Stock Trading Strategy Based on Historical Financial Ratios

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Abstract

This paper focuses on using historical financial ratios to form stock portfolios that would outperform the SET returns during 2002 to 2005. Each observation is assigned binary score based on its six major financial ratios for the most recent year and changes from the previous year. In addition, total observations are divided by price-to-book ratio and market capitalization in order to explore which group is the most appropriate for the proposed strategy. The market-adjusted return is quantified one day after earning announcement date of each observation. The results show that this short-term strategy can provide significant positive market-adjusted returns and the returns can be increased if it is applied to high price-to-book ratio with small market capitalization stocks.

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INTRODUCTION

Consistent with market efficiency hypothesis formulated by Eugene Fama in 1970, we cannot use both historical and publicly available information to beat the market if it is weak-form and semi-strong-form efficient, respectively. If the market is really efficient, this theory implies that no trading strategy can be solely constructed from accounting information. However, financial ratios are considered to be one of the most important accounting information for stock fundamental analysis. Therefore, my research question is whether financial ratios can signal returns in Thai stock market. Specifically, does it provide significant excess returns or just serve as a tools for explaining past performance of the firm?

In academic field, some may suggest that market can be beaten if intrinsic value is accurately estimated. In order to find the intrinsic value of the firm, we might use some well-known models such as dividend discount model or residual income model. However, these two techniques rely on many assumptions and many of those assumptions heavily rely on expectation such as future earnings, future dividend policy and so on. Consequently, if those expectations are violated, the intrinsic value derived from the model would have a weak power for identifying underpriced or overpriced stock. If this is the case, why can't we just use some key financial ratios to signal the underpriced and overpriced stocks?

From previous literature, book-to-market ratio has been extensively used as a key ratio in order to separate winners and losers in stock markets. This ratio is proven to have an impact on stock returns since it represents firm's accounting value relative to market value. Fama and French (1992) and Piotroski (2000) document that stocks with high book-to-market ratio can provide higher returns than those with low book-to-market ratio in the U.S. stock market. However, the relationship between book-to-market ratio and returns is different across the markets. According to Chen and Zhang (1998), in the U.S., Japan, Hong Kong and Malaysia, stocks with high book-to-market ratio experience higher returns than stocks with low book-to-market ratio. However, this relationship is not observed in Taiwan and Thailand.

Piotroski (2000) observes that although high book-to-market firms earn high future returns on average, those high returns came from a few firms. Therefore, a

group of high book-to-market ratio stocks is ranked by the binary score from financial ratios. He indicates that a simple strategy of separating winners from losers by using basic financial ratios has the ability to earn large abnormal returns in the future. In addition, this strategy is even more successful for small (market-cap) stocks. From these findings, my inspiration is to apply this concept with Thai stock market.

The main objective of this paper is to examine whether separating stocks by the price-to-book ratio and financial ratio analysis can generate significant positive excess returns. The second objective is to test whether the firm size has an impact on the returns from the strategy. The last objective is to develop a tool kit for investors to create portfolio that will potentially outperform the market. The execution is made one working day after the earnings announcement date of each firm. Then, the excess returns which are the differences between stock returns and market returns from two-day to one-month holding period are measured.

LITERATURE REVIEW

If stock prices have a lag time in response to public available information, a stock selection strategy based on historical information can be formed. Therefore, this paper applies financial statement analysis in designing profitable trading strategy based solely on key financial ratios in different aspects.

Book-to-Market Effect

Book-to-Market ratio is a financial ratio that evaluates the value of a company by comparing the book value to its market value. Book value of equity represents the portion of a company held by the stakeholders or simply the difference between total assets and total liabilities of a company obtained from the balance sheet. Market value is determined in the stock market through its market capitalization by multiplying stock price with number of shares outstanding of each company. Basically, the book-to-market ratio attempts to identify undervalued or overvalued securities by taking the book value and dividing it by market value. Many practitioners and academics commonly classify stocks with high book-to-market ratio as value stock whilst growth stock stands for stock with low book-to-market ratio. In this paper, price-to-book ratio which is the reverse of book-to-market ratio is employed instead of book-to-market ratio since it is more common and is frequently used by stock analysts and investors. It also can be used in line with price-to-earnings or price-to-sales.

The book-to-market effect has been demonstrated in a considerable of research in finance, accounting, economics and portfolio management. They show that book-to-market ratio of a firm is strongly positively correlated to future stock performance in the U.S. stock market e.g. Rosenberg, Reid and Lanstein (1984); Fama and French (1992); Lakonishok, Shleifer and Vishny (1994); and Piotroski (2000). In Fama and French (1992), they find that the variation of cross-sectional stock returns can be captured by two firms' characteristics which are firm size and book-to-market ratio. They suggest that book-to-market ratio may act as a proxy for bankruptcy risk and firm size may act as a proxy for liquidity risk. On average, small firms have lower trading volume and wider bid-ask spread as compared to large firms. Therefore, investing in small firms leads to higher liquidity risks. This additional risk is compensated by higher returns. Firms with higher book-to-market ratio are likely to have higher bankruptcy risk. A high ratio of book-to-market says that the market judges the prospects of a firm to be poor relative to firms with low book-to-market, thus book-to-market ratio may capture the relative-distress effect. As a result, high book-to-market firms earn excess returns in compensation for their greater risk. Chan, Hamao, and Lakonishok (1990) explore the impact of cash flow yield, dividend yield, earnings-to-price and book-to-market ratio on stock returns and conclude that the book-to-market ratio plays an important role in explaining the cross-sectional variation of stock returns in the Japanese market. Also, this ratio is the most prevailing fundamental variable among other variables observed.

