The Cross-section of Expected Stock Returns

By

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A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

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Graduate School of Business
Assumption University
Bangkok Thailand

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ABSTRACT

The Capital Asset Pricing Model (CAPM) is a widely known model by most investors because it gives a precise prediction of the relationship between the risk of an asset and its expected return by using beta as a measure of risk. However, there are many empirical evidences against the CAPM model. Fama and French (1992) state that it is not the beta that explains the stock returns but rather firm size, leverage, book-to-market equity and earnings yield.

Following Fama and French (1992), this study investigated how beta, firm size, leverage, book-to-market equity and earnings yield, sometimes called earnings-price ratios (E/P), affect the stock returns.

This study used cross-sectional and time series data of the Stock Exchange of Thailand (SET) from 1992 to 1999. All data were collected from SET database and I-Sims CD. It includes 451 listed companies during this period.

The result of the study indicates that only earnings yield is significant in explaining the stock returns. It has positive relationship with the stock returns. The remaining four variables, including beta, firm size, leverage and book-to-market equity are excluded from the model. They had no significant relationship with the stock returns and therefore do not explain the variation in the dependent variable.

Other important variables influencing the stock returns which were ignored from this study, should be taken into consideration for further studies.

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CHAPTER 1

GENERALITIES OF THE STUDY

1.1 Introduction of the Study

Stock market is considered as an important capital market in the modern business world. It is a place where vast amount of funds could be accessed by business entities, as well as a challenging venue for investors to reap good profits.

Thai stock market has long been established for more than two decades since 1975. From the investors' perspective, it is considered as a natural rule in all types of investment that risks are unavoidable. Most investors accept that, any investments, which generate high return rate, would generally have high risks. Although it is impossible for the total elimination of risks, there should be ways for mitigating them.

All factors that are capable of influencing the value of stocks and their return rates should be considered as risks. It is obvious that some risks could be controlled, as a result, it is possible to expect a more favourable rate of return in stock investment if controllable risks could be kept at the minimum level.

In financial analysis, factors such as Beta, firm size, leverage, BE/ME (Book to market equity) and earnings' yield should be taken into consideration in making systematic analysis of risk. However, many issues regarding these mentioned factors are not sufficiently understood by many investors, resulting to the lesser precision in risk analysis.

On Thaistocks.com, Paul A. Renaud states that in Thailand small shares have been ignored for years just because of their small market capitalization even though in fact small shares have by far outperformed the SET benchmark since 1997.

The following table shows the performance on "top 30" smaller cap portfolio. It demonstrates that not only small shares by far outperforming the SET index, but also it is further increasing compared price on Jan. 2, 99 to Oct 1, 00 ; Jan.2, 99 to Jan 2, 01 and Jan.2, 99 to March 31, 01.

Table 1.1 Top 30 smaller capitalization portfolio

Agri/Food	**Price on Jan. 2, 99***	**Price on Oct.1 '00**	**% Change**	**Price on Jan.2, 01**	**% Change**	**Price on March 31 ,01**	**% Change**
Stock Name							
CHOTI	129.00	194	50.4%	199	54.3%	231	79.1%
CM	29.00	36.25	25.0%	40	37.9%	41.75	44.0%
CPF	44.00	50.75	15.3%	84	90.9%	89	102.3%
GFPT	6.10	8.4	37.7%	8.6	41.0%	10.6	73.8%
STA	40.00	10	-75.0%	12.75	-68.1%	10.75	-73.1%
TAF	15.50	25	61.3%	25.5	64.5%	25.5	64.5%
PR	49.00	57.25	16.8%	55	12.2%	62	26.5%
TC	18.00	14.75	-18.1%	14.5	-19.4%	15.75	-12.5%
TUF	144.00	112.25	-22.0%	122.5	-14.9%	152.5	5.9%
Various							
CIT (de-listed)	22.50	45	100.0%	45	100.0%	45	100.0%
TCB	55.00	66.5	20.9%	66	20.0%	59	7.3%
METCO	60.00	80.5	34.2%	84	40.0%	84	40.0%
SUN	17.50	29.25	67.1%	31	77.1%	25.25	44.3%
SAWANG	12.00	10.2	-15.0%	10	-16.7%	9.7	-19.2%
THIP	26.00	17.55	-32.5%	20.8	-20.0%	21.05	-19.0%
CMBT	25.00	48	92.0%	53	112.0%	53	112.0%
S&J	14.25	47	229.8%	62	335.1%	61.5	331.6%
SPI	18.25	48	163.0%	59	223.3%	61	234.2%
BAT-3K	33.75	20.5	-39.3%	19.5	-42.2%	20.5	-39.3%
CPL	15.50	19	22.6%	20	29.0%	20	29.0%
Textile							
BRC	8.70	2.9	-66.7%	2.6	-70.1%	2.9	-66.7%
PAF	8.7	5.5	-36.8%	6.2	-28.7%	8.2	-5.7%
SUC	14.50	12.9	-11.0%	14.05	-3.1%	14.15	-2.4%

Agri/Food	Price on Jan. 2, 99*	Price on Oct.1 '00	% Change	Price on Jan.2, 01	% Change	Price on March 31 ,01	% Change
TNL	19.00	54	184.2%	79.5	318.4%	83.5	339.5%
TPCORP	10.00	43	330.0%	64	540.0%	65.5	555.0%
TTI	18.75	27	44.0%	28.5	52.0%	32	70.7%
TTL	23.75	27.5	15.8%	29.5	24.2%	31	30.5%
UF	14.50	17	17.2%	16.5	13.8%	17.25	19.0%
HT	71.00	49.5	-30.3%	53.5	-24.6%	53.5	-24.6%
UT	9.00	11.5	27.8%	12.75	41.7%	14.65	62.8%
Average percent change of "top 30"			40.3%		64.0%		70.3%
SET Index as of January 2, 99			360		360		360
SET Index as of Oct.1, 00 ; Jan. 2, 01 and March 31, 01 respectively			277		269		291
SET index change during Jan.2, 99 and Oct.1,00 ; Jan.2, 99 and Jan.2, 01 ; Jan.2, 99 and March 31, 01 respectively			-23.1%		-25.3%		-19.2%
Excess performance over SET benchmark :			63.3%		89.3%		89.5%

Sources : www.thaistocks.com

Paul A. Renaud also states that many investors simply pick up the stocks by following the stock's trading volume. Brokers, traders and institutions all have the same interest of high trading volume (high liquidity) even for different reasons. But individual investors favor high regular dividend income first more than the liquidity of the stocks, so they are not required to follow the market.

This research aims at giving a better understanding of important factors that could influence the return rate. It is expected that, if these important factors could be sufficiently understood by more investors and those who are interested in stock investment, then it is possible that volume of stock trading could be increased, as a consequence the stock market could be indirectly developed, as an alternative capital market, which should also benefit the business circle as a whole.

1.2 Research Objectives

The purpose of the study is beneficial to all investors who want to buy stocks in Thai Stock Market. It tells what factors among beta, firm size, leverage, BE/ME or earnings' yield they should consider to make a decision for buying stocks in order to receive high returns.

The objectives are as follows:

1. To find whether the stock returns are determined by beta and study the relationship between them.
2. To find whether the stock returns are determined by firm size and study the relationship between them.
3. To find whether the stock returns are determined by leverage and study the relationship between them.
4. To find whether the stock returns are determined by book-to-market equity (BE/ME) and study the relationship between them.
5. To find whether the stock returns are determined by earnings' yield and study the relationship between them.

1.3 Statement of the Problem

Most investors in the stock market consider risk and return as two important factors for making decisions in stock trading; they would try to minimize risk while maximize the expected return. The Capital Asset Pricing Model (CAPM) of Sharpe, Lintner and Black is a well-known model to predict the return based on the degree of risk (beta). It used beta as a measure of risk. Beta is positively related to the stock returns (the higher the beta, the higher the expected stock return). Besides beta, there are other variables that explain stock returns as suggested by Fama and French (1992).

Fama and French (1992) find that firm size, leverage, BE/ME, E/P ratios can explain stock returns in U.S. stock market. The result of this study will be an indication for explaining stock returns in Thai stock market. The result will also indicate whether the explanation for U.S. stock market in the past is consistent with the Thai stock market. If it is not consistent, the result will reveal that in what way stock returns in Thai stock market could be explained. As a consequence, this research aims to give clear answers to the problems as follows:

1. How betas affect stock returns?
2. Does firm size play an important role in stock return determination?
3. How leverage affects stock returns?
4. Does book-to-market equity (BE/ME) play an important role to determine stock returns?
5. Does earnings' yield affect stock returns?

1.4 Scope of the Study

This study will be based on cross-section and time series data of the Stock Exchange of Thailand from 1992 to 1999. It focuses on the Thai stock market, therefore, the conclusion applies specially to Thai stock market.

1.5 Limitations of the Research

This study limits itself to the relationship between stock returns and 5 factors including beta, firm size, leverage, book-to-market equity and earnings' yield. Other variables that may be related to the return are assumed to be constant. Moreover, transaction cost and taxes are ignored in the calculation of stock returns.

1.6 Significance of the Study

The stock market plays an important role as a source of funds to accommodate business sectors. It is widely accepted that higher risk stocks would produce higher return. Most investors would try to minimize risk and maximize stock return. The model which is commonly used in stock return investigation is Capital Asset Pricing Model (CAPM) which states that only beta can measure the risk. From the collection of many journals, researcher has found that there are limitations of CAPM. According to Fama and French (1992), not the beta, but other factors including firm size, leverage, book-to-market equity (BE/ME) or earnings' yield can explain stock returns. Therefore, this study will test whether beta, firm size, leverage, BE/ME or earnings' yield play an important role to determine stock returns in Thai stock market.

The goal of investor is to maximize the expected return on investment for a given level of risk. Therefore, this study is likely to benefit all investors either domestic or foreign who are interested in investing in Thai stock market. As the findings of this research could enable investors to determine factors that should be considered before making their decisions to buy stocks in Thailand. If these factors are sufficiently understood by many investors, it is possible that the volume of stock trading could be increased. As a consequence, Thai stock market could be indirectly developed as a whole.

1.7 Definition of Terms

1. **Stock Returns** are cash dividends received during the period, and capital appreciation or loss. It is defined as $k = [D_1+(P_1-Po)] /Po$. This is an ex ante (expected or required) rate of return; it is what investors anticipate receiving before the fact. (Pinches 1994)

2. **Beta** is a statistical measure of an asset's nondiversifiable risk. It is the measure of the asset's volatility in relation to the riskiness of the market portfolio as a whole- in other words, it measures what the returns on the asset are expected to be, relative to the returns on the market. (Pinches 1992)

3. **Firm Size** is the total market value of the common stock of a firm or market equity ME (a stock's price times shares outstanding). (Banz 1981)

4. **Leverage** is the use of borrowed money to increase the value of an investment. It is the company's ratio of debt or preferred stock to capital invested in common stocks. (Carolyn R. Gipson 1994)

5. **BE/ME** is the ratio of a firm's book value of common equity, BE, to its market value, ME. (Fama and French 1992)

6. **Earnings-Price Ratio (E/P ratios)** is the relationship of earnings per share to current stock price. Also known as earnings yield, it is used in comparing the relative attractiveness of stocks, bonds and money market instruments. Inverse of price-earnings ratio. (Downes J. and Goodman J.E. 1985)

7. **Earnings per share (EPS)** is the portion of a company's profit allocated to each outstanding share of common stocks. (Downes J. and Goodman J.E. 1985)

CHAPTER 2

LITERATURE REVIEW

The Capital Asset Pricing Model (CAPM) of Sharpe (1964), Lintner(1965) and Black (1972) (The SLB) implies that the market risk of a stock is measured by the single-index beta coefficient. The expected return on any asset is linearly related to its beta (the higher the beta, the higher the expected return). Since a stock's beta coefficient determines how it affects the riskiness of a diversified portfolio, beta is the most relevant measure of a stock's risk. However, there are several contradictions against the SLB model. Fama and French (1992) state that it is not beta to explain the cross-section of stock returns but they are firm size, leverage, book-to-market equity and earning-prices ratio. Thus, this chapter is divided into five parts to review the literature about the empirical evidences of the beta, firm size, leverage, book-to-market equity (BE/ME) and earning-prices ratio (E/P).

2.1 Beta

Black (1972) generates two assumptions about the nature of capital market equilibrium that have more restriction than the usual assumptions used in CAPM. First, it is assumed that there is no riskless asset and that no riskless borrowing or lending is allowed. Second, it is assumed that there is a riskless asset and that long positions in the riskless asset are allowed but that short positions in the riskless asset (borrowing) are not allowed. Under both assumptions, he finds that the expected return on any risky asset is a linear function of its β when there is no restrictions on borrowing. If there is a riskless asset, then the slope of the line relating the expected

return on a risky asset to its β must be smaller than it is when there are no restrictions on borrowing.

Black, Jensen, and Scholes (1972) analyze the returns on portfolios of stocks at different levels of β_i during 1926-66 period. They find that the average returns on these portfolios are not consistent with CAPM equation, especially in the postwar period 1946-66. Their estimates of the expected returns on portfolios of stocks at low levels of β_i are consistently higher than predicted by CAPM equation, and their estimates of the expected returns on portfolios of stocks at high levels of β_i are consistently lower than predicted by CAPM equation.

Fama and MacBeth (1973) find that there is a positive simple relation between average return and market β during the early years (1935-1968) of the Center for Research in Security Prices (CRSP) NYSE returns file.

Blume and Friend (1974) test the beta as measure of risk and concludes that beta provides a better explanation for price behavior of stocks with large market values (widely held by many investors).

Dimson (1979) studies about the problem occurred from infrequent shares trading and a method for measuring beta when share price suffer from this problem. Infrequent trading introduces serious bias for beta estimate which is biased downwards, while the figure for frequently traded securities is upward biased. A method of the process generating observed returns are introduced to develop the aggregated coefficients (AC) method for estimating unbiased beta.

Chan and Chen (1988) find a linear relation between the unconditional betas and expected returns implied by the conditional single-factor pricing equation under some assumptions about the time-series process of the size-portfolio market betas.

Fama and French (1992) study the relationship between market β and average stock returns in the cross-section by using the Fama MacBeth (FM 1973) regressions. The cross-section of stock returns is regressed on variables hypothesized to explain average returns. They first replicate the results of Chan and Chen (1988). Like them, Fama and French find that when portfolios are formed on size alone, there are strong positive relations between β and average return. It is highly correlated for size and βs of size portfolio (-0.988) so it is difficult to distinguish between the roles of size and β in average return. To allow for variation in β that is unrelated to size, they form portfolios on size and then on β by subdividing each size decide into 10 portfolios on the basis of pre-ranking βs for individual stocks. They find no relation between average return and β. The relation between β and average return disappears during the more recent 1963-1990 period even when β is used alone to explain average returns. They conclude that when one allows for variation in β that is unrelated to size, the relation between β and average return is flat, even when β is the only explanatory variable. The bottom line result is that β does not seem to help explain the cross-section of average stock returns.

