ปัจจัยที่มีผลกระทบต่ออัตราผลตอบแทนหุ้น...กรณีศึกษาประเทศไทย

The Cross-Section of Expected Stock Returns:
A Case of Thailand

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บทคัดย่อ

บทความนี้ศึกษาถึงการประยุกต์ใช้ CAPM ในตลาดหุ้นไทย โดยใช้แบบจำลอง
ที่พัฒนาโดย Fama and French (1992) ซึ่งศึกษาว่า beta ขนาดบริษัท อัตราส่วนมูลค่า
ทางบัญชีต่อมูลค่าตลาดของส่วนผู้ถือหุ้น (BTM) อัตราส่วนแทนโครงสร้างเงินทุน
(Leverage) และอัตราส่วนกำไรต่อราคาหุ้นมีผลต่อผลตอบแทนของหุ้นหรือไม่ ผลการ
ศึกษาในตลาดหุ้นไทยได้เช่นเดียวกับผลการศึกษาในตลาดหุ้นหลาย ๆ ประเทศ กล่าวคือ
นอกเหนือจาก beta แล้ว BTM ดูเหมือนจะเป็นตัวแปรที่สำคัญในการกำหนดผลตอบแทน
ของหุ้น โดยหุ้นที่มี BTM สูงจะมีผลตอบแทนที่คาดหวังสูงเช่นกัน อธิบายได้ว่าหุ้นที่มี
BTM สูงเป็นหุ้นที่ไม่ค่อยดี ถูกตีราคาในตลาดต่ำเมื่อเทียบกับมูลค่าทางบัญชีของบริษัท
นักลงทุนจึงคาดหวังผลตอบแทนในอัตราที่สูง เมื่อเทียบกับหุ้นที่ดีซึ่งได้รับการตีราคาที่สูงใน
ตลาด นอกจากนี้อัตราส่วนแสดงโครงสร้างเงินทุนก็เป็นตัวแปรที่สำคัญในการกำหนดผล
ตอบแทนของหุ้น ดังนั้น CAPM ซึ่งพิจารณาเพียงความเสี่ยงของตลาดหรือ beta จึงไม่พอ
ในการกำหนดผลตอบแทนในตลาดหุ้นไทย แบบจำลองในการกำหนดผลตอบแทนในตลาดหุ้น
ไทยควรรวมตัวแปรเฉพาะของบริษัทเช่น BTM ขนาด และโครงสร้างเงินทุนด้วย

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Abstract

This paper studies the CAPM application in the Thai stock market. Following the study done by Fama and French (1992), this study tests whether beta, size, book-to-market equity, leverage and earning-price ratios have any effect on Thai stock returns. Similar to the empirical results in the stock markets in various countries, the Book-to-Market (BTM) variable shows a positive relationship on the stock returns in the Thai stock market. In other words, the higher the BTM ratio, the higher the expected stock returns. The BTM variable represents the high market leverage relative to book leverage. Firms having a large amount of market-imposed leverage are interpreted as poor, and therefore, their stock prices are discounted relatively to their book values. The Market-Leverage and Book-Leverage variables also have the strong explanatory power on the stock returns. Therefore, the CAPM model with the market return sensitivity, or beta, may not be sufficient to explain the individual stock returns in the Thai stock markets. The model, however, should include the size, book-to-market equity, and leverage variables as well.

I. Introduction

Capital Asset Pricing Model (CAPM),developed almost simultaneously by Sharpe(1963, 1964) and Treynor (1961) and developed further by Mossin (1966), Lintner (1965b, 1969), and Black(1972), has long been known as the best academically equilibrium pricing model. It states that equilibrium rates of return on all risky assets are a function of their covariance with the market portfolio. All the non-systematic or firm-specific risks are diversified, only the systematic risk or beta is left to price the risky assets. Although all assumptions needed to derive CAPM are violated in the real world, many studies try to relax the unrealistic assumptions and prove that CAPM still holds. Empirically speaking, many researchers find the evidence to support CAPM, on the other hand, there are many empirical contradictions of CAPM. In 1992, Fama and French published the prominent paper revealing two easily measured variables, size and book-to-market equity, combine to capture the cross-sectional variation in average stock returns associated with market beta, size, leverage, book-to-market equity, and earnings-price ratios. And when the tests allow for variation in beta and even when beta is the only explanatory variable, it is found that the relation between market beta and average return is flat. This paper is to replicate the study done by Fama and French (1992) to test whether beta, size, book-to-market equity, leverage and earning-price ratios as stated in Fama and French (1992) have any effect on Thai stock returns.

