dependent variable is R_t which refers to the excess returns of stock i at month t on the rate of returns from a risk-free asset. There are four independent variables: (1) $EMKT_t$ denotes the market excess returns at month t on the risk-free asset returns. The risk-free asset in this study is the 1-day interbank rate; (2) $SIZE_t$, refers to the size of a firm measured by market capitalization of firm i at month t; (3) BM_t refers to the book-to-market equity ratio of firm i at month t ; and (4) AG_T denotes the asset growth of firm i at month t calculated from the annual change in percentage of the total asset of each year.

Results and Discussion

The results and discussion of this study are presented in this section. To answer the first objective, stocks are sorted by 5 economic periods and then sorted by industry group. Hence, the 7 industry group portfolios are constructed in each economic period. In total, there are 35 portfolios based on 5 economic periods and 7 industry groups. Then, the average asset growth and returns of each portfolio are calculated with the results being presented in Table 1.

The average asset growth of industry portfolios during the pre-Southeast Asian crisis period is presented in Panel A of Table 1. The results show that there is positive asset growth in all industry groups, specifically between 8.16% and 39.61%. The highest average asset growth occurs in the Resources industry group. This suggests that most companies in the Stock Exchange of Thailand have higher assets during the pre-Southeast Asian crisis. The high growth in companies' assets may originate from the effect of high economic growth during this period.

Panel B of Table 1 presents the average asset growth of industry portfolios during the Southeast Asian crisis period. The results show that only the Agro and Food industry portfolio experienced positive asset growth at 6.28%. The other portfolios had minus asset growth between -8.41% and 0.52%. The top 3 lowest average asset growths are in the Property and Construction, Technologies, and Resource portfolios at -8.41%, -6.92%, and 5.48%, respectively. This indicates that during the Southeast Asian crisis, many companies having financial difficulties sold their assets to increase their liquidity. Additionally, the dramatic drop in asset growth in the Property and Construction portfolio in this study confirm the financial distress during the Southeast Asian crisis period mainly affected businesses in the Property and Construction industry group.

Table 1: Average asset growth

Average asset growth					
Panel A: Pre-Southeast Asian crisis			**Panel C: Post-Southeast Asian crisis**		
Industry group	**Mean**	**St. Dev.**	**Industry group**	**Mean**	**St. Dev.**
AGRO	11.00%	0.19	AGRO	9.41%	0.10
CONSUMP	8.16%	0.17	CONSUMP	4.71%	0.11
INDUS	8.36%	0.19	INDUS	14.98%	0.45
PROPCON	11.97%	0.13	PROPCON	30.11%	3.13
RESOURC	39.61%	0.40	RESOURC	16.56%	0.54
SERVICE	13.89%	0.10	SERVICE	11.50%	0.36
TECH	16.61%	0.17	TECH	15.45%	0.16
F test	24.80		***F test***	11.89	
P-value	0.00	**	***P-value***	0.00	**
Panel B: Southeast Asian crisis			**Panel D: Subprime crisis**		
Industry group	**Mean**	**St. Dev.**	**Industry group**	**Mean**	**St. Dev.**
AGRO	6.18%	0.19	AGRO	5.07%	0.14
CONSUMP	-1.31%	0.16	CONSUMP	1.19%	0.10
INDUS	-1.08%	0.13	INDUS	8.81%	0.31
PROPCON	-8.41%	0.13	PROPCON	9.13%	0.14
RESOURC	-5.48%	0.11	RESOURC	3.57%	0.13
SERVICE	-0.51%	0.16	SERVICE	10.75%	0.58
TECH	-6.91%	0.16	TECH	5.97%	0.16
F test	37.42		***F test***	6.06	
P-value	0.00	**	***P-value***	0.00	**

Table 1: (Continued)

Panel E: Post-Subprime crisis		
Industry group	**Mean**	**St. Dev.**
AGRO	10.55%	1.14
CONSUMP	3.91%	0.11
INDUS	8.19%	0.58
PROPCON	19.89%	0.96
RESOURC	34.79%	1.38
SERVICE	19.39%	0.80
TECH	7.77%	0.14
F test	2.12	
P-value	0.05 *	