Jegadeesh (1992) study the validity of the market risk-based explanations for the cross-sectional differences in expected returns across size-based portfolios. They find that the correlations between firm size and betas across the test portfolios are close to one in magnitude. After controlling for firm size, betas explain virtually none of the cross-sectional differences in portfolio returns.

Roll and Ross (1994) study about the cross-sectional Ordinary Least Square (OLS) relation between expected returns and betas. They state that there is an exact linear relationship between expected returns and true betas when the market portfolio is on the ex ante mean-variance efficient frontier. From their empirical research, they

have found little relationship between mean returns and estimated betas when the index is not efficient. Moreover, they have found a zero relation if a market portfolio proxy lies inside the efficient frontier which may be close to the frontier. They refer to their studies in 1977 that "a positive and exact cross-sectional relation between ex ante expected returns and betas must hold if the market index against which betas are computed lied on the positively sloped segment of the mean-variance efficient frontier. Not finding a positive cross-sectional relation suggests that the index proxies used in empirical testing are not ex ante mean-variance efficient."

Jagannathan and Wang (1996) study about the ability of the conditional CAPM to explain the cross-sectional variation in average returns on a large collection of stock portfolios by using the value-weighted index from CRSP as the market portfolio. The general consensus of the Static CAPM assumes that betas remain constant over time and unable to explain satisfactorily the cross-section of average returns on stocks. In this study, Jagannathan and Wang view that the relative risk of a firm's cash flow is likely to vary over the business cycle and betas and expected returns will depend on the nature of the information available at any given point in time and vary over time. Thus, they assume that the conditional version of the CAPM holds the expected return on an asset based on the information available at any given point in time is linear in its conditional beta. They first derive the unconditional model implied by the conditional CAPM. They show that when the conditional version of the CAPM holds (when betas and expected returns vary over time), a two-factor model obtains unconditionally. The conditional CAPM in their study has three betas, whereas the standard CAPM has only one beta. This model can be a better proxy for the return on the market portfolio results in a two-beta model in place of the classical one-beta model and when the CAPM holds in conditional sense,

unconditional expected returns will be linear in the unconditional beta as well as a measure of beta-instability over time and when the CAPM holds conditionally, they need more than the unconditional beta calculated by using the value-weighted stock index to explain the cross-section of unconditional expected returns. The results show that the unconditional model implied by the conditional CAPM explains nearly 30 percent of the cross-sectional variation in average returns of 100 stock portfolios which show a lot of improvement when compared to the 1 percent explained by the static CAPM.

Daniel and Titman (1997) find that after controlling for size and BE/ME, a share with low market beta has the same expected return as other common shares with high market betas. Therefore, they conclude that the market beta has no explanatory power for returns even after controlling for size and book-to-market equity.

Knez and Ready (1997) use Least trimmed squares (LTS) which trims a proportion of the influential observations and then fits the remaining observations using Least squares (LS) to study the relationship between beta and average return and they find no insight in the beta-return relationship.

Elfakhani, Lockwood and Zaher (1998) examine the relation between average returns and market beta for Canadian stocks during 1975-92 using methodology similar to that of Fama and French (1992). To examine the effects on average return of market betas that are unrelated to firm size, they perform portfolios on size and then beta as Fama and French (1992). They find no relation between average return and market beta in the Canadian stock market.

Downs and Ingram (2000) study the relation between cross-section of stock returns and beta by using the same methodology as Fama and French (1992). They replicate the results of Fama and French (1992) and extend the analysis by re-

balancing the portfolios after eliminating extreme returns and re-estimating post-ranking betas and re-estimating cross-sectional equations. They eliminate monthly stock returns that deviate by more (+/-) than 50 percent from the respective monthly market return. They find that there is a statistically significant relation between beta and the cross-section of stock returns. As larger percentages of observations are eliminated, beta becomes increasingly significant. They conclude that beta and cross-section of stock returns are positively related.

2.2 Firm Size

Banz (1981) test the relationship between the total market value of NYSE common stock of a firm and its return during 1936-1975 period. He finds that smaller firms have higher risk adjusted returns, on average, than larger firms over a forty year period. This result is called "size effect". But this size effect is not linear through time because the main effect occurs for very small firms while there is little difference in return between average sized and large firms. There is no theoretical foundation for such an effect so it is unknown whether the factor is size itself or whether size is just a proxy for one or more true but unknown factors correlated with size. In conclusion, there is a strong relation between average return and firm size.

Basu (1983) studies the relationship between firm size and returns on the common stock of NYSE firms during 1963-80 period. He partitions securities into groups or classes on the basis of their E/P ratios and the market value of common stocks. The earnings' yield and market value portfolios were constructed by controlling for the effect of firm size and E/P ratios, respectively. While the common stock of small NYSE firms appear to have earned considerably higher returns than the

common stock of large NYSE firms, the size effect virtually disappears when returns are controlled for differences in risk and E/P ratios. Firm size may have an indirect effect on the risk-adjusted returns of NYSE common stocks.

Brown, Kleidon and Marsh (1983) find that the size effect is linear in the logarithm of size, but the excess return attributable to size is not stable through time. They state that at least part of the size effect may be explained by an omitted risk factor in the pricing model. Even if part of the average size effect is due to an unspecified risk variable, however, the behavior observed in January cannot be due solely to this cause because risk alone cannot explain a return premium observed in the same month each year.

Brown, Keim, Kleidon, and Marsh (1983) find a negative relation between average returns and the market capitalizations of firms for the Australian market during January. .

Keim (1983) studies the relation between abnormal returns and market value of NYSE and AMEX common stocks during 1963-1979 period month-to-month. He finds that the relation between abnormal returns and size is always negative and more significant in January than in other eleven months even in years when large firms earn larger risk-adjusted returns than small firms.

Berges, McConnell, and Schlarbaum (1984) find a small firm effect in the Canadian stock market. They find that the small firm effect persists in January even when there was no capital gains tax in Canada.

Cook and Rozeff (1984) study the relation between stock returns and firm size in January and non-January months separately. They find a significant relationship in size effects both in January and the remaining eleven months. They use ANOVA approach so it does not provide point estimates of statistical relations.

Chan, Chen and Hsieh (1985) study the firm size effect under a multi-factor pricing model during 1958-1977 period. Among the economic variables included, the measure of the changing risk premium explained a large portion of the size. They set the hypothesis that the risk premium would vary with changing business conditions. The results are consistent with the intuition that smaller firms are riskier than larger firms because they fluctuate more with economic expansions and contractions. They conclude that the firm size is captured by a multi-factor pricing model. The higher average returns of smaller firms are justified by the additional risks in an efficient market.

Chan and Chen (1988) find a linear relation between the unconditional betas and expected returns implied by the conditional single-factor pricing equation under some assumptions about the time-series process of the size-portfolio market betas. Under these assumptions, they find the "size effect" for only five years of data to estimate betas. The size effect disappears when they use data from a long period of time to estimate the betas. They conclude that a firm-size proxy among the size-ranked portfolios does not have additional explanatory power on the cross-sectional returns after controlling for the unconditional equally weighted market beta.

Chan and Chen **(1991)** argue that there are important economic reasons why small firms and large firms have different risk and return characteristics. They find that size effect is mainly driven by marginal firms in distress.

Jaffe, Keim and Westerfield (1989) study the relationship between stock returns and the effects of size during 1951-1986 period. They find that the size effect is significantly negative only in January.

Chan, Hamao and Lakonishok (1991) study cross-sectional relationship between firm size (market capitalization of equity) and returns on Japanese stocks

during 1971-1988 period including both manufacturing and non-manufacturing firms of the Tokyo Stock Exchange (TSE). The results are based on returns on individual securities and returns on portfolios, where portfolios are constructed under several different grouping schemes by earnings yield, then by size and last by BE/ME. They find that there is a size effect after adjusting for market risk and the other fundamental variables. They refer E/P, BE/ME, cash flow yield and size as fundamental variables. But a firm size is significant only to the specification of the model, in some cases it is not significant.

Fama and French (1992) measure the cross-sectional variation in average stock returns associated with size by using the Fama MacBeth 1973 (FM) regressions. Each month the cross-section of return on stocks is regressed on variables hypothesized to explain expected returns. Either portfolios are formed on size alone or two-pass sort on size and β , they find a strong negative relation between size and average return. They conclude that size (ME) is a good explanation for the cross-section of average returns on NYSE, AMEX, and NASDAQ stocks for the 1963-1990 period.

Fama and French **(1993)** use the time-series regression approach of Black, Jensen and Scholes (1972). Monthly returns on stocks are regressed on the returns to a market portfolio of stocks and mimicking portfolios for size and term-structure risk factors in returns. The time-series regressions slopes are factors loading that have a clear interpretation as risk-factor sensitivities. Size proxies for sensitivity to common risk factors that capture strong common variation in stock returns and help explain the cross-section of average returns because stock portfolios constructed to mimic risk factors related to size capture strong common variation in returns no matter what else is in the time series regressions. The time-series regressions use excess return

(monthly stocks return minus the one-month treasury bill rate) as dependent variables and either excess returns or returns on zero-investment portfolio model as explanatory variables. There are three stock market factors: an overall market factor and factors related to firm size and book-to-market equity. The common variation in stock returns is largely captured by three stock portfolio returns. The intercepts from three-factor regressions that include the excess market return and the mimicking return for size factors are close to zero so a market factor and their proxies for the risk factors related to size seem to do a good job explaining the cross-section of average stock returns. Finally, they conclude that a firm's size is in fact proxy for the firm's loading on priced risk factors because of two findings: firstly, the prices of small size stocks tend to move up and down in a way that is suggestive of a common risk factor and secondly, the loadings on zero cost factor portfolios formed based on size (a small capitalization portfolio minus large capitalization portfolio called SMB) explain the excess returns of a full set of size-sorted portfolios.

Fama and French **(1995)** study the behavior of stock prices, in relation to size (ME, stock price times shares outstanding), reflected the behavior of earnings by using simple rational-pricing models. If stocks are priced rationally, systematic differences in average return are due to differences in risk. Thus, ME must proxy for sensitivity to common risk factors returns. They find that size factors in earning help explain size factors in returns. Controlling for BE/ME, small stocks tends to have lower earning on book equity (less profitable) than big stocks.

Fama and French **(1996)** further study their work in 1993 about three-factor model. The model says that the expected return on a portfolio in excess of the risk-free rate $[E(R_i) - R_f]$ is explained by the sensitivity of its return to three factors: (i) the excess return on a broad market portfolio $(R_M - R_f)$; (ii) the difference between the

return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB, small minus big); and (iii) the difference between the return on a portfolio of high-book-to-market stocks and their return on a portfolio of low-book-to-market stocks (HML, high minus low). FF(1993) show that the model is a good description of returns on portfolios formed on size and BE/ME. Moreover, FF(1996) find that the model also explains the strong patterns in returns observed and cover dimensions of risk and expected return beyond those required to explain the returns on portfolios formed on size and BE/ME when portfolios are formed on earnings/price. It also captures the reversal of long-term returns but cannot explain the continuation of short-term returns.

Jegadeesh (1992) study the validity of the market risk-based explanations for the cross-sectional differences in expected returns across size-based portfolios. They find that the correlations between firm size and betas across the test portfolios are close to one in magnitude. Size effect is not explained by beta in the cross-sectional differences in portfolio returns.

Bhardwaj and Brooks (1993) test the size effect between bull and bear markets during 1926-1988 period by using a dual-beta market model (varying risk). Using a dual-beta market model to adjust for risk differences in bull and bear markets, systematic risk of small (large) firm stocks is larger (smaller) in bull months than in bear months. In conclusion, they find that large firm stocks, on average, earn significant positive excess returns and small firm stocks earn significant negative excess returns and however, small firm stocks continue to outperform large firm stocks in January, but the January size effect is much smaller when risks are allowed to vary in bull and bear months.

He, Kan, NG and Zhang (1996) examine whether the cross-sectional explanatory power of ME is consistent with a conditional multifactor asset pricing model based on Harvey (1989). They find that the traditional asset pricing model with commonly used factors can only explain a small portion of the stock returns predicted by firm size. The one-factor model explains virtually nothing about the predictive power of ME but the three-factor model with time-varying can explain little better.

Jagannathan and Wang (1996) study about the ability of the conditional CAPM to explain the cross-sectional variation in average returns on a large collection of stock portfolios by using the value-weighted index from CRSP as the market portfolio. The general consensus of the Static CAPM assumes that betas remain constant over time and unable to explain satisfactorily the cross-section of average returns on stocks. In their research, they assume that the CAPM holds in a conditional sense (betas and the market risk premium vary over time). The results show that the unconditional model implied by the conditional CAPM explains nearly 30 percent of the cross-sectional variation in average returns of 100 stock portfolios which show a lot of improvement when compared to the 1 percent explained by the static CAPM. When betas and expected returns are allowed to vary over time by assuming that the CAPM holds period by period, the size effects and the statistical rejections of the model specifications become much weaker. They find that when human capital is also included in measuring wealth, the unconditional model implied by the conditional CAPM is able to explain over 50 percent of the cross-sectional variation in average returns. More importantly, firm size does not have any additional explanatory power.

Daniel and Titman (1997) find that stocks with low capitalizations (small ME) have high average returns because of the characteristics rather than the covariance structure of returns that appear to explain the cross-sectional variation in stock returns and not because of the comovements of stocks with pervasive factors.

Knez and Ready (1997) extend the Fama and French (1992) monthly cross-sectional regression to include a robust regression estimator, called Least trimmed squares (LTS) to trim a proportion of the influential observations and then fit the remaining observations using Least squares (LS). The result shows that the negative relation between firm size and average returns is driven by a few extreme positive returns in each month. In fact after eliminating 1 percent of the most extreme returns, they find a significant positive relation between average returns and firm size. The significance of the coefficient on firm size increases as larger percentages of extreme observations are eliminated from the sample.

Chen and Zhang (1998) study about the behavior of value stocks in the United States, Japan, Hong Kong, Malaysia, Taiwan, and Thailand. Value stock is measured as a low market value relative to a typical stock or small ME. They set the hypothesis that the high returns of value stocks compensate for the high risks induced by the characteristics. They find that the high average return for value stocks tends to persist for the well-established market of the United States; is less persistent for the growth markets of Japan, Hong Kong, and Malaysia; and is almost nonexistent for the high growth markets of Taiwan and Thailand.

Elfakhani, Lockwood and Zaher (1998) examine the relation between average returns and firm size for Canadian stocks during 1975-92 using methodology similar to that of Fama and French (1992). They find that average returns are significantly related to firm size. They document a negative relation between average

return and the market capitalization of firms. While the small firm effect is significant during a period of reduced capital gains tax, it is noticeably lower than during the period leading up to the change.