Much evidence regarding the relationship between rates of return and systematic risk (beta) of portfolios supports CAPM. Fama and MacBeth (1973), Black, Jensen, and Scholes (1972) found that beta would be the only explanatory factor in explaining the cross-sectional

variation across stock portfolios. Modigliani and Pogue (1974) state that the linearity of the relationship between monthly return and the betas appear to be reasonable and positive. Regardless of the presence of firm size, book-to-market, and earnings-price ratios, beta is found by Dongcheol Kim (1997) to have significant explanatory power for average stock returns. The similar result was also found by Strong and Xu (1997), given book-to-market equity ratio, market leverage, market value and book leverage (1997). However, Akdeniz, Altay-Salih and Aydogan (2000), Daniel and Titman (1997), Sandip, Dhatt and Kim (1997), and Fama, et al. (1992) found that there was no evidence that high beta stocks outperform low beta stocks. Rouwenhorst (1999) also found the same result in emerging equity markets. The study by Puneet, Kothari and Wasley (1993) showed that the positively sloped linear relation between a security's expected rate of return and its relative risk (beta) was rejected using monthly returns, but failed to reject when annual holding period returns were used. Joao, Leonid and Lu (2003) suggest that the empirical success of size and book-to-market can be consistent with a single-factor conditional CAPM model. Also, Rosenberg and Marathe (1977) found that beta can predict return much better if other factors such as firm size, dividend yield, or trading volume are added to the model. Keith (2002) found that beta was unable to explain the average monthly returns on stocks continuously listed in Hong Kong Stock Exchange for the period July 1984-June 1997.

Studies by Reinganum (1981), Banz (1981), Keim (1983), Basu (1983), Jaffe and Keim (1989), and Fama et al. (1992) reveal that the size of a firm is important. Smaller firms tend to have high abnormal rates of return. For U.K. equities, research by Charitou, Clubb, and Andreou

(2001), and Strong et al. (1997) found that average returns are significantly negatively related to market value. The similar result was found in Stock Exchange of Singapore by Wong and Kye (1990), in Shanghai Stock Exchange by Drew, Naughton, and Veeraraghavan (2003), and in Japan by Chan, Hamao, and Lakonishok (1991 and 1993), and in Hong Kong Stock Exchange by Keith (2002). Ramcharran (2004) estimated the significance of price-to-book, price-to-earnings, and market size as determinants of equity returns of 21 emerging equity markets over 1991-2000. The estimates confirmed the significance of price-to-book ratio and market size. Joao et al. (2003) and Akdeniz et al. (2000) state that expected return can best be explained by book-to-market and size of stocks. On the other hand, the study by Dhatt, et al. (1999) found that Korean stock returns in general and returns on stocks listed in Section 1 in particular were not significantly related to market value of equity. Neither book-to-market nor firm size is important in forecasting the cross-section of bank stock returns as stated by Cooper, Jackson, and Patterson (2003). Also, Dongcheol (1997) reveals that firm size is barely significant using monthly returns, but no longer significant using quarterly returns using U.S. data.

Many researchers found a positive relationship between average return and book-to-market equity (Davis, Fama and French (2000), Capaul, Rowley and Sharpe (1993), Pontiff and Schall (1998), Kim(1997), Lakonishok, Shleifer, and Vishny (1994), Fama et al. (1992) and Rosenberg, Reid, and Lanstein (1985) and Statman (1980). Similar results were found in U.K. (Charitou et al. (2001), Strong et al. (1997)). Dhatt et al. (1999) also found significantly positive relationship between Korean stock returns and book-to-market ratio. In Japan, Chan, Hamao, and Lakonishok (1991, 1993) provide the evidence that the market-to-

book ratio is the most important variable, statistically and economically in explaining average returns. Esmeralda and Edward (2004) also found the similar result in Eastern Europe. Also Claessens, Dasgupta, and Glen (1998) found, in a number of emerging markets, market-to-book ratio was significantly related to stock returns. In Hong Kong Stock Exchange, the similar result was also found by Keith (2002). Roll (1995) stated that the mean daily returns of high book-to-market stocks in Indonesia was higher than the low ones. Aydogan and Gursoy (2000) reported a significant relationship between market-to-book ratio and stock returns in a panel data set of 19 emerging stock markets. Levent et al. (2000), Harri (2004), Davis (1994), and Joao et al. (2003) found that the market value of equity had predictive power for returns. Capaul, Rowley, and Sharpe (1993) reported that value stocks (proxied by high book-to-market) earned higher returns than growth stocks (proxied by low book-to-market) in France, Germany, Japan, Switzerland, the United Kingdom, and the United States. Also studies by Aggarwal, Hiraki and Rao (1992) revealed that stocks with low price-to-book value consistently earned higher risk-adjusted returns for securities on the Tokyo Stock Exchange, and in Shanghai (Drew, Naughton and Veeraraghavan (2003)). However, Cooper et al. (2003) found that neither book-to-market nor firm size was important in forecasting the cross-section of bank stock returns. Also, the study by Fama and French (1995) revealed no link between book-to market equity factors in earnings and returns. Kothari, Shanken and Sloan (1995) reported that the relation between book-to-market equity and returns was weaker and less consistent than that in Fama et al. (1992). The study done by Loughran (1997) also reported that in the largest quintile of all

firms in U.S., book-to-market had no significant explanatory power on the cross-section of realized returns during the 1963-1995.