*The 35 portfolios sorted by economic periods and industry groups are constructed using the following steps. Firstly, the equity data between January, 1996 and December, 2014 are sorted into 5-period portfolios according to economic period; pre-Southeast Asian crisis (January, 1996 to June, 1997), Southeast Asian crisis (July, 1997 to December, 1999), post-Southeast Asian crisis (January, 2000 to June, 2007), Subprime crisis (July, 2007 to December, 2008), and post-Subprime crisis (January, 2009 to December 2014). Subsequently, the stocks in each period portfolios are sorted into 7-industry portfolios by industry groups listed on the Stock Exchange of Thailand (SET): Agro and Food Industry (AGRO), Consumer Products (CONSUMP), Industrials (INDUS), Property and Construction (PROPCON), Resources (RESOURC), Services (SERVICE), and Technology (TECH). Subsequently, this procedure produces 35 economic portfolios in total. Then, the monthly average asset growth of each portfolio is calculated. Significance at the 1% and 5% levels is indicated by ** and *, respectively.*

The average asset growth of industry portfolios during the post-Southeast Asian crisis period is presented in Panel C of Table 1. Results clearly indicate that all industry group portfolios have a positive asset growth between 4.72% and 30.21%. The highest average asset growth involves the stocks in the Property and Construction industry group while the lowest average asset growth occurs in the stocks in the Consumer product industry group. Interestingly, after the Southeast Asian crisis period the companies recover from the financial crisis. This is consistent with the theory of security analysis regarding the economic cycle.

Panel D of Table 1 reveals the average asset growth of industry portfolios during the Subprime crisis. There is positive average asset growth in all industry groups ranging between 2.29% and 10.75%. The top 3 highest

average asset growth is in the Services, Property and Construction, and Industrials portfolios at 10.75%, 9.13%, and 8.81%, respectively.

The average asset growth of industry portfolios during the post-Subprime crisis is presented in Panel E of Table 1. In all industry groups it is evident that positive asset growth occurs. Companies in the Resources industry group have the highest average asset growth at 34.79%, while those in the Consumer product industry group have the lowest average asset growth at 3.91%. Based on all the results in Table 1, interestingly, the stocks in the Consumer product industry group have the lowest average asset growth compared to other industry groups in all periods except during the Southeast Asian crisis period. Moreover, the average asset growth of all 7 industry groups are significantly and statistically different in all periods, at least at the 5% significance level.

Table 2 presents the average equity returns of 35 portfolios sorted by economic stages and industry groups. Panel A of Table 2 presents the average equity returns of 7 industry portfolios during the pre-Southeast Asian crisis period. The results reveal that negative returns in all industry groups ranged between -64.39% and -17.51%. This implies that investors who invested during in this period lost their money when they invested in the Stock Exchange of Thailand. Especially, in the Property and Construction industry group, it dramatically falls in price at 64.39%. Interestingly, the evidence of negative equity returns during the pre-Southeast Asian crisis period may be the leading indicator of this particular crisis.

Table 2: Equally weighted equity returns

Equally weighted equity returns					
Panel A: Pre-Southeast Asian crisis			**Panel C: Post-Southeast Asian crisis**		
Industry group	**Mean**	**St. Dev.**	**Industry group**	**Mean**	**St. Dev.**
AGRO	-10.93%	0.11	AGRO	11.30%	0.16
CONSUMP	-17.51%	0.11	CONSUMP	14.81%	0.13
INDUS	-35.30%	0.14	INDUS	19.76%	0.39
PROPCON	-64.39%	0.15	PROPCON	33.48%	0.34
RESOURC	-13.76%	0.11	RESOURC	17.91%	0.19
SERVICE	-11.11%	0.13	SERVICE	30.60%	0.33
TECH	-45.71%	0.16	TECH	18.98%	0.17
F test	5.81		***F test***	0.33	
P-value	0.00	**	***P-value***	0.92	**
Panel B: Southeast Asian crisis			**Panel D: Subprime crisis**		
Industry group	**Mean**	**St. Dev.**	**Industry group**	**Mean**	**St. Dev.**
AGRO	51.36%	0.31	AGRO	-8.36%	0.11
CONSUMP	19.14%	0.17	CONSUMP	-13.63%	0.11
INDUS	19.76%	0.34	INDUS	-14.89%	0.16
PROPCON	87.11%	0.65	PROPCON	-41.11%	0.11
RESOURC	39.84%	0.39	RESOURC	-18.63%	0.13
SERVICE	10.75%	0.18	SERVICE	-11.50%	0.14
TECH	45.96%	0.34	TECH	-19.89%	0.13
F test	2.39		***F test***	4.62	
P-value	0.03	**	***P-value***	0.00	**

Table 2: (Continued)