Downs and Ingram (2000) study the relation between cross-section of stock returns and firm size by using the same methodology as Fama and French (1992). They replicate the results of Fama and French (1992) and extend the analysis by re-balancing the portfolios after eliminating extreme returns and re-estimating post-ranking betas and re-estimating cross-sectional equations. They eliminate monthly stock returns that deviate by more (+/-) than 50 percent from the respective monthly market return. They find that firm size is not statistically significant. As larger percentages of observations are eliminated, the size coefficient moves toward zero. Thus, they conclude that firm size is irrelevant.

2.3 Leverage

Bhandari (1988) finds that the expected common stock returns are positively related to the ratio of debt (non-common equity liabilities) to equity, controlling for the beta and firm size, both including and excluding January. An increase in the debt/equity ratio (DER) of a firm increases the risk of its common equity, measuring risk in any reasonable way assuming that the common equity has more risk than the debt in a firm so the unlikely possibility of a negative common-equity beta is excluded. DER is expected to be positively correlated to the risk of common equity across firms assuming that the cross-sectional correlation between DER and the firm-level risk is not so highly negative so DER can be used as a proxy for the risk of common equity when an adequate measure of risk is not known or cannot be

calculated from available information. From his results, conclusion is that Bhandari finds the positive relation between leverage and average return and leverage helps explain the cross-section of average stock returns in tests that include size (ME) and β.

Fama and French (1992) measure the cross-sectional variation in average stock returns associated with leverage by using the Fama MacBeth (FM 1973) regressions. Each month the cross-section of return on stocks is regressed on variables hypothesized to explain expected returns. They use two leverage variables, the ratio of book assets to market equity (A/ME) and the ratio of book assets to book equity (A/BE). A/ME is interpreted as a measure of market leverage and A/BE is a measure of book leverage. The regressions use the natural logs of the leverage ratios, ln(A/ME) and ln(A/BE). The two leverage variables are related to average returns but with the opposite signs. High market leverage is associated with higher average returns; the average slopes for ln (A/ME) are always positive. But higher book leverage is associated with lower average returns; the average slopes for ln (A/BE) are always negative. The average slopes for the two leverage variables are opposite in sign but close in absolute value. The difference between market and book leverage is book-to-market equity that helps explain average returns, ln (BE/ME) = ln (A/ME) – ln (A/BE). Used alone, leverage has explanatory power. In combinations of size (ME, a stock's price times shares outstanding) and book-to-market-equity ratio (BE/ME), it seems to absorb the roles of leverage in average stock returns, at least during 1963-1990 sample period.

2.4 Book-to-market equity (BE/ME)

Chan, Hamao and Lakonishok (1991) study cross-sectional relationship between book-to-market equity (BE/ME) and returns on Japanese stocks during 1971-1988 period including both manufacturing and non-manufacturing firms of the Tokyo Stock Exchange (TSE). The results are based on returns on individual securities and returns on portfolios, where portfolios are constructed under several different grouping schemes by earnings yield, then by size and last by BE/ME. They find that there is a strong positive significant relationship between BE/ME and returns on Japanese stocks.

Chan and Chen (1991) postulate that the earning prospects of firms are associated with a risk factor in returns. Firms that the market judges to have poor prospects, signaled by low stock prices and high ratios of BE/ME, have higher expected stock returns than firms with strong prospects.

Fama and French (1992) measure the cross-sectional variation in average stock returns associated with book-to-market equity by using the Fama MacBeth (1973) regressions. Each month the cross-section of return on stocks is regressed on variables hypothesized to explain expected returns. Used alone, BE/ME has explanatory power. They find the strong positive relationship between book value/price ratios and average returns which persisted in both the univariate and multivariate tests. Firms with low market equity or high BE/ME are more likely to have poor prospects due to lower stock prices. Large stocks are more likely to be firms with stronger prospects, higher stock prices lower book-to-market equity, and lower average stock returns. Finally, they conclude that BE/ME was a good

explanation for the cross-section of average returns on NYSE, AMEX, and NASDAQ stocks for the 1963-1990 period.

Fama and French **(1993)** use the time-series regression approach of Black, Jensen and Scholes (1972). Monthly returns on stocks are regressed on the returns to a market portfolio of stocks and mimicking portfolios for BE/ME and term-structure risk factors in returns. The time-series regressions slopes are factors loading that have a clear interpretation as risk-factor sensitivities. BE/ME proxies for sensitivity to common risk factors that capture strong common variation in stock returns and help explain the cross-section of average returns because stock portfolios constructed to mimic risk factors related to BE/ME capture strong common variation in returns no matter what else is in the time series regressions. The time-series regressions use excess return (monthly stocks return minus the one-month treasury bill rate) as dependent variables and either excess returns or returns on zero-investment portfolio model as explanatory variables. There are three stock market factors: an overall market factor and factors related to firm size and book-to-market equity. The common variation in stock returns is largely captured by three stock portfolio returns. The intercepts from three-factor regressions that include the excess market return and the mimicking return for BE/ME factors are close to zero so a market factor and their proxies for the risk factors related to BE/ME seem to do a good job explaining the cross-section of average stock returns. Finally, they conclude that a firm's book-to-market ratio is in fact proxy for the firm's loading on priced risk factors because of two findings: firstly, the prices of high BE/ME tend to move up in a way that is suggestive of a common risk factor and secondly, the loadings on zero cost factor portfolios formed based on BE/ME (a high book-to-market portfolio minus a low

book-to-market portfolio called HML) along with a value-weighted market portfolio explain the excess returns of a full set of book-to-market sorted portfolios.

Fama and French **(1995)** study the behavior of stock prices, in relation to book-to-market-equity (BE/ME), reflected the behavior of earnings by using simple rational-pricing models. If stocks are priced rationally, systematic differences in average return are due to differences in risk. Thus, BE/ME must proxy for sensitivity to common risk factors returns. They find no link between BE/ME factors in earnings and returns. High BE/ME (a low stock price relative to BV) sustains low earning on book equity. Controlling for BE/ME, small stocks tend to have lower earning on book equity (less profitable) than big stocks.

Fama and French **(1996)** further study their work in 1993 about three-factor model. The model says that the expected return on a portfolio in excess of the risk-free rate $[E(R_i) - R_f]$ is explained by the sensitivity of its return to three factors: (i) the excess return on a broad market portfolio $(R_M - R_f)$; (ii) the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB, small minus big); and (iii) the difference between the return on a portfolio of high-book-to-market stocks and their return on a portfolio of low-book-to-market stocks (HML, high minus low). FF(1993) show that the model is a good description of returns on portfolios formed on size and BE/ME. Moreover, FF(1996) find that the model also explains the strong patterns in returns observed and cover dimensions of risk and expected return beyond those required to explain the returns on portfolios formed on size and BE/ME when portfolios are formed on earnings/price. It also captures the reversal of long-term returns but cannot explain the continuation of short-term returns.

Fama and French **(1998)** study about value versus growth stocks in markets around the world. They say that investment managers classify firms that have high book-to-market equity (BE/ME) as value stock and firms that have low ratios of book-to-market equity (BE/ME) as growth stocks. Value stocks have higher returns than growth stocks in markets around the world. Sorting on BE/ME, the difference between the average returns on global portfolios of high and low BE/ME stocks is 7.68 percent per year during the 1975-1995 period. Value stocks outperform growth stocks in twelve of thirteen major markets.

Lakonishok, Shleifer, and Vishy (1994) (LSV) suggest that the high returns associated with high book-to-market stocks (value stocks) are generated by investor who incorrectly estimate the past earnings growth rates of firms. They suggest that investors are overly optimistic about firms which have done well in the past and are overly pessimistic about those that have done poorly. LSV also suggest that low book-to-market stocks (growth stocks) are more attractive than value stocks and may attract naïve investors who push up prices and lower the expected returns of these securities.

He, Kan, NG and Zhang (1996) examine whether the cross-sectional explanatory power of BE/ME is consistent with a conditional multifactor asset pricing model based on Harvey (1989). They find that the traditional asset pricing model with commonly used factors can only explain a small portion of the stock returns predicted by BE/ME. The one-factor model explains virtually nothing about the predictive power of BE/ME but the three-factor model with time-varying can explain little better.

Jagannathan and Wang (1996) study about the ability of the conditional CAPM to explain the cross-sectional variation in average returns on a large collection

of stock portfolios by using the value-weighted index from CRSP as the market portfolio. The general consensus of the Static CAPM assumes that betas remain constant over time and unable to explain satisfactorily the cross-section of average returns on stocks. In their paper, they assume that the conditional version of the CAPM holds (betas vary over time). The results show that the unconditional model implied by the conditional CAPM explains nearly 30 percent of the cross-sectional variation in average returns of 100 stock portfolios which show a lot of improvement when compared to the 1 percent explained by the static CAPM. When a proxy for the return on human capital is included in measuring the return on aggregate wealth, the unconditional model implied by the conditional CAPM is able to explain over 50 percent of the cross-sectional variation in average returns. More importantly, book-to-market variables have little ability to explain what is left unexplained.

Daniel and Titman (1997) find that stocks with high book-to-market equity (high BE/ME) have high average returns because of the characteristics rather than the covariance structure of returns that appear to explain the cross-sectional variation in stock returns and not because of the comovements of stocks with pervasive factors. Moreover, their results show that factor loadings do not explain the high returns associated with small and high book-to-market stocks.

Chen and Zhang (1998) study about the behavior of value stocks in the United States, Japan, Hong Kong, Malaysia, Taiwan, and Thailand. Value stock is measured as a low market price relative to book (low P/BV) or high book-to-market equity (high BE/ME). They set the hypothesis that the high returns of value stocks compensate for the high risks induced by the characteristics. They find in present study before the portfolios are formed, that a typical high book-to-market stock in Taiwan and Thailand earns positive excess returns while a typical high book-to-

market stock in the United States and Japan earns negative or zero excess returns. But after forming portfolios according to size and book-to-market, they find a strong value stock effects persist in the United States; are somewhat less persistent in Japan, Hong Kong, and Malaysia; and are undetectable in Taiwan and Thailand. Value stocks have higher returns in the United States, Japan, Hong Kong, and Malaysia because these are likely to be from firms that are in distress.

Elfakhani, Lockwood and Zaher (1998) examine the relation between average returns and book-to-market equity for Canadian stocks during 1975-92 using methodology similar to that of Fama and French (1992). They find that average returns are positively related to book-to-market value especially during the period of lower capital gains tax. The results show a significant positive relation between average returns and BE/ME among Canadian stocks after 1984 and the post-1984 value effect persists throughout January and non-January months. A high book-to-market ratio indicates a value stock, while a low book-to-market ratio indicates a growth stock. A positive relation between average returns and book-to-market ratio indicates a value effect, in which value stocks produce higher returns, on average, than growth stocks.

2.5 Earnings-price ratios (E/P)

Ball (1978) posits that the earnings-price ratio is a catch-all for omitted risk factors in expected returns. Earnings variables proxy for omitted variables in the two-parameter model: that the measured market portfolio is not mean-variance efficient. E/P is likely to be higher (prices are lower relative to earnings) for stocks with higher risks and expected returns, whatever the unnamed sources of risk.

Basu (1983) studies the relationship between earnings' yield and returns on the common stock of NYSE firms during 1963-80 period. He partitions securities into groups or classes on the basis of their E/P ratios and the market value of common stocks. He refers to his findings in 1975 and 1977 which indicates that portfolios of high (low) earnings' yield securities trading on the NYSE appear to have earned higher (lower) absolute and risk-adjusted rates of return, on average, than portfolios consisting of randomly selected securities. The results in his study (1983) is similar to his old studies (1975,1977) showing that the common stock of high E/P firms earn, on average, higher risk-adjusted returns than the common stock of low E/P firms and that this effect is clearly significant even if experimental control is exercised over differences in firm size. More specifically, the results that the E/P effect is sufficiently weak for larger than average NYSE firms. In conclusion, E/P help explain the cross-section of average returns on U.S. stocks in test that also include size and market β.

Cook and Rozeff (1984) study the relation between stock returns and earning-to-price ratios in January and non-January months separately. They find a significant relationship in E/P effects both in January and the remaining eleven months. They use ANOVA approach so it does not provide point estimates of statistical relations.

Jaffe, Keim and Westerfield (1989) study the relationship between stock returns and earnings to price ratio (E/P) during 1951-1986 period. They find that E/P has a significant relation in both January and the other eleven months.

Chan, Hamao and Lakonishok (1991) study cross-sectional relationship between earnings yield and returns on Japanese stocks during 1971-1988 period including both manufacturing and non-manufacturing firms of the Tokyo Stock Exchange (TSE). The results are based on returns on individual securities and returns

on portfolios, where portfolios are constructed under several different grouping schemes by earnings yield, then by size and last by BE/ME. They find that high E/P ratios would out-perform a strategy of holding low E/P stocks. Used alone or combination with size, E/P has a significant positive relationship with returns. Moreover, if they add BE/ME into model, the coefficient on earnings yield becomes insignificantly different from zero. In the context of the full model, E/P ratios have a negative relation with stock returns.

Fama and French (1992) measure the cross-sectional variation in average stock returns associated with earnings-price ratios by using Fama and MacBeth (1973) regressions. Each month the cross-section of return on stocks is regressed on variables hypothesized to explain expected returns. Used alone, E/P has explanatory power. They find the relation between E/P and average return is U-shaped when the E/P variables are used alone in the FM regressions. The average slope for stocks with positive E/P shows that average returns increase with E/P when it is positive. In combinations of size (ME, a stock's price times shares outstanding) and book-to-market-equity ratio (BE/ME), it seems to absorb the roles of E/P in average stock returns, at least during 1963-1990 sample period. The results suggest that most of the relation between (positive) E/P and average return is due to the positive correlation between E/P and ln(BE/ME), firms with high E/P tend to have high book-to-market equity ratios.

Fama and French **(1998)** study about value versus growth stocks in markets around the world. They say that investment managers classify firms that have high ratios of earnings to prices (E/P) as value stock and firms that have low ratios of earnings to price (E/P) as growth stocks. Value stocks have higher returns than

growth stocks in markets around the world. Value stocks outperform growth stocks in twelve of thirteen major markets.