Bhandari (1988) found the effect of leverage on returns. In simple regressions, Strong, et.al. (1997) found that average returns were significantly positively related to market leverage, and significantly negatively related to book leverage for U.K. equities. Dhatt et al. (1999) also found that Korean stock returns in general were significantly positively related to debt-equity ratios.

Common stock of high Earning-to-Price ratio (E/P) firms was found to earn, on average, higher risk-adjusted returns than the common stock of low E/P firms by Basu (1983), Ball (1988), Jaffe et al. (1989), Davis (1994) and Laknoishok et al. (1994). Akdeniz et al. (2000) reported that expected return could best be explained by E/P ratio only when beta and itself were in the regression. Returns of stocks listed on the Stock Exchange of Singapore (SES) were significantly related to price-to-earnings ratio. Similar results were also found in Japan (Chan et al. (1991 and 1993), in Hong Kong (Keith (2002), and in emerging markets (Claessens et al. (1998) and Aydogan et al. (2000)). On the other hand, Esmeralda and Edward (2004) found that E/P ratios were negatively related to future returns in countries of Eastern Europe, while Harri (2004) reported that price-to-earnings ratio was not significant in determining equity returns of 21 emerging equity markets.

As shown above, studies on the relationship between five factors, namely beta, size, book-to-market, leverage and earnings-price ratio, and the stock returns provide mixed results. The result from our study shows that out of the five factors, book-to-market equity ratio shows the consistently positive result, while the market leverage ratio using total asset to market equity ratio shows a positive relationship;

however, result turns to be negative relationship using book leverage or total asset to book equity ratio.

The next section deals with data and methodology. Results of the study and the discussions of findings are shown in section 3, and section 4 concludes the paper.

II. Data and Methodology

This study replicated the study done by Fama and French (1992); therefore, the same methodology was employed. Monthly return of non-financial companies listed on Stock Exchange of Thailand used in portfolio formation and regression are from 1992-2002. In calculating pre-ranking beta, 24 to 60 monthly returns in the past 5 years before July of year t are used for estimation. For example, pre-ranking beta of each firm in June 1992 is calculated from market model using monthly return from June 1987-June 1992. We include only the firms that have the history of returns of more than 24 months.

To make sure that investors know accounting data before the investment decision, we allow gap of 6 months by matching accounting data in December of year t-1 with the returns from July of year t to June of year t+1. Accounting data used in the study are market equity, book value of equity, total asset, earnings per share and price per share. Variables used are firm size using natural log of market equity (ln(ME)), book-to-market equity ratio using natural log of book equity to market equity ratio (ln(BE/ME), market leverage using natural log of total asset to market equity ratio (ln(A/ME)), book leverage using natural log of total asset to book equity ratio(ln(A/BE)), earnings/price ratio using earnings per share to price per share. If earnings are positive, actual earnings will be used in estimation

(E(+)/P); otherwise, value of zero will be assigned to earnings/price ratio, and value of one will be assigned to earnings/price dummy (E/P Dummy). We use the market equity, book equity, total asset, earnings per share, and price per share in December of year t-1 to calculate book-to-market equity ratio, market leverage, book leverage, earnings/price and earnings/price dummy. Only for firm size estimation, we use market equity in June of year t . For example, monthly return from July 1992 to June 1993 are matched with pre-ranking beta in June 1992, firm size in June 1992, and book-to-market ratio, market leverage ratio, book leverage ratio and earning/price ratio in December 1991.

To measure the effect of firm size and beta on the return, in June of year t, we form ten portfolios based on the firm size, and then for each size, we subdivide them into another ten portfolios based on the pre-ranking beta of each stock. At the end, we have a matrix of 100 portfolios divided by firm size and then pre-ranking beta. We, then, find the average return of each portfolio using July of year t to June of year t+1 for each portfolio. For example, in June 1992, we form 100 portfolios based on the firm size and pre-ranking beta of June 1992. A after that, we find the average return of each portfolio using monthly returns of stocks in each portfolio from July 1992 to June 1993. We repeat the process until June 2001 and the average return of each portfolio is calculated using monthly returns of stocks from July 2001 to June 2002. At the end, we have post-ranking return of each portfolio from July 1992 to June 2002 or 120 months. We, then, regress these monthly returns for each portfolio using full sample of 120 months with the current and prior month's market return. Market returns are calculated using the SET index. The post-ranking betas are calculated by summing the coefficients obtained from the regression. This

method is proposed by Dimson (1979) to help adjust for nonsynchronous trading. In each portfolio, the post-ranking beta is then assigned to each stock in that portfolio and this beta will be used in the regression analysis.