Panel E: Post-Subprime crisis		
Industry group	**Mean**	**St. Dev.**
AGRO	36.00%	0.30
CONSUMP	14.34%	0.15
INDUS	11.99%	0.15
PROPCON	10.36%	0.14
RESOURC	14.56%	0.14
SERVICE	15.14%	0.16
TECH	15.31%	0.15
F test	2.12	
P-value	0.05	*

*The 35 portfolios sorted by economic periods and industry groups are constructed using the following steps. Firstly, the equity data between January, 1996 and December, 2014 are sorted into 5-period portfolios according to economic period; pre-Southeast Asian crisis (January, 1996 to June, 1997), Southeast Asian crisis (July, 1997 to December, 1999), post-Southeast Asian crisis (January, 2000 to June, 2007), Subprime crisis (July, 2007 to December, 2008), and post-Subprime crisis (January, 2009 to December 2014). Subsequently, the stocks in each period portfolios are sorted into 7-industry portfolios by industry groups listed on the Stock Exchange of Thailand (SET): Agro and Food Industry (AGRO), Consumer Products (CONSUMP), Industrials (INDUS), Property and Construction (PROPCON), Resources (RESOURC), Services (SERVICE), and Technology (TECH). Subsequently, this procedure produces 35 economic portfolios in total. Then, the monthly average equity returns of each portfolio are calculated. Significance at the 1% and 5% levels is indicated by ** and *, respectively.*

Surprisingly, the average equity returns in the Southeast Asian crisis period shown in Panel B of Table 2 are positive returns in all industry groups, ranging between 20.75% and 87.12%. The top three highest equity returns are the stocks in the Property and Construction, Agro and Food, and Technology industry groups, respectively. The results in the Southeast Asian crisis period confirm the asset pricing theory of Sharpe (1963, 1964), Lintner (1965) and Black (1972), which explained that the stocks with higher risk provide the higher returns. Noticeably, the stocks during this period provide the highest average equity returns compared to other periods.

Panel C of Table 2 presents the average equity returns of industry groups during the post-Southeast Asian crisis. It is evident that positive

average equity returns in all industry groups ranged between 22.30% and 33.48%. The stocks in the Property and Construction industry group in the post-Southeast Asian crisis give the highest average equity returns at 33.48%. In contrast the stocks in Agro and Food industry groups provide the lowest average equity returns at 22.30%.

The average equity returns of 7 industry groups during the Subprime crisis are presented in Panel D of Table 2. Here the results show that there are negative average equity returns in all industry groups, ranging between -29.89% and -8.36% in the Technology, and Agro and Food industry groups, respectively. Unlike the evidence for the Subprime crisis, there are positive average equity returns during the post-Subprime crisis in all 7 industry groups. The results of the post-Subprime crisis are presented in Panel E of Table 2. The highest average equity returns occur in the Agro and Food industry group at 36.00%. The lowest average equity returns are in the Property and Construction industry group at 20.36%. Results from Table 2 reveal that the average equity returns of all 7 industry groups are significantly and statistically different in all periods, at least at the 5% significance level. The exception to this is the post-Southeast Asian crisis period.

To answer the second objective of this study, the asset growth effect on equity returns controlled by market risk, firm's size, and book-to-market equity value factors is examined. The model is tested in 35 portfolios grouped into: firstly, 5 economic periods: pre-Southeast Asian crisis, Southeast Asian crisis, post-Southeast Asian crisis, Subprime crisis, and post-Subprime crisis; and secondly, 7 industry groups, these being Agro and Food industry (AGRO), consumer products (CONSUMP), industrials (INDUS), property and construction (PROPCON), resources (RESOURC), services (SERVICE), and technology (TECH). The impacts of asset growth on equity returns of 7 industry group portfolios during the pre-Southeast Asian crisis are presented in Panel A of Table 3. The asset growth significantly explains equity returns at the significance level of 5% only in the Property and Construction portfolio.