CHAPTER 3

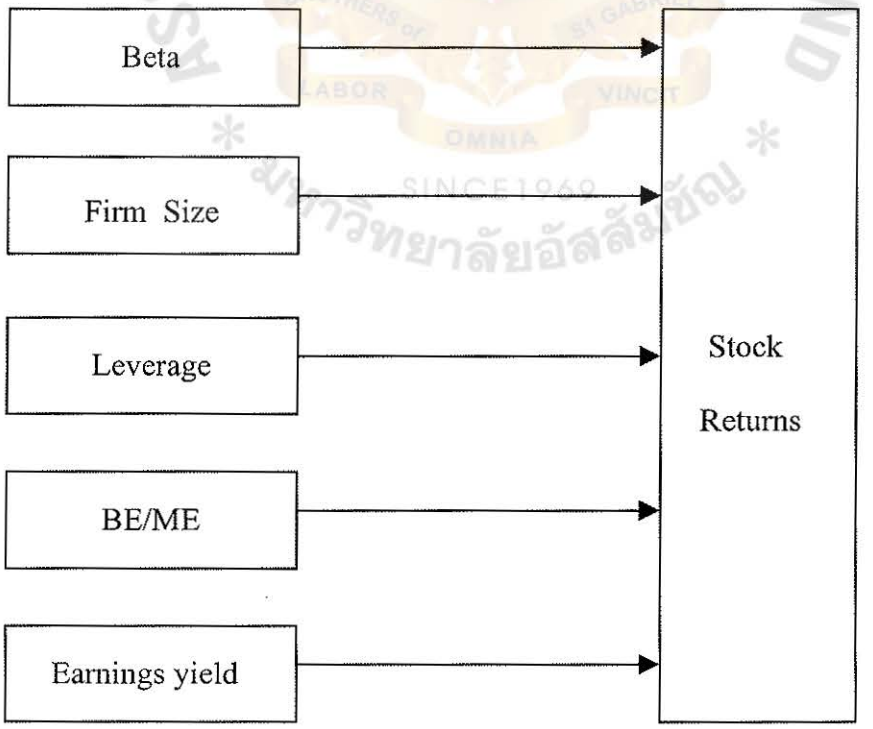
RESEARCH FRAMEWORK

There are four sections in this chapter. The first section presents the conceptual framework concerning about empirical studies in the previous chapter. The second section presents the regression model based on conceptual framework. The third section mentions about the operational definitions of the research variables. And the last section presents the research hypothesis.

3.1 Conceptual Framework

This conceptual framework is based on both empirical evidence of studies and related theories as follows :

Figure 3.1 Conceptual Framework



Risk arises from many different sources and has a number of different meanings in practice. For securities held in a diversified portfolio, the contribution of any one security to the riskiness of a particular portfolio is its nondiversifiable, or market risk. Therefore, for securities in a diversified portfolio, risk can best be measured by how their returns move, or are correlated with, the returns of the portfolio as a whole (Pinches 1992). One of the objectives in measuring risk is to come up with an estimate of an expected return for an investment. This expected return then becomes the benchmark which determines whether the investment is a good or bad one (Damodaran 1996).

Beta measures the amount of systematic risk, that is, the risk arising because of fluctuations in the market return. There is no adjustment for risk specific to the firm (unsystematic risk) in the CAPM, since it is assumed that the unsystematic risk goes to zero given the very large number of investments (the unsystematic components are independent). The beta of a security measures how the securities' return is correlated with the market's return; thus it is a measure of the security's systematic risk (Bierman and Smidt 1986). Therefore, it is concluded that risk effects the return and beta is one type of risk so it also effects the return.

The study of Fama and MacBeth (1973) shows that there is a positive relation between average return and market beta during 1935-1968 of the Center for Research in Security Prices (CRSP) New York Stock Exchange (NYSE) returns file. Chan and Chen (1988) find linear relation between the unconditional betas and expected returns implied by the conditional single-factor pricing equation under some assumptions about the time-series process of the size-portfolio market betas. In 1992, Fama and French find that when portfolios are formed on size and then beta, the relationship between beta and average return is flat. In 1994, Roll and Ross find that there is an

exact linear relationship between expected returns and true betas when the market portfolio is on the ex ante mean-variance efficient frontier. Down and Ingram (2000) replicate the results of Fama and French (1992) but eliminate monthly stock returns that deviate by more (+/-) than 50 percent from monthly market return, they find significant positive relation between beta and cross-section of stock returns.

Smaller firms have higher risk adjusted return, on average, than larger firms. This is called "size effect". And most investors would not desire to hold small stocks due to lack of information which lead to limited diversification and therefore lead to higher returns for undesirable stocks of small firms (Banz 1981).

Studies have consistently found that smaller firms (low ME) earn higher returns than larger firms (high ME) of equivalent risk, where risk is defined in terms of the market beta. There are several possible explanation to explain this effect.

(1) The transactions costs of investing in small stocks is significantly higher than the transactions costs of investing in larger stocks.

(2) The CAPM model may not be the right model for risk, and betas underestimate the true risk of small stocks. Thus, the small firm premium is really a measure of the failure of beta to capture risk (Damodaran 1996).

There are evidences to support firm size as well. Banz (1981) finds a strong relation between average return and firm size. Basu (1983) also finds that small firms earn higher return than large firms but the size effect virtually disappear when returns are controlled for differences in risk and E/P ratios. So he concludes that firm size may have an indirect effect on the risk-adjusted return of NYSE common stocks. Brown, Keim, Kleidon, Marsh (1983) in Austrarian market and Jaffe, Keim, Westerfield (1989) in U.S. market find negative relationship between return and size

only in January but Cook and Rozeff (1984) and Elfakhani, Lockwood, Zaher (1998) find a significant relationship in size effects both January and non-January in U.S. market. Chan, Chen and Hsieh (1985) point out that small firms tend to be riskier than large firms. In 1992, Fama and French point that size is a good explanation for the cross-section of expected return. They find a strong negative relation between them. Knez and Ready (1997) extend the work of Fama and French (1992) by eliminating 1% of the most extreme returns and they find a positive relation between return and size.

For leverage variable, Bhandari (1988) defines leverage as debt-equity ratio (DER). He finds a positive relation between DER and risk and also between DER and return. When beta is not an adequate measure of risk, leverage may be used as a proxy for risk to determine the cross-section of average stock returns. Fama and French (1992) find that higher market leverage is associated with higher average returns.

Another statistic that is widely used by investors in investment strategy is the book-to-market equity (BE/ME). The consistent finding from these studies is that there is a positive relationship between returns and BE/ME that is high BE/ME stocks earn higher returns than low BE/ME stocks (Damodaran 1996).

Chan, Hamao, and Lakonishok (1991) find that BE/ME ratio has a strong positive role in explaining the cross-section of average returns on Japanese stocks. Chan and Chen (1991) point that firms with poor prospects (high BE/ME) have higher expected stock returns than firms with strong prospects (low BE/ME). Fama and French (1992) state that high BE/ME (low P/BV) may operate as a measure of risk, since firms with prices well below book value are more likely to be in trouble and go out of business. They find the strong positive relation between BE/ME and average

returns in both the univariate and multivariate tests. Firms with high BE/ME are more likely to have poor prospects due to lower stock prices. Large stocks are more likely to be firms with stronger prospects, higher stock prices lower BE/ME, and lower average stock returns. In 1998, Fama and French point that value stocks (high BE/ME) have higher returns than growth stocks (low BE/ME) in markets around the world. Daniel and Titman (1997) find that stocks with high BE/ME have high average returns because of the characteristics. Elfakhani, Lockwood and Zaher (1998) find a significant positive relation between returns and BE/ME for Canadian stocks. They also point that value stocks produce higher returns, on average, than growth stocks.

For earnings yield, the studies are parallel to those done to BE/ME ratios, the relationship between returns and E/P ratios have been studied. Studies have found that in tests of CAPM is the tendency of likely to be outperform the market and earn excess returns. There are several reasons behind this phenomenon.

(1) The CAPM does not adequately measure risk and that betas are underestimated for high E/P stocks and overestimated for low E/P stocks.

(2) The model's focus on pretax returns obscures the higher tax liability that will be faced by the investor buying the high E/P stocks and getting higher dividends.

(3) Investors consistently overestimate the value of growth and pay too much for high growth firms and too little for stable firms (Damodaran 1996).

Ball (1978) points that E/P is likely to be higher for stocks with higher risks and expected returns, whatever the unnamed sources of risk. Basu (1983) shows that stocks with high E/P earn, on average, higher risk-adjusted returns than the stocks with low E/P. Cook, Rozeff (1984) and Jaffe, Keim and Westerfield (1989) also find

a significant relationship in E/P effects both January and non-January months. Chan, Hamao and Lakonishok (1991) find high E/P ratios would out-perform a strategy of holding low E/P stocks. Used alone or combination with size, E/P has a significant positive relationship with returns but if adding BE/ME into model, E/P will have negative relation with stock returns. In 1992, Fama and French find the positive relation between E/P and returns and in 1998, they point that value stocks (high E/P) have higher returns and outperform than growth stocks (low E/P) in markets around the world.

3.2 Regression Model

The Multivariate Regression Model with Ordinary Least Squares (OLS)

$$\text{Stock Returns} = \beta_0 + \beta_1 \text{ beta} + \beta_2 \text{ ME} + \beta_3 \text{ A/ME} + \beta_4 \text{ BE/ME} + \beta_5 \text{ E/P} + \in_{ij}$$

whereas each variable stands for the following:

β_0	=	intercept
$\beta_1 \ldots \beta_5$	=	parameters to be estimated
ME	=	market value of equity (market capitalization of firm) to measure firm size
A/ME	=	the ratio of total assets to market equity to measure leverage
BE/ME	=	the ratio of book value of common equity to its market value of equity
E/P	=	earning-prices ratio
$\in_{ij}$	=	a random error term

3.3 Operationalization of Independent and Dependent variables

Table 3.1 Operationalization of Independent and Dependent variables

Variables to be tested	Operationalized by	Literature Support
Independent Variable		
Stock Returns	$[D_1+(P_1-Po)]$ /Po	Pinches (1994)
Dependent Variables		
Beta	a measure of the sensitivity of the security's real return to a change in real return of the market index.	Pinches (1992)
Firm Size	ME (Market Equity or a stock's price times shares outstanding)	Banz(1981), Basu, Brown, Keim, Kleidon and Marsh (1983), Berges, Cook, McConnell, Rozeffand, Schlarbaum(1984), Chan, Chen and Hsieh (1985), Chan and Chen (1988), Jaffe, Keim, Westerfield (1989), Chan, Chen, Hamao and Lakonishok (1991), Fama and French (1992,1993,1995,1996), Jegadeesh (1992),

		Bhardwaj and Brooks (1993), He, Jagannathan, Kan, NG, Wang and Zhang (1996), Daniel, Knez, Titman and Ready (1997), Chen, Elfakhani, Lockwood, Zaher and Zhang (1998), Downs and Ingram (2000)
Leverage	A/ME (Total assets to market equity)	Fama and French (1992)
BE/ME	BE/ME (book value of common equity / market equity)	Chan, Chen, Hamao and Lakonishok (1991),Fama and French (1992,1993,1995,1996, 1998), Lakonishok, Shleifer and Vishy (1994), He, Jagannathan, Kan, NG, Wang and Zhang (1996), Daniel and Titman (1997), Chen, Elfakhani, Lockwood, Zaher and Zhang (1998)
Earnings yield or E/P ratios	EPS/Stock price	Ball (1978), Basu (1983), Cook and Rozeff (1984),

		Jaffe, keim and Westerfield (1989), Chan, Hamao and Lakonishok (1991), Fama and French (1992,1998)

3.4 Research Hypothesis

There are 5 research hypothesis which are set according to the conceptual framework as follows :

3.4.1 H1o : There is no significant relationship between stock returns and beta.

H1a : There is a significant relationship between stock returns and beta.

Or it can be stated in statistical terms as :

H1o : $\beta_1 = 0$

H1a : $\beta_1 \neq 0$

Level of Significance = 95 % , ($\alpha = 0.05$)

3.4.2 H2o : There is no significant relationship between stock returns and firm size.

H2a : There is a significant relationship between stock returns and firm size.

Or it can be stated in statistical terms as :

H2o : $\beta_2 = 0$

H2a : $\beta_2 \neq 0$

Level of Significance = 95 % , ($\alpha = 0.05$)

3.4.3 H3o : There is no significant relationship between stock returns and leverage.

H3a : There is a significant relationship between stock returns and leverage.

Or it can be stated in statistical terms as :

H3o : $\beta_3 = 0$

H3a : $\beta_3 \neq 0$

Level of Significance = 95 % , ($\alpha = 0.05$)

3.4.4 H4o : There is no significant relationship between stock returns and BE/ME.

H4a : There is a significant relationship between stock returns and BE/ME.

Or it can be stated in statistical terms as :

H4o : $\beta_4 = 0$

H4a : $\beta_4 \neq 0$

Level of Significance = 95 % , ($\alpha = 0.05$)

3.4.5 H5o : There is no significant relationship between stock returns and earnings yield.

H5a : There is a significant relationship between stock returns and earnings yield.

Or it can be stated in statistical terms as :

H5o : $\beta_5 = 0$

H5a : $\beta_5 \neq 0$

Level of Significance = 95 % , ($\alpha = 0.05$)

CHAPTER 4

RESEARCH METHOOLOGY

This chapter presents the methodology used to conduct in this research including data sources, data collection, measurement and data analysis.

4.1 Data Source and Data Collection

This research uses only secondary data as a source of information. The secondary data is collected from many sources including world wide web, journals, text books, SET database and CD-Rom to support the study. The sample includes all common stocks quoted on the SET in I-Sims CD during 1992-1999.

4.2 Measurement

In Quantitative data, there are many types of measurement including nominal scale, ordinal scale, interval scale and ratio scale. For this research, both dependent (stock returns) and independent variables (beta, firm size, leverage, BE/ME and earnings yield) use ratio scale as level of measurement.

4.3 DataAnalysis

For the study of cross-section of expected stock returns, this research will cover the time period during 1992-1999. The analysis will be conducted with those securities which provide completed information totaling 451 securities during all 1992-1999 period in SET index (I-Sims CD).

This study of cross-section of expected stock returns will be based on multivariate regression analysis by using stepwise method in the Statistical Package

for Social Science (SPSS) program to help analyze the data. The average value for dependent and independent variables during 1992-1999 is used to run the regression in SPSS program. F-tests and T-tests will be performed in this study.

♦**F-tests**

F-test statistic is used to test the validity of the multivariate regression model for both dependent and independent variables. If p value is less than 0.05, Ho is rejected, showing F-test statistic is significant which means that the multi regression model is reliable. It shows that there is at least one independent variable that has relationship with dependent variable. On the other hand, if p value is more than 0.05, Ho cannot be rejected, showing F-test statistic is insignificant which means that the multi-regression model is not reliable so the model cannot be used to predict the relationship between dependent and independent variables.

The hypothesis is as follows:

Ho : $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$

Ha : At least one correlation coefficient is not equal to zero ($\beta i \neq 0$)

If F-test is significant, T-test will be performed later to test which independent variable has relationship with the dependent variable.

♦**T-tests**

T-tests will be conducted for all 5 variables (beta, size, leverage, BE/ME and earnings yield) subject to 95% confidence level. T statistic will test the significance of the slope which is equivalent to testing the significance of the correlation between dependent and independent variable. The relationship will be tested in a single multivariate regression model. The null and alternative hypothesis are as follows:

H1o : There is no significant relationship between stock returns and beta.

H1a : There is a significant relationship between stock returns and beta.

H2o : There is no significant relationship between stock returns and firm size.

H2a : There is a significant relationship between stock returns and firm size.

H3o : There is no significant relationship between stock returns and leverage.

H3a : There is a significant relationship between stock returns and leverage.

H4o : There is no significant relationship between stock returns and BE/ME.