We also form portfolio based on one-dimensional sorts of stock returns on size or pre-beta. Ten portfolios are formed at the end of June each year from 1992 to 2001, we then calculate average return of each portfolio using the monthly return from July of year t to June of t+1. For example, in June 1992, we sort out the size or pre-beta of all stocks and divide them into ten portfolios. We then calculate the average return for each stock using monthly return from July 1992 to June 1993, and finally we find the equally weighted average return for each portfolio for 1992. We reform the portfolio again in June of 1993, and at last we find the time-series average return for each portfolio. The same method is used to find the average value of post-beta, size, book-to-market ratio, leverage ratios and earning-price ratios for each portfolio.

To test the relationship between return and book-to-market ratios and earnings-price ratios, we also form the portfolio using one-dimensional sorts on either book-to-market or earnings-price ratios. The same method as previous paragraph is applied except the time of portfolio formation, in this case, portfolio will be formed in December of year t-1.

Fama and MacBeth's cross-sectional regression approach in asset-pricing tests (1973) is also used in the study. In each month, monthly returns of each stock (R_{mj}) are regressed cross-sectionally with the post-ranking beta (β_j), or firm size (ln(ME)), or book-to-market, or market leverage, or book leverage, or earnings/price ratio or combination

of variables. Then, the time-series average of the coefficients is estimated to see whether the hypothesized variable has any effect on the expected return. The following regressions are run cross-sectionally :

Univariate Regressions:

$$R_{m\,i} = a + \theta_1 \beta_i + e_i \quad \dots \quad (1)$$

$$R_{m\,i} = a + \theta_1 \ln(ME)_i + e_i \quad \dots \quad (2)$$

$$R_{m\,i} = a + \theta_1 \ln(BE/ME)_i + e_i \quad \dots \quad (3)$$

$$R_{m\,i} = a + \theta_1 \ln(A/ME)_i + \theta_2 \ln(A/BE)_i + e_i \quad \dots \quad (4)$$

$$R_{m\,i} = a + \theta_1 E/P\ Dummy_i + \theta_2 E(+)/P_i + e_i \quad \dots \quad (5)$$

Multivariate Regressions:-

$$R_{m\,i} = a + \theta_1 \beta_i + \theta_2 \ln(ME)_i + e_i \quad \dots \quad (6)$$

$$R_{m\,i} = a + \theta_1 \ln(ME)_i + \theta_2 \ln(BE/ME)_i + e_i \quad \dots \quad (7)$$

$$R_{m\,i} = a + \theta_1 \ln(BE/ME)_i + \theta_2 E/P\ Dummy_i + \theta_2 E(+)/P_i + e_i \quad \dots \quad (8)$$

$$R_{m\,i} = a + \theta_1 \beta_i + \theta_2 \ln(ME)_i + \theta_2 \ln(BE/ME)_i + e_i \quad \dots \quad (9)$$

where i stands for firm i

III. Results

Forming portfolios based on size and then pre-ranking beta in panel A of Table 1, the results show no consistent relationship neither between return and size nor between return and beta. Across size, return of smallest-sized portfolio of −3.5% increases to 1.2% in size-2, then decreases down to −2.4% in size-5, then changes to −0.6% in largest-sized portfolio. Across beta, return of lowest-beta portfolio of −1.11% increases to 0.2% in beta-4, and then decreases to −1.4% in beta-6, and finally changes to −3.5% in highest-beta portfolio. Controlling the beta and letting sizes vary under each group of beta, eight out of ten groups show that returns of the largest-sized portfolio are higher than the smallest-sized portfolio.

Though not consistency across different sizes, there seems to be a positive relationship between firm size and return of stocks in Thailand. This is opposite to findings reported by Banz (1981), Reinganum (1981) and others that smaller firms tended to have high abnormal rates of return. For the returns of portfolios that control size and let betas vary, the result is conclusive. Five out of ten groups show that highest-beta portfolio has higher return than lowest-beta portfolios. Similar results, which state that there is no evidence that high beta stocks outperform low beta stocks, are found in emerging equity markets (Rouwenhorst (1999)), and in Hong Kong by Keith (2002).