Table 3: The relationship between asset growth and equity returns

Panel A: Pre-Southeast Asian crisis										
Industry group	**Constant**		**Mkt RP**		**MV**		**BM**		**AG**	**R-sq(adj)**
AGRO	0.005		0.401	**	0.000		-0.011	*	0.035	6.81%
CONSUMP	0.080	**	0.415	**	0.000		-0.050	**	-0.038	10.44%
INDUS	0.016		0.666	**	0.000		-0.031	**	0.056	11.36%
PROPCON	-0.018		1.038	**	0.000		-0.004		0.094 *	16.80%
RESOURC	0.053	*	0.977	**	0.000		-0.017		0.008	19.18%
SERVICE	0.006		0.687	**	0.000		-0.005		0.001	14.60%
TECH	0.036		0.993	**	0.000		-0.040	*	0.053	15.90%
Panel B: Southeast Asian crisis										
Industry group	**Constant**		**Mkt RP**		**MV**		**BM**		**AG**	**R-sq(adj)**
AGRO	0.065	**	0.543	**	0.000		-0.018	*	0.170 *	8.06%
CONSUMP	0.063	**	0.379	**	0.000		-0.018	**	-0.009	6.11%
INDUS	0.011		0.597	**	0.000		0.000		-0.115	10.66%
PROPCON	0.050	*	1.388	**	0.000		0.001		-0.173 *	14.73%
RESOURC	-0.011		1.196	**	0.000	*	-0.001		-0.078	37.16%
SERVICE	0.011	*	0.699	**	0.000		-0.003		0.098	17.14%
TECH	0.034		1.091	**	0.000		0.001		-0.055	14.19%

Table 3: (Continued)

Panel C: Post-Southeast Asian crisis										
Industry group	**Constant**		**Mkt RP**		**MV**	**BM**		**AG**		**R-sq(adj)**
AGRO	0.011	**	0.465	**	0.000	0.000		0.015		4.58%
CONSUMP	0.016	**	0.311	**	0.000	0.000		0.045	*	3.55%
INDUS	0.011	**	0.519	**	0.000	-0.001		0.010		0.76%
PROPCON	0.010	**	1.060	**	0.000	0.000		0.000		4.43%
RESOURC	0.013		0.801	**	0.000	0.001		0.011		3.31%
SERVICE	0.018	**	0.581	**	0.000	0.000		0.015		1.58%
TECH	0.004		0.874	**	0.000	-0.001		0.013		14.61%
Panel D: Subprime crisis										
Industry group	**Constant**		**Mkt RP**		**MV**	**BM**		**AG**		**R-sq(adj)**
AGRO	0.011		0.605	**	0.000	-0.003		0.071	*	15.70%
CONSUMP	0.014		0.331	**	0.000	-0.016	**	-0.013		8.54%
INDUS	0.051	**	0.755	**	0.000	-0.018	**	0.009		19.09%
PROPCON	0.005		0.833	**	0.000	-0.014	**	0.019		33.41%
RESOURC	0.038	**	0.901	**	0.000	-0.034	**	-0.003		38.16%
SERVICE	0.011	*	0.701	**	0.000	-0.008	**	0.001		15.73%
TECH	0.010	*	0.734	**	0.000	-0.014	**	0.011		16.51%

Table 3: (Continued)

Panel E: Post-Subprime crisis												
Industry group	**Constant**		**Mkt RP**		**MV**		**BM**		**AG**		**R-sq(adj)**	
AGRO	0.011	**	0.571	**	0.000		0.000		0.041		1.68%	
CONSUMP	0.031	**	0.433	**	0.000	*	-0.011	**	0.039	*	7.67%	
INDUS	0.015	**	0.808	**	0.000		-0.011	**	0.014	**	15.00%	
PROPCON	0.015	**	0.966	**	0.000		-0.013	**	0.007	**	19.05%	
RESOURC	0.031	**	0.938	**	0.000		-0.016	**	0.001		11.16%	
SERVICE	0.014	**	0.708	**	0.000		-0.003	*	0.008	**	8.96%	
TECH	0.019	**	0.817	**	0.000		-0.011	**	0.033	**	14.33%	

The cross sectional analysis in stock returns associated with market risk, size of firm, book-to-market equity ratio, and asset growth is employed and tested in 35 portfolios sorted by economic periods and industry groups. The tested models are $R_t = a + b_1EMKT_t + b_2SIZE_t + b_3BM_t + b_4AG_t + e_t$ *where the dependent variable is* R_t *, which refers to the excess returns of stock i at month t on the rate of returns from risk-free asset.* $EMKT_t$ *denotes the market excess returns at month t on the risk-free asset returns. The risk-free asset in this study is the 1-day interbank rate.* $SIZE_t$*, refers to the size of firm measured by market capitalization of firm i at month t.* BM_t *refers to the book-to-market equity ratio of firm i at month t and* AG_T *denotes the asset growth of firm i at month t calculated from the annual percentage change of total asset in each year. Significance at the 1% and 5% levels is indicated by ** and *, respectively.*

Panel B of Table 3 presents the relationship between asset growth and equity returns of 7 industry group portfolios during the Southeast Asian crisis. There are only 2 portfolios - Agro and Food industry and Property and Construction - confirming the significant impact of asset growth on equity returns at the significance level of 5%. Noticeably, there is a significantly positive relationship between asset growth and equity returns in the Agro and Food industry portfolio. Conversely, a significantly negative relationship between asset growth and equity returns exists in the Property and Construction portfolio.