H4a : There is a significant relationship between stock returns and BE/ME.

H5o : There is no significant relationship between stock returns and earnings yield.

H5a : There is a significant relationship between stock returns and earnings yield.

To accept the null hypothesis, it means that independent variable does not explain the dependent variable. To reject the null hypothesis, it means that the independent variable explains dependent variable. If p value is less than significant level 0.05, the null hypothesis is rejected so it means that there is a significant relationship between dependent and independent variable. On the other hand, if p value is more than significant level 0.05, the null hypothesis is accepted so it means that there is no significant relationship between dependent and independent variable.

CHAPTER 5

RESULT OF THE STUDY

This chapter will present empirical results of the model presented in chapter three. This chapter is divided into five sections. The first section discusses the result of correlation coefficient. The second section presents the final regression equation. The third section discusses the result of the T-test, F-test, R^2 and adjusted R^2. The fourth section discusses the interpretation of the result. The last section discusses the validity of Ordinary Least Squares (OLS).

5.1 Correlation Coefficient

In this study, Pearson Correlation is used to measure the strength and direction of the linear relationship between two variables without controlling for other relevant variables. If two variables are perfectly negatively correlated, then r = -1. If two variables are totally uncorrelated, then r = 0. If two variables are perfectly positively correlated, then r = +1.

Table 5.1 Correlations

Correlations

		RETURN	BETA	ME	AME	BEME	EP
RETURN	Pearson Correlation	1.000	.042	.056	-.031	-.021	.167**
	Sig. (2-tailed)	.	.378	.239	.505	.655	.000
	N	451	451	451	451	451	451
BETA	Pearson Correlation	.042	1.000	.365**	.003	-.028	-.020
	Sig. (2-tailed)	.378	.	.000	.948	.560	.670
	N	451	451	451	451	451	451
ME	Pearson Correlation	.056	.365**	1.000	.029	.039	.051
	Sig. (2-tailed)	.239	.000	.	.536	.408	.276
	N	451	451	451	451	451	451
AME	Pearson Correlation	-.031	.003	.029	1.000	.342**	.002
	Sig. (2-tailed)	.505	.948	.536	.	.000	.964
	N	451	451	451	451	451	451
BEME	Pearson Correlation	-.021	-.028	.039	.342**	1.000	.007
	Sig. (2-tailed)	.655	.560	.408	.000	.	.888
	N	451	451	451	451	451	451
EP	Pearson Correlation	.167**	-.020	.051	.002	.007	1.000
	Sig. (2-tailed)	.000	.670	.276	.964	.888	.
	N	451	451	451	451	451	451

**. Correlation is significant at the 0.01 level (2-tailed).

From table 5.1, $R_{return,\ EP} = 0.167$, significance $= 0.000 < 0.05$

$R_{beta,\ ME} = 0.365$, significance $= 0.000 < 0.05$

$R_{AME,\ BEME} = 0.342$, significance $= 0.000 < 0.05$

The conclusion is that earnings-price ratios (E/P) has relationship with stock returns. Beta has relationship with firm size (ME). Leverage (A/ME) has relationship with book-to-market equity (BE/ME)

It is found that some independent variables correlate among themselves. Beta has linear relationship with ME. A/ME has linear relationship with BE/ME. The correlation among independent variables contradict with the OLS assumption which states that independent variables must be independent among one another. This problem is called Multicollinearity. Therefore, stepwise method in linear regression is

conducted to find the good-of-fit regression model by using Variance Inflation Factor (VIF) to detect this problem.

5.2 Regression Equation

In this model, the research uses average value for dependent and independent variables of 451 listed companies since 1992-1999 which all variables are estimated by OLS regression with stepwise method. By using stepwise method, model 1 is the best model (see appendix).

Model 1 is estimated as follows :

Stock Return = $\beta_0 + \beta_5$ **E/P** + $\in_{ij}$

= 0.006117 + 0.00081 E/P

Significant at 95% confidence interval

Number of observations = 451 securities

Where, β_0 = a constant or intercept

β_5 = a parameter to be estimated

E/P = earning-prices ratio

$\in_{ij}$ = a random error term

5.3 Quality of model in term of F-test, T-test, R, R Square and Adjusted R Square

5.3.1 F-Test

Table 5.2 F-test

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.370E-02	1	1.370E-02	12.869	.000[a]
	Residual	.478	449	1.065E-03		
	Total	.492	450			

a. Predictors: (Constant), EP

b. Dependent Variable: RETURN

Under model 1, F-test is 12.869 or P(F>12.869) = 0.000. The null hypothesis is rejected due to significance = 0.000 < 0.05. It means that there is at least one independent variable that has relationship with dependent variable.

From the hypothesis, Ho : $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$

Ha : At least one correlation coefficient is not equal to zero ($\beta i \neq 0$)

5.3.2 T-test

Table 5.3 The Estimation Result by OLS Estimation

Variables	Coefficient	T-statistic	Significance
(Constant)	0.006117	3.86	0.000
E/P	0.00081	3.587	0.000

5.3.3 R, R^2 and Adjust R^2

Table 5.4 R, R^2 and Adjust R^2

R	R^2	Adjust R^2
0.167	0.028	0.026

5.4 Interpretation of result

From table 5.2, the result of the F-test shows that F value is equal to 12.869 and its significance level is equal to 0.000. It means that there is at least one independent variable in the model that can explain dependent variable (stock return).

From table 5.3, By using stepwise method, T-test is used to analyze which independent variable will be included in the regression model. It is found that only one variable included in the model which is earning-prices ratio (E/P) because its significance = 0.000 < 0.05.

From the hypothesis, $H_5o : \beta_5 = 0$

$H_5a : \beta_5 \neq 0$

H_5o is rejected. It means that there is a significant relationship between E/P and stock returns.

The coefficient of E/P, is positive and significant at 5%. This indicates that E/P has a positive impact on the stock return. As the earnings-price ratios increase, the stock returns also increase. The result is consistent with Fama and French (1992). The reason behind this relationship is that when a firm has earnings (that is profits), it can pay its owners a dividend or retain some earnings for further reinvestment. Retained Earnings allow the company to grow and this growth causes the stock price to rise so the firm can pay income (that is returns) to shareholders not just now but next year and the year after. Earnings yield acts like an engine to drive stock returns in terms of both dividend and capital gain.

The coefficient indicates the change in dependent variable associated with one unit increase in independent variable holding constant all other independent variables in the equation. When the independent variable (Xi) changes one percent, it causes the dependent variable to change βi percent.

One percentage increase of E/P will cause the stock return to increase by 0.00081 percent. From this result, it implies that the rise in E/P has very little impact on the stock return.

From table 5.4, the variable included in the model (E/P) has the correlation 16.7%. The overall goodness of fit of the model is measured by R^2 which is equal to 2.8%. It means that the independent variable (E/P) can explain the changing in dependent variable (stock return) 2.8%. Another 97.2% are explained by other factors, which are not included in the model. The Adjust R^2 is 2.6% which is close to R^2.

From table 5.5, there are 4 variables excluded from the equation.

Table 5.5 Excluded Variables

Variables	T-statistic	Significance
Beta	0.966	0.335
ME	1.010	0.313
A/ME	-0.683	0.495
BE/ME	-0.477	0.633

From the hypothesis,

1. $H_1o : \beta_1 = 0$

$H_1o : \beta_1 \# 0$

Significant = 0.335 > 0.005 so H_1o cannot be rejected.

It means that beta has no significant relationship with the stock return.

2. H_2o : $\beta_2 = 0$

H_2o : $\beta_2 \# 0$

Significant = 0.313 > 0.005 so H_2o cannot be rejected.

It means that firm size (ME) has no significant relationship with the stock return.

3. H_3o : $\beta_2 = 0$

H_3o : $\beta_2 \# 0$

Significant = 0.495 > 0.005 so H_3o cannot be rejected.

It means that leverage (A/ME) has no significant relationship with the stock return.

4. H_4o : $\beta_4 = 0$

H_4o : $\beta_4 \# 0$

Significant = 0.633 > 0.005 so H_4o cannot be rejected.

It means that book-to-market equity (BE/ME) has no significant relationship with the stock return.

Therefore, it is concluded that they are beta, firm size (ME), leverage (A/ME) and book-to-market equity (BE/ME) which are excluded from the model because their significance are higher than 0.05.

5.5 Validity of Ordinary Least Squares (OLS) Assumption

The result of the OLS assumption are as follows:

Table 5.6 Validity of OLS

Durbin-Watson	Variance Inflation Factor (VIF)	Plot Spread
1.987	VIF is about 1.	Good Form

From table 5.6, the Validity of Ordinary Least Squares (OLS) Assumption is presented as follows:

♦ Durbin-Watson is used to test the Autocorrelation whether the error terms for different observations are correlated. The best value of Durbin-Watson is between 1.5-2.5. It shows that e_i and e_j are independent of each other where e_i is random error of i and e_j is the random error of j. If value < 1.5 and close to 0, it shows that e_i and e_j have positive relationship. If value > 2.5 and close to 4, it shows that ei and ej have negative relationship[1]. From the result, the value of Durbin-Watson is 1.987 which is between 1.5-2.5 so it can be concluded that e_i and e_j are not related in this model.

♦ Variance Inflation Factor (VIF) is used to test the Multicollinearity whether there is a relationship among independent variables. If VIF > 5, it shows the high correlation among independent variables[2]. VIF of independent variable is about 1 so it means that there is no relationship among independent variables in this model. However, this model included only one independent variable so VIF must be equal to one.

♦ Scatterplot is used to plot the spread to test the Heteroskedasticity whether the variance of the error term is constant for all observations. From the result shown in figure 5.1, most observations of the error term are drawn from the distribution with the constant variance so there is no heteroskedasticity.

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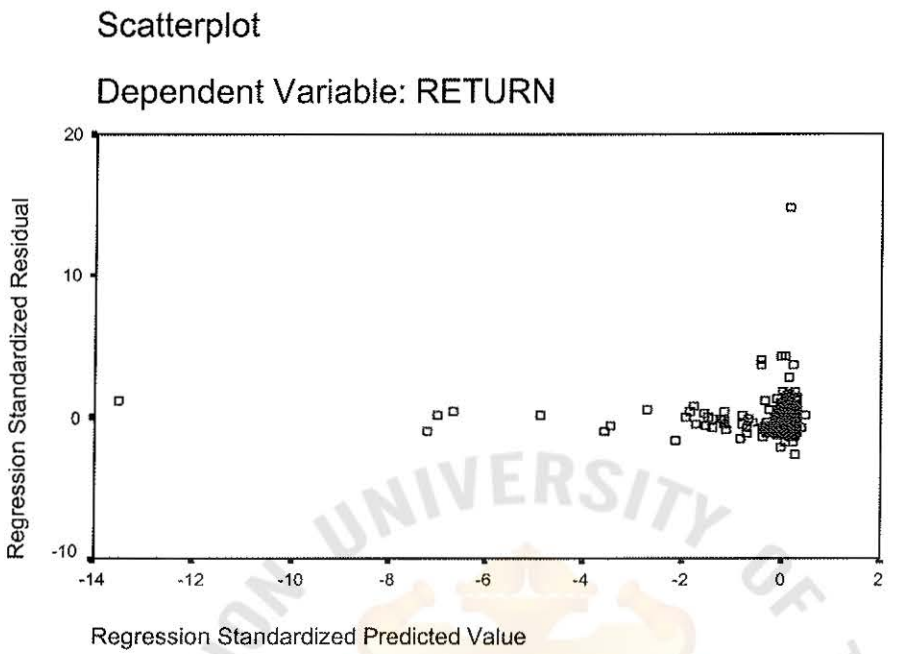
[1] KANLAYA,W., 2001, การใช้SPSS FOR WINDOWS ในการวิเคราะห์ข้อมูล, 4th EDITION. Pg.424

[2] STUDENMUND, A.H., 1992, USING ECONOMETRICS, 2ND EDITION. Pg.276

Figure 5.1 Scatterplot



CHAPTER 6

CONCLUSIONS AND RECOMMENDATION

This chapter is divided into two sections. The first section is the summary of findings. The second section is the recommendation.

6.1 Summary of Findings

From the result of the analysis, there is only one independent variable which is significant to the model. It is earnings-price ratios (E/P).

The excluded variables are beta, firm size (ME), leverage (A/ME) and book-to-market equity (BE/ME).

The regression equation can be presented as follows:

$$\text{Stock Return} = \beta_0 + \beta_5 \, E/P + \epsilon_{ij}$$

Where, β_0 = a constant or intercept

β_5 = a parameter to be estimated

E/P = earnings-price ratio

ϵ_{ij} = a random error term

It shows that the stock returns of 451 listed companies during 1992-1999 can be explained by earnings-price ratios.

The coefficient of E/P (0.00081) has a positive sign as expected. It means that the increase in E/P will cause the stock returns to increase. The reason to explain this relationship is that when a firm has earnings (that is profits), it can pay its owners a dividend or retain some earnings for further reinvestment. Retained Earnings allow the company to grow and this growth causes the stock price to rise so the firm can pay income (that is returns) to shareholders not just now but next year and the year after.

Therefore, earnings yield can raise stock returns in terms of both dividend and capital gain. Although E/P is significant to the stock returns, it has very little impact to the returns from the study because its coefficient is only 0.00081, which means that one unit increased in E/P will cause 0.00081 unit increased in stock return.

Beta, firm size (ME), leverage (A/ME) and book-to-market equity (BE/ME) are not significant to the equation so they are excluded from the model because their significance are higher than 0.05. Therefore, they cannot be concluded to have impact on stock return in this study.

F-test is equal to 12.869 or P(F>12.869) = 0.000. Its significance = 0.000 < 0.05 so the null hypothesis is rejected. The R value is 16.7%. The overall goodness of fit of the model is measured by R^2 (2.8%) and measured by Adjusted R^2 (2.6%). The Durbin-Watson value is 1.987 which is concluded that the error terms for different observations are not correlated. VIF is about 1 which means that there is no relationship among independent variables. The Plot Spread is in good form, showing that the variance of the error term for most observations is constant. Therefore, there is no violation of OLS assumption.

6.2 Recommendation

One possible reason that makes stock return unpredictability from beta, firm size, leverage, book-to-market equity or little explained by earnings-price ratios, is the inefficient stock market of Thailand. The efficiency of stock market depends on many factors such as investors' confidence, insider trading, sources of information and other factors that effect to the stock price movement. For Stock Exchange of Thailand (SET), there is lack of efficiency because of unequal knowledge, irrational investors, share manipulation, low quality information presenters and especially insider trading according to the study of Naraumol (1995). Due to inefficient Thai

stock market, the investors can make profit by studying the movement of the past prices. The movement of the stock prices may be the result of some groups of investors who know the information before the others and use it to manipulate the prices to be higher. This comes from the inequality of the information and abnormal information dissemination the market. The stock price changes all the time so it causes the speculation all the time too.