Panel B of Table 1 shows the values of post-beta of each portfolio formed on size and then pre-ranking beta. Unlike the results by Fama and French (1992), under each size, the post-ranking betas do not reproduce the ordering of the pre-ranking betas, and under each pre-ranking portfolios, the post-ranking betas for each size varies a lot. Attention is then brought to the method of beta calculation.

Similar results are found as Fama and French (1992) for panel C of Table 1. Under each size-portfolio, the average sizes of each portfolio are not different between highest-beta and lowest-beta portfolios. This shows that by forming the portfolio by size and then beta, we can separate the effect of beta from the effect of size on stock returns, if any.

Larger-sized firms tend to have higher betas and higher average returns as shown in panel A of Table 2. Portfolios are formed based on one-dimensional sort on either on size or beta. Positive relationship between firm size and average returns is found given the low correlation (0.0158) between size and beta. We also find that large firms tend to have low book-to-market (BTM) ratios, which many research call them "growth stocks". Chan, Karceski, and Lakonishok (2003) state that BTM is a measure of a company's future growth opportunities relative to its accounting value. Low BTM suggests that investors expect high future growth prospects compared with the value of assets in place. Earnings/Price (E/P) tends to be lower for the large firms. As stated by Ball (1978), E/P is a catch all proxy for unnamed factors in expected returns : E/P tends to be lower for stocks having lower risks and expected returns.

Though the post-ranking beta found in Table 1 do not closely reproduce the ordering of the pre-ranking betas, forming the portfolios solely by pre-ranking beta, in Panel B of Table 2, shows the better trend. Large pre-ranking beta portfolios show higher post-beta than small pre-ranking ones. Small-to-medium beta portfolios tend to generate higher return for higher beta (-1.1% to 0.2%); however for medium-to-high beta portfolios, the returns show the opposite direction, medium-beta portfolios generate more return than high-beta

portfolios (0.2% to −3.5%). Average firm size for each portfolio formed on pre-ranking betas are very close to each other. Large-beta portfolios also show higher BTM and E/P than small-beta portfolios. Fama and French (1996) reported that stocks with high BTM were more prone to financial distress and were hence riskier than low BTM. Also consistent with Ball (1978) who states that high E/P stocks tend to have higher risks.

Average returns on portfolios formed on BTM as shown in Panel A of Table 3 show that high BTM portfolios tend to have higher returns. Chan and Lakonishok (2004) reported that value stocks (high BTM) generates superior returns, and this may result from behavioral considerations of investors and agency costs of delegated investment management. Also Fama and French (1996) relates high BTM to financial distress and higher risk. However, beta and size shown in the Table tend to be lower for higher BTM stocks, while E/P shows no relationship with BTM.

Panel B of Table 3 shows that high E/P stocks tend to have lower returns which is not consistent with tprevious research which reported that high E/P stocks tended to have higher risks and expected returns. Results also show that high E/P stocks tends to have low beta and low BTM, but no relationship with firm size. All are not consistent with the previous literature, which reported that high beta and high BTM stocks should show higher risk which might be captured by high E/P ratios.

In Table 4, we run the month-to-month regressions of cross-section of stock returns on beta, size, BTM, leverage, E/P and combination of those hypothesized variables using data from June 1992 to December 2002. Then, we find the time-series average of coefficients of

each variable in each model. Model 1 and 2 show no significant relationship between average return and beta, and size consecutively.

Significant positive returns are detected between average return and BTM which is consistent with the results found in U.K. by Charitou et al.(2001), Strong et al. (1997), and Capaul et al.(1993), in France, Germany, Switzerland, and the United States by Capaul et al. (1993), in Eastern Europe by Esmeralda and Edward (2004), in Japan by Chan et al.(1991,1993) and Aggarwal et al.(1992), in Shanghai by Drew, et al. (2003), in Korea by Dhatt et al.(1999), in Hong Kong by Keith (2002), in Indonesia by Roll (1995), and in emerging markets by Claessens et al.(1998) and Aydogan et al. (2000).

Market leverage proxied by natural log of asset to market equity is found to be significantly positively related to the average returns, and book leverage proxied by natural log of asset to book equity is found to have a significantly negative effect on returns. This result is consistent with Fama and French (1992), and Bhandari (1988) who find the positive relation between market leverage and average return, and negative relation between book leverage and average return. Fama, et.al. (1992) shows that $\ln(BE/ME) = \ln(A/ME) - \ln(A/BE)$, or BTM ratio is the difference between market leverage $(\ln(A/ME))$ and book leverage $(\ln(A/BE))$. Therefore, the reason of high BTM may be due to high market leverage relative to book leverage, or high BTM may be interpreted as high leverage. This implies that markets judges firms having a large amount of market-imposed leverage as poor, and therefore discounts the stock price relative to book value. In the same way, Chan and Chen (1991), Fama and French (1996) and Chan and Lakonishok (2004) says that BTM may capture the relative distress effect which markets perceive it as a poor

prospect, and therefore higher risk. Fama and French (1995) reports as well that high BTM may signal persistent poor earnings. Chen and Zhang (1998) also state that value stocks (high BTM) are riskier because they are usually firms under distress, have high financial leverage, and face substantially uncertainty in future earnings.