Panel C of Table 3 documents the effects of asset growth on equity returns of 7 industry group portfolios during the post-Southeast Asian crisis. The results show there is a significant and positive relationship between asset growth and equity returns at the significance level of 5% only in the consumer product stocks.

Panel D of Table 3 presents the relationship between the asset growth and equity returns of 7 industry group portfolios during the Subprime crisis. Asset growth has a significant and positive effect on equity returns at the significance level of 5% only in the Agro and Food industry portfolio.

The results on the tests for the relationship between asset growth and equity returns of 7 industry group portfolios during the post-Subprime crisis are presented in Panel E of Table 3. Interestingly, there is a significantly positive relationship at least at the 5% significance level in 5 of 7 tested industry group portfolios, i.e. Consumer products, Industrials, Property and Construction, Services, and Technology portfolios.

In summary, 9 out of 35 portfolios sorted by industry groups and economic periods present the statistically positive relationship between asset growth and equity returns over tested periods. It can therefore be suggested that in those portfolios the companies with higher assets growth enjoy higher equity returns and vice versa. This finding is inconsistent with most of the published evidence (Cooper et al., 2008; Gray and Johnson, 2011; Yao et al., 2011) showing a negative relationship between asset growth and equity returns. Interestingly, the evidence in this study is consistent with the analysis by Cao (2016) who found a significantly positive relationship between asset growth financed by suppliers**[s?]** and equity returns. This implies that the

varied providers of capital - suppliers, bondholders or stock investors who conduct different economic roles - may have different implications for stock returns.

Remarkably, the market risk premium positively affects equity returns in all tested portfolios at the significance level of 1%. The results are consistent with the CAPM model of Sharpe (1963, 1964), Lintner (1965) and Black (1971) who reported that the market risk premium is a state variable in explaining equity returns. These results also indicate that the market value insignificantly explains equity returns in most of portfolios while the book-to-market equity ratio significantly explains equity returns in 18 of 35 cases at least at the 5% significance level. Therefore, both market value and book-to-market equity ratio constitute a non-systematic risk factor in The Stock Exchange of Thailand which is consistent with Fama and French (1992, 1993, 1996) who reported the significant impact of market value and book-to-market equity ratio on equity returns.

Conclusions

There is inconsistent evidence on asset growth effect on equity returns in emerging markets (Cooper et al., 2008; Gray and Johnson, 2011; Vo, 2014; Yao et al., 2011; Cao, 2016). The studies on emerging markets are few compared with those in developed markets. Only one study by Yao et al. (2011) employed data from the Thai stock market. Additionally, previous evidence documented in Bega et al. (2000) shows that an economic stage and industrial sector-based methodology could have significantly affected the results and interpretation. To offer an out-of-sample evidence from previous studies, the objectives of this analysis are to: firstly, investigate the averages of asset growth and equity returns; and secondly, examine the effect of asset growth on equity returns in the Stock Exchange of Thailand in different economic periods and industry groups.

Results show that both asset growth and equity returns do vary according to alternative economic states and equity returns. The positive average asset growth exists in all industry groups in all economic periods except during the Southeast Asian crisis period, which found that negative average asset growth occurred in most industry groups. Furthermore, this

study presents positive average equity returns in all portfolios during the Southeast Asian crisis, post-Southeast Asian crisis, post-Subprime crisis periods. In the meantime the negative average equity returns are present in the pre-Southeast Asian crisis and Subprime crisis periods.

Employing the market risk, size, and book-to-market value ratio augmented with asset growth, results show a significantly positive asset growth effect on equity returns in some cases. It can be concluded that asset growth is non-systematic risk and cannot explain equity returns. Nevertheless, there is the significance of market risk premium in all tested cases. Consistent with Sharpe (1963, 1964), Lintner (1965) and Black (1971) and Fama and French (1991, 1993, 1996), market risk premium can explain the equity returns in the Stock Exchange of Thailand. For studies in the future, other factors such as liquidity and economic factors may be examined and whether they are priced in equity returns. Moreover, other markets may be tested on related issues regarding asset growth and equity returns.

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