It is said that Thai stock market is a highly volatile stock market due to overreaction phenomenon existing in the market according to the study of Dheerapat (1997). Investors overreact to available information that pours into the market so it causes the irrational stock price movement. In order to predict return, the stock price is used to calculate for return. When the stock price movement is irrational, the stock return is unpredictability. Therefore, when stock market overreacts to the information, the stock return movement will be more volatile than a normal range.

There are three possible strategies for investment in the stock market which has unusual stock price movements.

1. The Contrarian strategy. It is to buy the past loser stocks and sell the past winner stock to make profit because winner stocks are overvalued while the loser stocks are undervalued. Therefore, past losers will be the future winners and past winners will be the future losers.
2. The relative strength strategy. It is to buy past winner stocks and sell past loser stocks to get positive returns. This comes from the speculation from the past trend.
3. Uncertain Information Hypothesis (UIH) strategy. It is to buy past winner stocks and past loser stocks to earn excess returns because the investors

overreact to bad news and underreact to good news. Therefore, past winners will be future winners and past losers will be future winners too.

Note: The winner stock is the stock that earns a positive return higher than the market. In contrast, the loser stock is the stock which underperforms the market.

In addition, the way that investors can use to reduce the risk, is diversification. The investors can reduce the risk by diversifying their holding of shares not to hold only one stock in order to avoid excessive exposure to any one source of risk. Risks come from two ways. First, there is the risk that comes from conditions in the general economy such as business cycle, the inflation rate, the interest rate and exchange rate. These macroeconomic factors cannot be predicted with certainty and all affect rate of return. Second, there is the firm specific risk, such as the founder dies and personnel changes. Suppose that the investor diversified by placing half funds in Thai Airways and half in Banchak. When oil prices fall, it hurts Banchak but help Thai Airways. The two effects are offsetting and they stabilize portfolio return.

However, it is needed to have other financial instruments to stabilize a stock market, to reduce the volatility of market, to protect overall investors from irrational stock price & return movements in order to make investors have more confident in the standard of Thai stock market.

For now, the stock market has no institutional mechanism to protect investors from irrational stock price and return movement. Since other financial tools beyond beta, ME, A/ME, BE/ME and E/P are not studied in this paper, they should be considered in future studies for possible relationship with stock returns.

APPENDICES

APPENDIX A

LIST OF COMPANIES

SECURITIES	NAMES OF THE COMPANIES
AA	ADVANCE AGRO PUBLIC COMPANY LIMITED
ABICO	ABICO HOLDINGS PUBLIC COMPANY LIMITED
ACL	ASIA CREDIT PUBLIC COMPANY LIMITED
ACMG	AYUDHYA CMG LIFE ASSURANCE PUBLIC COMPANY LIMITED
ADVANC	ADVANCED INFO SERVICE PUBLIC COMPANY LIMITED
AFC	ASIA FIBER PUBLIC COMPANY LIMITED
AHC	AIKCHOL HOSPITAL PUBLIC COMPANY LIMITED
AIFT	AIG FINANCE(THAILAND) PUBLIC COMPANY LIMITED
AITCO	AYUDHYA INVESTMENT AND TRUST PUBLIC COMPANY LIMITED
AJ	A.J. PLAST PUBLIC COMPANY LIMITED
ALUCON	ALUCON PUBLIC COMPANY LIMITED
AMARIN	AMARIN PLAZA PUBLIC COMPANY LIMITED
APC	ADVANCE PAINT & CHEMICAL (THAILAND) PUBLIC COMPANY LIMITED
APRINT	AMARIN PRINTING AND PUBLISHING PUBLIC COMPANY LIMITED
ASIA	ASIA HOTEL PUBLIC COMPANY LIMITED
ASIAN	ASIAN SEAFOODS COLDSTORAGE PUBLIC COMPANY LIMITED
ASIMAR	ASIAN MARINE SERVICES PUBLIC COMPANY LIMITED
ASL	ADKINSON SECURITIES PUBLIC COMPANY LIMITED
AST	ASIA SECURITIES TRADING PUBLIC COMPANY LIMITED
ASTL	AMERICAN STANDARD SANITARYWARE(THAILAND) PUBLIC COMPANY LTD.
ATC	THE AROMATICS (THAILAND) PUBLIC COMPANY LIMITED
ATEC	ALPHATEC ELECTRONICS PUBLIC COMPANY LIMITED
AYUCO	AYUDHYA CMG LIFE ASSURANCE PUBLIC COMPANY LIMITED
AYUD	THE AYUDHYA INSURANCE PUBLIC COMPANY LIMITED

BANPU	BANPU PUBLIC COMPANY LIMITED
BAP	BANGKOK AGRO-INDUSTRIAL PRODUCTS PUBLIC COMPANY LIMITED
BAT-3K	THAI STORAGE BATTERY PUBLIC COMPANY LIMITED
BATA	THAI STORAGE BATTERY PUBLIC COMPANY LIMITED
BAY	BANK OF AYUDHYA PUBLIC COMPANY LIMITED
BBC	THE BANGKOK BANK OF COMMERCE PUBLIC COMPANY LIMITED
BBL	BANGKOK BANK PUBLIC COMPANY LIMITED
BC	THE BOOK CLUB FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
BCHANG	BAN CHANG GROUP PUBLIC COMPANY LIMITED
BCP	THE BANGCHAK PETROLEUM PUBLIC COMPANY LIMITED
BEC	BEC WORLD PUBLIC COMPANY LIMITED
BECL	BANGKOK EXPRESSWAY PUBLIC COMPANY LIMITED
BFIT	BANGKOK FIRST INVESTMENT AND TRUST PUBLIC COMPANY LIMITED
BGES	B.GRIMM ENGINEERING SYSTEMS PUBLIC COMPANY LIMITED
BGH	BANGKOK DUSIT MEDICAL SERVICES PUBLIC COMPANY LIMITED
BH	BUMRUNGRAD HOSPITAL PUBLIC COMPANY LIMITED
BIC	BANGKOK INVESTMENT PUBLIC COMPANY LIMITED
BIGC	BIG C SUPERCENTER PUBLIC COMPANY LIMITED
BIJOUX	BIJOUX HOLDINGS PUBLIC COMPANY LIMITED
BJC	BERLI JUCKER PUBLIC COMPANY LIMITED
BKI	BANGKOK INSURANCE PUBLIC COMPANY LIMITED
BKP	BANGKOK PRODUCE MERCHANDISING PUBLIC COMPANY LIMITED
B-LAND	BANGKOK LAND PUBLIC COMPANY LIMITED
BMB	BANGKOK METROPOLITAN BANK PUBLIC COMPANY LIMITED
BMBF	BANGKOK METROPOLITAN FUND
BMF	THE BUAULUANG MUTUAL FUND
BNC	THE BANGKOK NYLON PUBLIC COMPANY LIMITED
BOA	THE BANK OF ASIA PUBLIC COMPANY LIMITED
BPT	BPT INDUSTRIES PUBLIC COMPANY LIMITED
BRC	BANGKOK RUBBER PUBLIC COMPANY LIMITED

BSI	BANGKOK STEEL INDUSTRY PUBLIC COMPANY LIMITED
BTNC	BOUTIQUE NEWCITY PUBLIC COMPANY LIMITED
BUI	BANGKOK UNION INSURANCE PUBLIC COMPANY LIMITED
CATHAY	CATHAY FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
CFRESH	SEAFRESH INDUSTRY PUBLIC COMPANY LIMITED
CHARAN	CHARAN INSURANCE PUBLIC COMPANY LIMITED
CHOTI	KIANG HUAT SEA GULL TRADING FROZEN FOOD PUBLIC CO., LTD.
CIRKIT	CIRCUIT ELECTRONIC INDUSTRIES PUBLIC COMPANY LIMITED
CIT	CARPETS INTERNATIONAL THAILAND PUBLIC COMPANY LIMITED
CK	CH.KARNCHANG PUBLIC COMPANY LIMITED
CM	CHIANGMAI FROZEN FOODS PUBLIC COMPANY LIMITED
CMBT	CARNAUDMETALBOX (THAILAND) PUBLIC COMPANY LIMITED
CMG	CHAOPHYA MARBLE-GRANITE PUBLIC COMPANY LIMITED
CMIC	CMIC FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
CMICRK	THE CMIC RUANG KHAO HIGH INCOME FUND
CNT	CHRISTIANI & NIELSEN (THAI) PUBLIC COMPANY LIMITED
CNTRY	COUNTRY (THAILAND) PUBLIC COMPANY LIMITED
COCO	THE COGENERATION PUBLIC COMPANY LIMITED
CPF	CHAROEN POKPHAND FEEDMILL PUBLIC COMPANY LIMITED
CPH	CASTLE PEAK HOLDINGS PUBLIC COMPANY LIMITED
CPI	CHUMPORN PALM OIL INDUSTRY PUBLIC COMPANY LIMITED
CPICO	CENTRAL PAPER INDUSTRY PUBLIC COMPANY LIMITED
CPL	C.P.L. GROUP PUBLIC COMPANY LIMITED
CPN	CENTRAL PATTANA PUBLIC COMPANY LIMITED
CPNE	CHAROEN POKPHAND NORTHEASTERN PUBLIC COMPANY LIMITED
CSC	CROWN SEAL PUBLIC COMPANY LIMITED
CSR	CITY SPORTS AND RECREATION PUBLIC COMPANY LIMITED
CTW	CHAROONG THAI WIRE & CABLE PUBLIC COMPANY LIMITED
CWT	CHAI WATANA TANNERY PUBLIC COMPANY LIMITED

DCC	DYNASTY CERAMIC PUBLIC COMPANY LIMITED
DEFT	DYNAMIC EASTERN FINANCE THAILAND (1991) PUBLIC CO.,LTD.
DELTA	DELTA ELECTRONICS (THAILAND) PUBLIC COMPANY LIMITED
DIANA	DIANA DEPARTMENT STORE PUBLIC COMPANY LIMITED
DISTAR	DISTAR ELECTRIC CORPORATION PUBLIC COMPANY LIMITED
D-MARK	THAI-DENMARK SWINE BREEDER PUBLIC COMPANY LIMITED
DRACO	DRACO PCB PUBLIC COMPANY LIMITED
DS	DHANA SIAM FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
DTC	DUSIT THANI PUBLIC COMPANY LIMITED
DTCI	D.T.C. INDUSTRIES PUBLIC COMPANY LIMITED
DTM	DATAMAT PUBLIC COMPANY LIMITED
DVS	THE DEVES INSURANCE PUBLIC COMPANY LIMITED
EAC	THE EAST ASIATIC (THAILAND) PUBLIC COMPANY LIMITED
EASTAR	EASTERN STAR REAL ESTATE PUBLIC COMPANY LIMITED
EASTW	EASTERN WATER RESOURCES DEVELOPMENT AND MANAGEMENT PLC.
EFS	EKACHART FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
EGCOMP	ELECTRICITY GENERATING PUBLIC COMPANY LIMITED
EI	EARTH INDUSTRIAL PUBLIC COMPANY LIMITED
EMC	EMC PUBLIC COMPANY LIMITED
EPCO	EASTERN PRINTING PUBLIC COMPANY LIMITED
EWC	EASTERN WIRE PUBLIC COMPANY LIMITED
F&D	FOOD AND DRINKS PUBLIC COMPANY LIMITED
FANCY	FANCY WOOD INDUSTRIES PUBLIC COMPANY LIMITED
FAS	FIRST ASIA SECURITIES PUBLIC COMPANY LIMITED
FBCB	FIRST BANGKOK CITY BANK PUBLIC COMPANY LIMITED
FE	FAR EAST ADVERTISING PUBLIC COMPANY LIMITED
FFT	FOREMOST FRIESLAND (THAILAND) PUBLIC COMPANY LIMITED
FIN1	FINANCE ONE PUBLIC COMPANY LIMITED
FSTAR	FIVE STARS PROPERTY PUBLIC COMPANY LIMITED
GEL	GENERAL ENGINEERING PUBLIC COMPANY LIMITED
GF	GENERAL FINANCE & SECURITIES PUBLIC COMPANY LIMITED

GFPT	GFPT PUBLIC COMPANY LIMITED
GOLD	GOLDEN LAND PROPERTY DEVELOPMENT PUBLIC COMPANY LIMITED
GRAMMY	GRAMMY ENTERTAINMENT PUBLIC COMPANY LIMITED
GRANIT	THAI GRANITE PUBLIC COMPANY LIMITED
GYT	GOODYEAR (THAILAND) PUBLIC COMPANY LIMITED
HANA	HANA MICROELECTRONICS PUBLIC COMPANY LIMITED
HEMRAJ	HEMARAJ LAND AND DEVELOPMENT PUBLIC COMPANY LIMITED
HIPRO	HIPRO ELECTRONICS PUBLIC COMPANY LIMITED
HT	HUA THAI MANUFACTURING PUBLIC COMPANY LIMITED
HTC	HAAD THIP PUBLIC COMPANY LIMITED
HTX	HANTEX PUBLIC COMPANY LIMITED
IBC	INTERNATIONAL BROADCASTING CORPORATION PUBLIC CO.,LTD.
ICC	I.C.C. INTERNATIONAL PUBLIC COMPANY LIMITED
IEC	THE INTERNATIONAL ENGINEERING PUBLIC COMPANY LIMITED
IFCT	THE INDUSTRIAL FINANCE CORPORATION OF THAILAND
IFEC	INTER FAR EAST ENGINEERING PUBLIC COMPANY LIMITED
IHG	THE NEW IMPERIAL HOTEL PUBLIC COMPANY LIMITED
INLIFE	INTERLIFE JOHN HANCOCK ASSURANCE PUBLIC COMPANY LIMITED
INSURE	INDARA INSURANCE PUBLIC COMPANY LIMITED
IRC	INOUE RUBBER (THAILAND) PUBLIC COMPANY LIMITED
ITD	ITALIAN-THAI DEVELOPMENT PUBLIC COMPANY LIMITED
ITF	ITF FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
JASMIN	JASMINE INTERNATIONAL PUBLIC COMPANY LIMITED
JCC	JALAPRATHAN CEMENT PUBLIC COMPANY LIMITED
JCT	JACK CHIA INDUSTRIES (THAILAND) PUBLIC COMPANY LIMITED
JULDIS	JULDIS DEVELOP PUBLIC COMPANY LIMITED
KARAT	KARAT SANITARYWARE PUBLIC COMPANY LIMITED
KCAP 2	KAMRAI TAWEE FUND 2 'S CAPITAL UNIT
KCE	KCE ELECTRONICS PUBLIC COMPANY LIMITED
KDH	KRUNGDHON HOSPITAL PUBLIC COMPANY LIMITED