Earnings/Price ratios show no significant relationship with the average return. This is contrast with the result found by Ball (1978) which revealed that high-risk stocks with high expected returns would have low prices relative to their earnings, or high E/P ratio.

Effect of BTM on average return is very strong. Though we add beta or size or E/P or all variables to the regression as shown in model 6-9, BTM still shows statistically significant positive relationship with average returns. From model 9, we include 3 hypothesized variables namely beta, size and book-to-market in the model, and the result shows that beta and size turn to be statistically significantly positive, while the BTM is still very strong. This may be due to the misspecification of the univariate model in model 1 and 2.

In conclusion, Book-to-Market ratio, as well as Market Leverage and Book Leverage, has the strong explanatory power on the return.

IV. Conclusions and Implications

Results from the great bunch of academically empirical research support the significant effect of Book-to-Market on the return in various countries, and so does our study in Thai Stock Market. Many researchers try to point out the reasons behind the higher return for high BTM stocks. Chan and Chen (1991), Fama and French (1992, 1995), Chan and Lakonishok (2004) and Chen and Zhang (1998) state

that high BTM stocks are more prone to financial distress, and also high leverage and poor earnings which markets perceive as poor prospects, and hence riskier. Chan and Lakonishok (2004) also concluded that the higher return might result from Behavioral Approach on investors and agency costs. They explain that in psychology studies, individuals tend to use simple heuristics for decision making, which opens up the possibility of judgmental biases in investment behavior. Also, most analysts have a self-interest in recommending successful stocks to generate high trading commission. Growth stocks (low BTM) tend to be followed by analysts and therefore are overpriced relative to the fundamentals while value stocks (high BTM) tends to be underpriced.

The practical implications of this study can be on investment either on individual stocks or portfolio formation and performance evaluation. Higher return may be expected if we choose to invest in the stocks that have high BTM ratios; however, this will be under the limitations of higher risk which may result from probability of financial distress or high financial leverage, or poor earnings prospect. Also when evaluating the performance of portfolio, the benchmark portfolios should have similar BTM characteristics.

The study done by Jensen, Johnson, and Mercer (1997) shows that BTM effects depend largely on the Monetary environment, where the effect is significant only in expansion monetary policy periods, and also depend on the holding period of the returns employed in the study (Dongcheol (1997) and Gilmer (1988)). This will be left for further study to explore whether the BTM effect is affected by the monetary policy or holding period return.

Other than the effect of beta, size, BTM, leverage and E/P on stock returns, Esmeralda and Zychowicz (2004) try to find the effect of dividend yields, Dhatt and Mukherji (1999), Mukherji, Dhatt, and Kim (1997) and Barbee, Mukherji and Rames (1996) study on the sales-price, and David (1994) and Chan, Hamao and Lakonishok (1993) analyze the cash flow yield. This is again left for further study to explore whether any variables other than beta as stated in CAPM can price the returns.

Table 1
Average Monthly Returns, Post-Ranking Betas, and Average Size for Portfolios
Formed on Size (down) and then Pre-Ranking Beta(across) in June of year t
From July 1992 to December 2002