KG	KIAN GWAN (THAILAND) PUBLIC COMPANY LIMITED
KINC2	KAMRAI TAWEE FUND 2'S INCOME UNIT
KK	KIATNAKIN FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
KKC	KULTHORN KIRBY PUBLIC COMPANY LIMITED
KKI	KHOOM KHAO INSURANCE PUBLIC COMPANY LIMITED
KMC	KRISDA MAHANAKORN PUBLIC COMPANY LIMITED
KRP	K.R. PRECISION PUBLIC COMPANY LIMITED
KT	KRUNGTHAI FEEDMILL PUBLIC COMPANY LIMITED
KTB	KRUNG THAI BANK PUBLIC COMPANY LIMITED
KTT	KRUNGTHAI THANAKIT PUBLIC COMPANY LIMITED
KWC	KRUNGDHEP SOPHON PUBLIC COMPANY LIMITED
KWH	WIIK & HOEGLUND PUBLIC COMPANY LIMITED
KYE	KANG YONG ELECTRIC PUBLIC COMPANY LIMITED
LANNA	LANNA LIGNITE PUBLIC COMPANY LIMITED
LEE	LEE FEED MILL PUBLIC COMPANY LIMITED
LH	LAND AND HOUSE PUBLIC COMPANY LIMITED
LNH	CHIANG MAI MEDICAL SERVICES PUBLIC COMPANY LIMITED
LOXLEY	LOXLEY PUBLIC COMPANY LIMITED
LPN	L.P.N. DEVELOPMENT PUBLIC COMPANY LIMITED
LST	LAM SOON (THAILAND) PUBLIC COMPANY LIMITED
LTB	LAEM THONG BANK PUBLIC COMPANY LIMITED
LTX	LUCKYTEX (THAILAND) PUBLIC COMPANY LIMITED
MAKRO	SIAM MAKRO PUBLIC COMPANY LIMITED
MALEE	MALEE SAMPRAN FACTORY PUBLIC COMPANY LIMITED
MANRIN	THE MANDARIN HOTEL PUBLIC COMPANY LIMITED
MATI	MATICHON PUBLIC COMPANY LIMITED
MBK-PD	MBK PROPERTIES AND DEVELOPMENT PUBLIC COMPANY LIMITED
MCC	MULTI-CREDIT CORPORATION OF THAILAND PUBLIC COMPANY LIMITED
M-CHAI	MAHACHAI HOSPITAL PUBLIC COMPANY LIMITED
MDX	M.D.X. PUBLIC COMPANY LIMITED
MEDIAS	MEDIA OF MEDIAS PUBLIC COMPANY LIMITED
METCO	MURAMOTO ELECTRON (THAILAND) PUBLIC COMPANY LIMITED
MFC	THE MUTUAL FUND PUBLIC COMPANY LIMITED

MGR	MANAGER MEDIA GROUP PUBLIC COMPANY LIMITED
M-HOME	MODERN HOME DEVELOPMENT PUBLIC COMPANY LIMITED
MINOR	MINOR CORPORATION PUBLIC COMPANY LIMITED
MK	M.K. REAL ESTATE DEVELOPMENT PUBLIC COMPANY LIMITED
MODERN	MODERNFORM GROUP PUBLIC COMPANY LIMITED
MORKOT	MORAKOT INDUSTRIES PUBLIC COMPANY LIMITED
MSC	METRO SYSTEMS CORPORATION PUBLIC COMPANY LIMITED
NATION	NATION MULTIMEDIA GROUP PUBLIC COMPANY LIMITED
NAVA	NAVA FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
NC	NEWCITY (BANGKOK) PUBLIC COMPANY LIMITED
NCORP	NITHI VENTURE CORPORATION PUBLIC COMPANY LIMITED
NEP	NEP REALTY AND INDUSTRY PUBLIC COMPANY LIMITED
NEW	WATTANA KARNPAET PUBLIC COMPANY LIMITED
NFC	NATIONAL FERTILIZER PUBLIC COMPANY LIMITED
NFS	NATIONAL FINANCE PUBLIC COMPANY LIMITED
NIPPON	NIPPON PACK (THAILAND) PUBLIC COMPANY LIMITED
NKI	THE NAVAKIJ INSURANCE PUBLIC COMPANY LIMITED
NOBLE	NOBLE DEVELOPMENT PUBLIC COMPANY LIMITED
N-PARK	NATURAL PARK PUBLIC COMPANY LIMITED
NPAT	NITHIPAT FINANCE PUBLIC COMPANY LIMITED
NPC	NATIONAL PETROCHEMICAL PUBLIC COMPANY LIMITED
NPK	NEW PLUS KNITTING PUBLIC COMPANY LIMITED
NSI	NAM SENG INSURANCE PUBLIC COMPANY LIMITED
NSM	NAKORNTHAI STRIP MILL PUBLIC COMPANY LIMITED
NSTAR	NORTH STAR PUBLIC COMPANY LIMITED
NTB	NAKORNTHON BANK PUBLIC COMPANY LIMITED
NTS	N.T.S. STEEL GROUP PUBLIC COMPANY LIMITED
NTV	NONTHAVEJ HOSPITAL PUBLIC COMPANY LIMITED
NWR	NAWARAT PATANAKARN PUBLIC COMPANY LIMITED
OCC	O.C.C. PUBLIC COMPANY LIMITED
OHTL	THE ORIENTAL HOTEL (THAILAND) PUBLIC COMPANY LIMITED
O-LAP	ORIENTAL LAPIDARY PUBLIC COMPANY LIMITED

ONE	ONE HOLDING PUBLIC COMPANY LIMITED
ONONO	THAI ONONO PUBLIC COMPANY LIMITED
ONPA	ONPA INTERNATIONAL PUBLIC COMPANY LIMITED
OSK1	OM-SIN KASEM SUB 1 FUND
OSU	OM SIN UDOM SUB FUND
PA	PACIFIC ASSETS PUBLIC COMPANY LIMITED
PAE	PAE (THAILAND) PUBLIC COMPANY LIMITED
PAF	PAN ASIA FOOTWEAR PUBLIC COMPANY LIMITED
PATKOL	PATKOL PUBLIC COMPANY LIMITED
PATO	PATO CHEMICAL INDUSTRY PUBLIC COMPANY LIMITED
PCM	THE PCM PRECAST FLOORS PUBLIC COMPANY LIMITED
PDI	PADAENG INDUSTRY PUBLIC COMPANY LIMITED
PE	PREMIER ENTERPRISE PUBLIC COMPANY LIMITED
PERFEC	PROPERTY PERFECT PUBLIC COMPANY LIMITED
P-FCB	PRAKIT & FCB PUBLIC COMPANY LIMITED
PFS	POONPIPAT FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
PG	PEOPLE'S GARMENT PUBLIC COMPANY LIMITED
PHA	PHATRA INSURANCE PUBLIC COMPANY LIMITED
PHATRA	PHATRA THANAKIT PUBLIC COMPANY LIMITED
PIC	PHUKET ISLAND PUBLIC COMPANY LIMITED
PIZZA	THE PIZZA PUBLIC COMPANY LIMITED
PL	PHATRA LEASING PUBLIC COMPANY LIMITED
POMPUI	KUANG PEI SAN FOOD PRODUCTS PUBLIC COMPANY LIMITED
POST	THE POST PUBLISHING PUBLIC COMPANY LIMITED
PP	POWER-P PUBLIC COMPANY LIMITED
PPPC	PHOENIX PULP & PAPER PUBLIC COMPANY LIMITED
PR	PRESIDENT RICE PRODUCTS PUBLIC COMPANY LIMITED
PRANDA	PRANDA JEWELRY PUBLIC COMPANY LIMITED
PRECHA	PREECHA GROUP PUBLIC COMPANY LIMITED
PRG	PATUM RICE MILL AND GRANARY PUBLIC COMPANY LIMTED
PRIME	PRIME FINANCE & SECURITIES PUBLIC COMPANY LIMITED
PSL	PRECIOUS SHIPPING PUBLIC COMPANY LIMITED

PTSL	PRUDENTIAL TSLIFE ASSURANCE PUBLIC COMPANY LIMITED
PTTEP	PTT EXPLORATION AND PRODUCTION PUBLIC COMPANY
PYT	PRASIT PATANA PUBLIC COMPANY LIMITED
QH	QUALITY HOUSES PUBLIC COMPANY LIMITED
RAIMON	RAIMON LAND PUBLIC COMPANY LIMITED
RAM	RAMKHAMHAENG HOSPITAL PUBLIC COMPANY LIMITED
RANCH	BANGKOK RANCH PUBLIC COMPANY LIMITED
RCI	THE ROYAL CERAMIC INDUSTRY PUBLIC COMPANY LIMITED
RCL	REGIONAL CONTAINER LINES PUBLIC COMPANY LIMITED
RENOWN	RENOWN LEATHERWEARS PUBLIC COMPANY LIMITED
RGR	ROYAL GARDEN RESORT PUBLIC COMPANY LIMITED
RHC	RAJADAMRI HOTEL PUBLIC COMPANY LIMITED
RKF	THE RUANG KHAO FUND
ROBINS	ROBINSON DEPARTMENT STORE PUBLIC COMPANY LIMITED
ROCK	ROCKWORTH PUBLIC COMPANY LIMITED
ROJANA	ROJANA INDUSTRIAL PARK PUBLIC COMPANY LIMITED
RPF2	RUAMPHATANA 2
RR	RATTANA REAL ESTATE PUBLIC COMPANY LIMITED
RRF1	ROONGROJ ONE FUND
S & J	S & J INTERNATIONAL ENTERPRISES PUBLIC COMPANY LIMITED
S & P	S & P SYNDICATE PUBLIC COMPANY LIMITED
SAFARI	SAFARI WORLD PUBLIC COMPANY LIMITED
SAFE	THE SAFETY INSURANCE PUBLIC COMPANY LIMITED
SAICO	SIAM AGRO-INDUSTRY PINEAPPLE AND OTHERS PUBLIC CO., LTD.
SAMART	SAMART CORPORATION PUBLIC COMPANY LIMITED
SAMCO	SAMMAKORN PUBLIC COMPANY LIMITED
SAMTEL	SAMART TELCOMS PUBLIC COMPANY LIMITED
SAN	SUB-ANAN FUND
SATTEL	SHINAWATRA SATELLITE PUBLIC COMPANY LIMITED
SAUCE	THAI THEPAROS FOOD PRODUCTS PUBLIC COMPANY LIMITED
SAWANG	SAWANG EXPORT PUBLIC COMPANY LIMITED
SC	SONGKLA CANNING PUBLIC COMPANY LIMITED

SCAN	SCANDINAVIAN LEASING PUBLIC COMPANY LIMITED
SCB	THE SIAM COMMERCIAL BANK PUBLIC COMPANY LIMITED
SCBMF	SCB MUNKHONG FUND
SCBPF	SCB PRIME FUND
SCBPG	SCB PRIME GROWTH FUND
SCBSF	SCB SAVING FUND
SCBTS	SCB TAWEESUB FUND
SCC	THE SIAM CEMENT PUBLIC COMPANY LIMITED
SCCC	SIAM CITY CEMENT PUBLIC COMPANY LIMITED
SCCF	SIAM CITY CREDIT FINANCE & SECURITIES PUBLIC COMPANY LIMITED
SCF	SCF FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
S-CHEM	THE SIAM CHEMICALS PUBLIC COMPANY LIMITED
SCIB	SIAM CITY BANK PUBLIC COMPANY LIMITED
SCLA	SIAM COMMERCIAL LIFE ASSURANCE PUBLIC COMPANY LIMITED
SCP	SOUTHERN CONCRETE PILE PUBLIC COMPANY LIMITED
SDF	SRI DHANA FINANCE PUBLIC COMPANY LIMITED
SE-ED	SE-EDUCATION PUBLIC COMPANY LIMITED
SGF	SIAM GENERAL FACTORING PUBLIC COMPANY LIMITED
SH	SEA HORSE PUBLIC COMPANY LIMITED
SHANG	SHANGRI-LA HOTEL PUBLIC COMPANY LIMITED
SHIN	SHINAWATRA COMPUTER AND COMMUNICATIONS PUBLIC COMPANY LTD.
SIAM	SIAM STEEL INTERNATIONAL PUBLIC COMPANY LIMITED
SIKRIN	SIKARIN PUBLIC COMPANY LIMITED
SINGER	SINGER THAILAND PUBLIC COMPANY LIMITED
SIRI	SANSIRI PUBLIC COMPANY LIMITED
SITCA	SITCA INVESTMENT & SECURITIES PUBLIC COMPANY LIMITED
SITHAI	SRITHAI SUPERWARE PUBLIC COMPANY LIMITED
SMC	SWEDISH MOTORS CORPORATION PUBLIC COMPANY LIMITED
SMG	THE SAMAGGI INSURANCE PUBLIC COMPANY LIMITED
SMK	SYN MUN KONG INSURANCE PUBLIC COMPANY LIMITED
SMPC	SAHAMITR PRESSURE CONTAINER PUBLIC COMPANY LIMITED

SOMPR	SOMPRASONG LAND PUBLIC COMPANY LIMITED
S-ONE	SECURITIES ONE PUBLIC COMPANY LIMITED
SORKON	S.KHONKAEN FOOD INDUSTRY PUBLIC COMPANY LIMITED
SP	STRONGPACK PUBLIC COMPANY LIMITED
SPC	SAHA PATHANAPIBUL PUBLIC COMPANY LIMITED
SPI	SAHA PATHANA INTER-HOLDING PUBLIC COMPANY LIMITED
SPL	SIAM PANICH LEASING PUBLIC COMPANY LIMITED
SPP	THE SIAM PULP & PAPER PUBLIC COMPANY LIMITED
SPSU	S.P. SUZUKI PUBLIC COMPANY LIMITED
SRI	SRITHAI FOOD & BEVERAGE PUBLIC COMPANY LIMITED
SS	SUNSHINE PUBLIC COMPANY LIMITED
SSC	SERM SUK PUBLIC COMPANY LIMITED
SSF	SURAPON FOODS PUBLIC COMPANY LIMITED
SSI	SAHAVIRIYA STEEL INDUSTRIES PUBLIC COMPANY LIMITED
SSPORT	SIAM SPORT SYNDICATE PUBLIC COMPANY LIMITED
SSSC	SIAM STEEL SERVICE CENTER PUBLIC COMPANY LIMITED
SST	SUB SRI THAI WAREHOUSE PUBLIC COMPANY LIMITED
STA	SRI TRANG AGRO-INDUSTRY PUBLIC COMPANY LIMITED
STACO	STA GROUP (1993) PUBLIC COMPANY LIMITED
STAR	STAR BLOCK GROUP PUBLIC COMPANY LIMITED
STC	SIAM TYRE PUBLIC COMPANY LIMITED
STECON	SINO-THAI ENGINEERING AND CONSTRUCTION PUBLIC CO.,LTD.
STPI	STP&I PUBLIC COMPANY LIMITED
STRD	SINO-THAI RESOURCES DEVELOPMENT PUBLIC CO., LTD.
SUC	SAHA-UNION PUBLIC COMPANY LIMITED
SUE	SANYO UNIVERSAL ELECTRIC PUBLIC COMPANY LIMITED
SUN	SUN WOOD INDUSTRIES PUBLIC COMPANY LIMITED
SUNTEC	SUN TECH GROUP PUBLIC COMPANY LIMITED
SUPALI	SUPALAI PUBLIC COMPANY LIMITED
SURAT	SURAT CANNING PUBLIC COMPANY LIMITED
SUSCO	SIAM UNITED SERVICES PUBLIC COMPANY LIMITED