	All	Low	Beta-2	Beta-3	Beta-4	Beta-5	Beta-6	Beta-7	Beta-8	Beta-9	High
			Panel A:	Average Monthly Returns (in Percent)							
All		-0.011	-0.003	-0.001	0.002	-0.002	-0.014	-0.002	-0.009	-0.036	-0.035
Small-Size	-0.035	-0.043	-0.020	-0.049	0.031	-0.027	-0.004	-0.091	-0.007	-0.061	-0.111
Size-2	0.012	-0.003	0.017	0.054	0.035	0.004	-0.001	0.048	-0.011	0.026	-0.102
Size-3	-0.002	0.026	0.019	0.005	0.009	0.001	-0.020	0.019	0.032	-0.077	-0.064
Size-4	-0.002	0.009	0.017	-0.015	0.009	0.021	-0.017	0.008	-0.030	0.001	-0.028
Size-5	-0.024	-0.039	-0.007	0.005	-0.012	-0.011	-0.006	-0.006	-0.007	-0.090	-0.077
Size-6	-0.008	-0.024	0.001	-0.003	0.018	0.003	-0.021	0.003	-0.009	-0.039	-0.014
Size-7	-0.014	0.001	-0.049	-0.010	-0.018	0.005	-0.029	0.005	-0.005	-0.028	-0.011
Size-8	-0.018	-0.016	-0.007	-0.002	-0.018	0.000	-0.020	-0.031	-0.009	-0.076	0.000
Size-9	-0.012	-0.017	0.005	0.008	-0.011	-0.015	-0.008	-0.015	-0.040	-0.021	-0.007
Large-Size	-0.006	-0.004	-0.009	-0.006	-0.019	-0.011	-0.013	0.013	-0.003	-0.002	-0.003
			Panel B:	Post-Rankings Betas							
All		0.44	0.35	0.62	0.40	0.66	0.72	0.84	0.88	0.96	0.65
Small-Size	0.20	-0.08	-0.34	0.18	0.04	0.19	-1.33	-0.79	1.73	1.68	1.94
Size-2	0.40	-0.39	-0.23	0.69	0.68	-0.24	0.76	0.45	0.70	0.63	0.85
Size-3	0.68	1.73	0.81	1.05	0.56	1.10	0.33	0.27	1.39	-0.39	-0.23
Size-4	0.80	0.25	1.13	0.33	0.44	1.04	-0.02	1.94	0.21	2.14	0.78
Size-5	0.51	0.59	-0.40	-0.02	0.33	0.17	1.07	1.59	-0.12	1.03	0.68
Size-6	0.84	0.26	0.92	1.79	0.70	0.32	0.97	0.65	1.20	0.64	0.74
Size-7	0.58	1.27	0.23	0.55	0.10	0.50	0.45	0.92	0.70	0.55	0.67
Size-8	0.79	-0.25	0.77	0.43	-0.05	1.30	1.57	0.53	1.42	1.40	0.53
Size-9	0.36	0.53	0.01	0.74	-0.22	-0.10	0.67	1.02	0.15	0.59	0.15
Large-Size	1.17	0.35	0.37	0.34	1.27	2.20	1.62	1.25	1.53	1.58	1.07
			Panel C:	Average Size (ln(ME))							
All		20.49	20.57	20.65	20.59	20.69	20.62	20.67	20.66	20.73	20.67
Small-Size	18.59	18.31	18.66	18.69	18.55	18.84	18.72	18.78	18.47	18.57	18.26
Size-2	18.98	19.11	19.10	18.96	18.95	18.97	18.97	18.82	19.03	18.98	18.93
Size-3	19.41	19.24	19.39	19.34	19.41	19.44	19.47	19.41	19.34	19.65	19.48
Size-4	19.79	19.72	19.69	19.81	19.77	19.80	19.76	19.89	19.85	19.84	19.75
Size-5	20.10	19.93	20.06	20.17	19.98	20.22	20.15	20.11	20.26	20.10	19.98
Size-6	20.48	20.35	20.51	20.48	20.49	20.48	20.49	20.50	20.51	20.50	20.47
Size-7	20.94	20.96	20.95	20.96	20.93	20.97	20.90	20.89	20.89	20.98	20.94
Size-8	21.38	21.37	21.44	21.35	21.46	21.30	21.35	21.32	21.36	21.47	21.39
Size-9	22.00	22.01	21.93	22.04	22.02	21.92	21.94	21.98	22.04	22.08	22.09
Large-Size	23.44	22.95	23.32	23.65	23.58	23.74	23.39	23.72	23.32	23.51	23.10

Table 2
Properties of Portfolios Formed on Size or Pre-Ranking Beta in June of year t
From July 1992 to December 2002

	Small	Size-2	Size-3	Size-4	Size-5	Size-6	Size-7	Size-8	Size-9	Large
	Panel A: Portfolios Formed on Size									
Return	-0.035	0.012	-0.002	-0.002	-0.024	-0.008	-0.014	-0.018	-0.012	-0.006
Beta	0.20	0.40	0.68	0.80	0.51	0.84	0.58	0.79	0.36	1.17
Ln(ME)	18.59	18.98	19.41	19.79	20.10	20.48	20.94	21.38	22.00	23.44
Ln(BE/ME	0.17	0.24	0.25	0.16	0.13	0.09	-0.10	-0.29	-0.41	-0.91
Ln(A/ME)	1.29	1.28	1.11	0.98	0.97	0.95	0.71	0.47	0.44	-0.01
Ln(A/BE)	1.12	1.04	0.86	0.82	0.84	0.86	0.81	0.76	0.85	0.90
E/P dummy	0.56	0.45	0.38	0.36	0.37	0.30	0.35	0.26	0.21	0.22
E(+)/P	0.53	0.03	0.05	0.09	0.04	0.07	0.07	0.03	0.34	0.03

	Small	Beta-2	Beta-3	Beta-4	Beta-5	Beta-6	Beta-7	Beta-8	Beta-9	Large
	Panel B: Portfolios Formed on pre-ranking beta									
Return	-0.011	-0.003	-0.001	0.002	-0.002	-0.014	-0.002	-0.009	-0.036	-0.035
Beta	0.44	0.35	0.62	0.40	0.66	0.72	0.84	0.88	0.96	0.65
Ln(ME)	20.49	20.57	20.65	20.59	20.69	20.62	20.67	20.66	20.73	20.67
Ln(BE/ME	-0.18	-0.17	-0.14	-0.10	0.02	-0.04	-0.07	-0.05	-0.18	0.06
Ln(A/ME)	0.62	0.57	0.61	0.67	0.84	0.78	0.85	0.88	0.85	1.30
Ln(A/BE)	0.81	0.75	0.75	0.77	0.82	0.82	0.92	0.93	1.02	1.24
E/P dummy	0.31	0.26	0.25	0.27	0.30	0.30	0.33	0.38	0.44	0.58
E(+)/P	0.03	0.03	0.04	0.32	0.05	0.04	0.35	0.04	0.10	0.08

Table 3
Properties of Portfolios Formed on Book-to-Market or Earnings-Price Ratios in December of year t-1
From July 1992 to December 2002

	Low	BTM-2	BTM-3	BTM-4	BTM-5	BTM-6	BTM-7	BTM-8	BTM-9	High
	Panel A: Portfolios Formed on Book-to-Market									
Return	-0.036	-0.020	-0.017	-0.002	-0.006	-0.004	-0.011	0.000	-0.001	0.009
Beta	0.96	0.73	0.64	0.67	0.65	0.59	0.62	0.64	0.58	0.57
Ln(ME)	22.55	21.57	21.06	21.00	20.67	20.51	20.32	20.17	19.87	19.82
Ln(BE/ME	-1.53	-0.87	-0.61	-0.34	-0.24	-0.04	0.15	0.33	0.52	1.00
Ln(A/ME)	-0.44	0.09	0.29	0.56	0.58	0.78	0.92	1.13	1.33	1.82
Ln(A/BE)	1.06	0.96	0.89	0.90	0.83	0.82	0.77	0.80	0.81	0.83
E/P dummy	0.24	0.29	0.31	0.29	0.31	0.29	0.32	0.34	0.35	0.51
E(+)/P	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.05	0.03

	Negative	EP-2	EP-3	EP-4	EP-5	EP-6	EP-7	EP-8	EP-9	High
	Panel B: Portfolios Formed on Earnings-Price Ratio									
Return	0.003	-0.024	-0.010	-0.010	-0.007	-0.012	-0.024	-0.002	-0.004	-0.013
Beta	0.68	0.81	0.65	0.71	0.60	0.62	0.67	0.57	0.52	0.51
Ln(ME)	20.20	21.59	21.40	21.30	21.24	20.94	21.01	20.63	20.37	20.51
Ln(BE/ME)	0.26	-0.36	-0.43	-0.26	-0.42	-0.18	-0.17	0.02	0.08	-0.03
Ln(A/ME)	1.34	0.36	0.28	0.39	0.19	0.42	0.39	0.63	0.80	0.75
Ln(A/BE)	1.08	0.72	0.71	0.65	0.60	0.60	0.56	0.62	0.72	0.78
E/P dummy	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E(+)/P	0.00	0.02	0.03	0.03	0.03	0.04	0.05	0.05	0.06	0.16

Table 4
Time-series Average Slopes (p-value) from Month-by-Month Regressions of Cross-Section
of Stock Returns on Beta, Size, Book-to-Market Equity, Leverage, and Earnings/Price and Combination:
July 1992 to December 2002

Model	Beta	Ln(ME)	Ln(BE/ME)	Ln(A/ME)	Ln(A/BE)	E/P Dummy	E(+)/P
1	0.0042501 (0.1359)						
2		-0.001259 (0.5735)					
3			0.0135987 (0.0001)***				
4				0.0136977 (0.0002)***	-0.025158 (0.0001)***		
5						0.0726879 (0.2878)	-0.004975 (0.5491)
6	0.0070183 (0.0154)***		0.0144977 (0.0001)***				
7		0.0049064 (0.0684)**	0.0205614 (0.0001)***				
8			0.148128 (0.0001)***			-0.059202 (0.3046)	-0.011113 (0.1794)
9	0.005689 (0.0413)**	0.0045045 (0.0937)*	0.0206281 (0.0001)***				

Note: * shows significance level at 10%
        ** shows significance level at 5%
        *** shows significance level at 1%

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