S-VARA	SRIVARA REAL ESTATE GROUP PUBLIC COMPANY LIMITED
SVH	SAMITIVEJ PUBLIC COMPANY LIMITED
SVI	SEMICONDUCTOR VENTURES INTERNATIONAL PUBLIC COMPANY LIMITED
SVOA	SAHAVIRIYA OA PUBLIC COMPANY LIMITED
SYNTEC	SIAM SYNTECH CONSTRUCTION PUBLIC COMPANY LIMITED
TA	TELECOMASIA CORPORATION PUBLIC COMPANY LIMITED
TAF	THAI AGRI FOODS PUBLIC COMPANY LIMITED
TAG	THAI-ASAHI GLASS PUBLIC COMPANY LIMITED
TASCO	TIPCO ASPHALT PUBLIC COMPANY LIMITED
TBSP	THAI BRITISH SECURITY PRINTING PUBLIC COMPANY LIMITED
TC	TROPICAL CANNING (THAILAND) PUBLIC COMPANY LIMITED
TCB	THAI CARBON BLACK PUBLIC COMPANY LIMITED
TCCC	THAI CENTRAL CHEMICAL PUBLIC COMPANY LIMITED
TCI	THE THAI COMMERCIAL INSURANCE PUBLIC COMPANY LIMITED
TCJ	TCJ MOTOR PUBLIC COMPANY LIMITED
TCMC	THAILAND CARPET MANUFACTURING PUBLIC COMPANY LIMITED
TCOAT	THAI COATING INDUSTRIAL PUBLIC COMPANY LIMITED
TCP	THAI CANE PAPER PUBLIC COMPANY LIMITED
TDB	THE THAI DANU BANK PUBLIC COMPANY LIMITED
TDT	THAI DURABLE TEXTILE PUBLIC COMPANY LIMITED
TEIC	THAI ELECTRONIC INDUSTRY PUBLIC COMPANY LIMITED
TEM	THAI ENGINE MANUFACTURING PUBLIC COMPANY LIMITED
TF	THAI PRESIDENT FOODS PUBLIC COMPANY LIMITED
TFB	THE THAI FARMERS BANK PUBLIC COMPANY LIMITED
TFC	THAILAND FISHERY COLD STORAGE PUBLIC COMPANY LIMITED
TFD	THAI FACTORY DEVELOPMENT PUBLIC COMPANY LIMITED
TFI	THAI FILM INDUSTRIES PUBLIC COMPANY LIMITED
T-FISH	THAI FISHERIES PUBLIC COMPANY LIMITED
TFS	THAI FINANCIAL SYNDICATE PUBLIC COMPANY LIMITED
TFT	THAI FINANCIAL TRUST PUBLIC COMPANY LIMITED

TGCI	THAI-GERMAN CERAMIC INDUSTRY PUBLIC COMPANY LIMITED
TGI	THAI GLASS INDUSTRIES PUBLIC COMPANY LIMITED
TGP	THAI GYPSUM PRODUCTS PUBLIC COMPANY LIMITED
TGPRO	THAI-GERMAN PRODUCTS PUBLIC COMPANY LIMITED
THAI	THAI AIRWAYS INTERNATIONAL PUBLIC COMPANY LIMITED
THAIRE	THAI REINSURANCE PUBLIC COMPANY LIMITED
THANA1	THANA ONE FUND
THECO	THAI HEAT EXCHANGE PUBLIC COMPANY LIMITED
THIP	THANTAWAN INDUSTRY PUBLIC COMPANY LIMITED
THL	TONGKAH HARBOUR PUBLIC COMPANY LIMITED
THORES	THORESEN THAI AGENCIES PUBLIC COMPANY LIMITED
TIC	THE THAI INSURANCE PUBLIC COMPANY LIMITED
TIG	THAI INDUSTRIAL GASES PUBLIC COMPANY LIMITED
TIP	DHIPAYA INSURANCE PUBLIC COMPANY LIMITED
TIPCO	THE THAI PINEAPPLE PUBLIC COMPANY LIMITED
TISCO	THAI INVESTMENT AND SECURITIES PUBLIC COMPANY LIMITED
TIW	THAILAND IRON WORKS PUBLIC COMPANY LIMITED
TLI	THAI LIFT INDUSTRIES PUBLIC COMPANY LIMITED
T-LUXE	THAILUXE ENTERPRISES PUBLIC COMPANY LIMITED
TM	THAI MODERN PLASTIC INDUSTRY PUBLIC COMPANY LIMITED
TMB	THE THAI MILITARY BANK PUBLIC COMPANY LIMITED
TMD	THAI METAL DRUM MANUFACTURING PUBLIC COMPANY LIMITED
TMF	THAIMEX FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
TMP	THAI MELON POLYESTER PUBLIC COMPANY LIMITED
TNL	THANULUX PUBLIC COMPANY LIMITED
TNP	THE THANA PHUM FUND
TNPC	THAI NAM PLASTIC PUBLIC COMPANY LIMITED
TONHUA	TON HUA COMMUNICATIONS PUBLIC COMPANY LIMITED
TOPP	THAI O.P.P. PUBLIC COMPANY LIMITED
TPA	THAI POLY ACRYLIC PUBLIC COMPANY LIMITED
TPCORP	TEXTILE PRESTIGE PUBLIC COMPANY LIMITED
TPI	THAI PETROCHEMICAL INDUSTRY PUBLIC COMPANY LIMITED

TPP	THAI PACKAGING & PRINTING PUBLIC COMPANY LIMITED
TR	THAI RAYON PUBLIC COMPANY LIMITED
TRS	TRANG SEAFOOD PRODUCTS PUBLIC COMPANY LIMITED
TRU	THAI RUNG UNION CAR PUBLIC COMPANY LIMITED
T-RUBB	THAI RUBBER LATEX CORPORATION (THAILAND) PUBLIC CO.,LTD.
TSI	THE THAI SETAKIJ INSURANCE PUBLIC COMPANY LIMITED
TSTE	THAI SUGAR TERMINAL PUBLIC COMPANY LIMITED
TT&T	THAI TELEPHONE & TELECOMMUNICATION PUBLIC COMPANY LIMITED
TTF	THAI TANAKORN FINANCE PUBLIC COMPANY LIMITED
TTI	THAI TEXTILE INDUSTRY PUBLIC COMPANY LIMITED
TTL	TTL INDUSTRIES PUBLIC COMPANY LIMITED
TTTM	THAI TORAY TEXTILE MILLS PUBLIC COMPANY LIMITED
TUF	THAI UNION FROZEN PRODUCTS PUBLIC COMPANY LIMITED
TUNTEX	TUNTEX (THAILAND) PUBLIC COMPANY LIMITED
TVI	PACIFIC INSURANCE PUBLIC COMPANY LIMITED
TVO	THAI VEGETABLE OIL PUBLIC COMPANY LIMITED
TWC	THAI WAH PUBLIC COMPANY LIMITED
TWFP	THAI WAH FOOD PRODUCTS PUBLIC COMPANY LIMITED
TWP	THAI WIRE PRODUCTS PUBLIC COMPANY LIMITED
TWRD	THAI WAH RESORTS DEVELOPMENT PUBLIC COMPANY LIMITED
TYONG	TANAYONG PUBLIC COMPANY LIMITED
UAF	UNION ASIA FINANCE PUBLIC COMPANY LIMITED
UB	THE UNION BANK OF BANGKOK PUBLIC COMPANY LIMITED
UBC	UNITED BROADCASTING CORPORATION PUBLIC COMPANY LIMITED
UCOM	UNITED COMMUNICATION INDUSTRY PUBLIC COMPANY LIMITED
UCT	UNICORD PUBLIC COMPANY LIMITED
UF	UNION FOOTWEAR PUBLIC COMPANY LIMITED
UFC	UNIVERSAL FOOD PUBLIC COMPANY LIMITED
UFM	UNITED FLOUR MILL PUBLIC COMPANY LIMITED
UGP	UNIQUE GAS & PETROCHEMICALS PUBLIC COMPANY LIMITED

UMI	THE UNION MOSAIC INDUSTRY PUBLIC COMPANY LIMITED
UMW	UNITED MOTOR WORKS (SIAM) PUBLIC COMPANY LIMITED
UNI	UNITED FOODS PUBLIC COMPANY LIMITED
UNITED	UNITED FINANCE CORPORATION PUBLIC COMPANY LIMITED
UNIVES	UNIVEST LAND PUBLIC COMPANY LIMITED
UP	UNION PLASTIC PUBLIC COMPANY LIMITED
UPF	UNION PIONEER PUBLIC COMPANY LIMITED
UPOIC	UNITED PALM OIL INDUSTRY PUBLIC COMPANY LIMITED
UST	UNITED STANDARD TERMINAL PUBLIC COMPANY LIMITED
UT	UNION TEXTILE INDUSTRIES PUBLIC COMPANY LIMITED
UTL	UNITHAI LINE PUBLIC COMPANY LIMITED
UV	UNIVENTURES PUBLIC COMPANY LIMITED
VARO	VAROPAKORN PUBLIC COMPANY LIMITED
VIBHA	VIBHAVADI MEDICAL CENTER PUBLIC COMPANY LIMITED
VK	VIDHAYAKOM PUBLIC COMPANY LIMITED
VNG	VANACHAI GROUP PUBLIC COMPANY LIMITED
VNT	VINYTHAI PUBLIC COMPANY LIMITED
WACOAL	THAI WACOAL PUBLIC COMPANY LIMITED
WALL	WALL STREET FINANCE AND SECURITIES PUBLIC COMPANY LIMITED
WAT	WATTACHAK PUBLIC COMPANY LIMITED
WFC	WONGPAITOON GROUP PUBLIC COMPANY LIMITED
WG	WHITE GROUP PUBLIC COMPANY LIMITED
YCI	YONG THAI PUBLIC COMPANY LIMITD
Z-MICO	SEAMICO SECURITIES PUBLIC COMPANY LIMITED

APPENDIX B

REGRESSION

Correlations

		RETURN	BETA	ME	AME	BEME	EP
RETURN	Pearson Correlation	1.000	.042	.056	-.031	-.021	.167**
	Sig. (2-tailed)	.	.378	.239	.505	.655	.000
	N	451	451	451	451	451	451
BETA	Pearson Correlation	.042	1.000	.365**	.003	-.028	-.020
	Sig. (2-tailed)	.378	.	.000	.948	.560	.670
	N	451	451	451	451	451	451
ME	Pearson Correlation	.056	.365**	1.000	.029	.039	.051
	Sig. (2-tailed)	.239	.000	.	.536	.408	.276
	N	451	451	451	451	451	451
AME	Pearson Correlation	-.031	.003	.029	1.000	.342**	.002
	Sig. (2-tailed)	.505	.948	.536	.	.000	.964
	N	451	451	451	451	451	451
BEME	Pearson Correlation	-.021	-.028	.039	.342**	1.000	.007
	Sig. (2-tailed)	.655	.560	.408	.000	.	.888
	N	451	451	451	451	451	451
EP	Pearson Correlation	.167**	-.020	.051	.002	.007	1.000
	Sig. (2-tailed)	.000	.670	.276	.964	.888	.
	N	451	451	451	451	451	451

**. Correlation is significant at the 0.01 level (2-tailed).

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EP		Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: RETURN

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.167[a]	.028	.026	3.26E-02	1.987

a. Predictors: (Constant), EP

b. Dependent Variable: RETURN

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.370E-02	1	1.370E-02	12.869	.000[a]
	Residual	.478	449	1.065E-03		
	Total	.492	450			

a. Predictors: (Constant), EP

b. Dependent Variable: RETURN

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6.117E-03	.002		3.860	.000		
	EP	8.055E-04	.000	.167	3.587	.000	1.000	1.000

a. Dependent Variable: RETURN

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	BETA	.045[a]	.966	.335	.046	1.000	1.000	1.000
	ME	.047[a]	1.010	.313	.048	.997	1.003	.997
	AME	-.032[a]	-.683	.495	-.032	1.000	1.000	1.000
	BEME	-.022[a]	-.477	.633	-.023	1.000	1.000	1.000

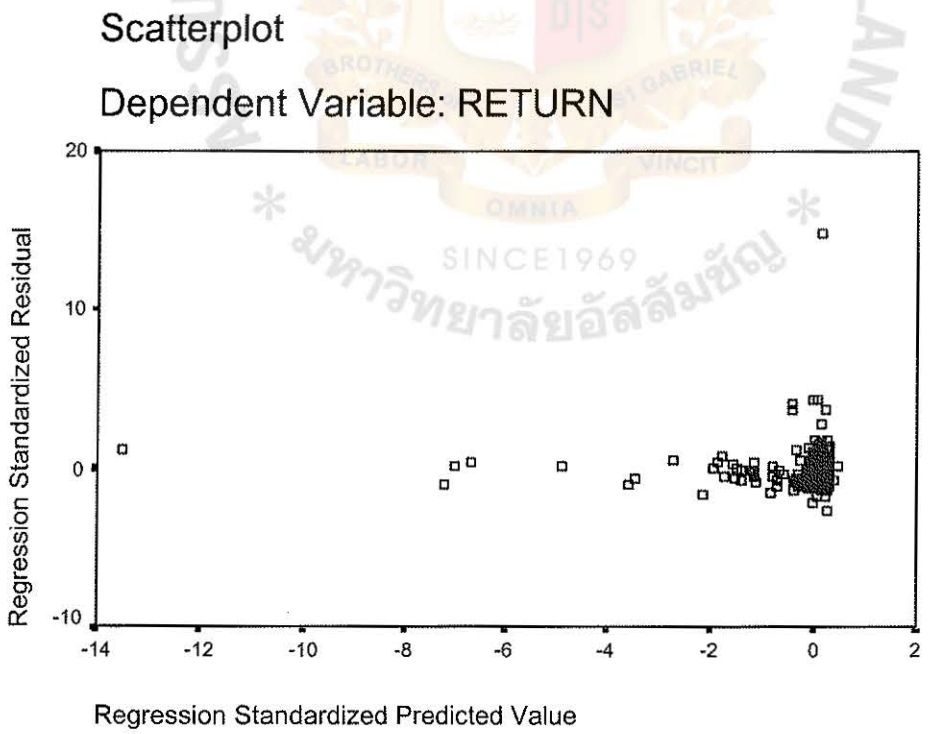
a. Predictors in the Model: (Constant), EP

b. Dependent Variable: RETURN

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-7.0E-02	7.26E-03	4.73E-03	5.52E-03	451
Residual	-8.6E-02	.4840807	8.62E-19	3.26E-02	451
Std. Predicted Value	-13.500	.458	.000	1.000	451
Std. Residual	-2.633	14.834	.000	.999	451

a. Dependent Variable: RETURN



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