Chen and Zhang (1998) have explored the relationship between book-to-market ratio and stock returns from both developed and emerging markets in the sample period of July 1970 to December 1993. In the U.S., Japan, Hong Kong and Malaysia, book-to-market ratio is positively correlated to returns. However, this relationship is not observed in Taiwan and Thailand which are emerging markets. In other words, higher return for stocks with high book-to-market ratio is absent. These findings are consistent with Chui and Wei (1998) who conclude that in Hong Kong, Korea and Malaysia, there exist a positive relationship between book-to-market ratio and stock returns while book-to-market and returns are negatively correlated in Taiwan and Thailand stock market. The sample period of their study is different across countries, for example, the sample period for Thai market is in 1984 to 1993 while the period between 1977 and 1993 is applied for Taiwan market. Many

literatures have focused on the relationship of book-to-market ratio and returns from emerging markets. Negative relationship is found in China and Turkey according to Drew, Naughton and Veeraraghavan (2003) and Gonenc and Karan (2001), respectively.

Size Effect

In examining the size effect to the stock market, the market capitalization has come in place. Chan and Chen (1991) summarize that small firms do indeed represent riskier investments justifying higher expected returns. Chan, Hamao, and Lakonishok (1990) also confirm the existence of the size effect stating that small firms tend to outperform larger firms, after adjusting for market risk and the other fundamental variables. Berk (1995 and 1997) provides a theoretical explanation for the relationship between stock returns and firm size. He claims that size is always inversely related to expected returns, since stocks with high expected returns also have high discount rates which, in turn, automatically cause lower market values. Along with Vassalou and Xing (2004), they propose that, since smaller firms suffer from financial distress, they are expected to experience higher stock returns.

Financial Statement Analysis

Many papers have examined the usefulness of using financial statements in predicting future stock returns among countries. Ou and Penman (1989) employ certain financial ratios which are calculated based on historical financial statements in forecasting future changes in company's earnings. Although, those ratios have been used solely as the explanatory variables, they do not provide conceptual explanations for each ratio and its changes from one period to the next. To avoid over-fitting the data, Lev and Thiagarajan (1993) analyze 12 financial signals that are frequently used by financial analysts and show that these signals are directly correlated to stock returns. Since the market may not completely impound value-relevant information in a timely manner, Abarbanell and Bushee (1997) investigate the ability of Lev and Thiagarajan. Abarbanell and Bushee show that developing an investment strategy based on these signals earn significant abnormal returns. There has also been a considerable research focused on above-the-market returns that can be earned from certain financial signals. This direct evidence of a relation between financial signals

and future earnings suggests that the observed association between returns and the fundamental signals reflect the ability of signal to predict value-relevant information.

In contrast, Mohanram (2004) applies the tools of financial statement analysis to develop an investment strategy for low book-to-market firms or growth firms. In other words, he would like to examine whether the fundamentals driven strategy can generate excess returns. The results indicate that the growth oriented fundamental strategy is able to strongly differentiate between future winners and losers. Firms with high score (6 to 8) earn substantially higher size-adjusted returns than firms with low score (0 to 1).

RESEARCH METHODOLOGY

Data: Sample Selection

The final sample consists of 195 stocks listed in the Stock Exchange of Thailand (SET) during 2000-2005. The sample is intended to filter stocks in the financial sector because financial institution including bank, securities and brokerage firm, and insurance company needs different framework and concept in order to analyze its financial statement and its financial ratios. The period of 2000-2005 is being analyzed so that I can get the latest data and avoid market crash during 1997 Asian Financial Crisis. Their earnings announcement dates over the 2000-2005 are available on Bloomberg and Securities and Exchange Commission, Thailand (SEC).

Table 1 describes two main sources for stock deduction which are stocks in financial sector and stock whose announcement date is not available for every fiscal year. According to SET official website, there are 473 stocks listed in the SET with 67 stocks in financial sector as of 2007. Therefore, number of non-financial stocks is 406. For non-financial stocks that are selected as the sample, they have to be listed prior to 2000 and their financial statement announcement dates for every fiscal year from 2000 to 2005 are available. Consequently, there are 195 stocks in my sample.

Table 1: Number of total stocks and sample stocks

All listed stocks in SET	**473**
Less Financial Sector	67
Non-financial stock	**406**
Less Announcement date unavailability	211
Sample stock	**195**

Table 2 represents total number and sample of stocks in each sector. In addition, % coverage which is number of sample stocks divided by number of total stocks is also presented. In general, my study covers 48.03% of total non-financial stocks.

Table 2: Number of total stocks and sample stocks by industry/sector

Industry / Sector	Total	Sample	% Coverage
Agro & Food Industry / Agribusiness	21	16	76.19%
Agro & Food Industry / Food and Beverage	26	13	50.00%
Consumer Products / Fashion	27	15	55.56%
Consumer Products / Home & Office Products	12	10	83.33%
Consumer Products / Personal Products & Pharmaceuticals	6	2	33.33%
Industrials / Automotive	20	5	25.00%
Industrials / Industrial Materials & Machinery	21	5	23.81%
Industrials / Packaging	13	7	53.85%
Industrials / Paper & Printing Materials	3	0	0.00%
Industrials / Petrochemicals & Chemicals	13	6	46.15%
Property & Construction / Construction Materials	29	12	41.38%
Property & Construction / Property Development	67	31	46.27%
Resources / Energy & Utilities	23	10	43.48%
Resources / Mining	1	1	100.00%
Services / Commerce	15	10	66.67%
Services / Health Care Services	14	7	50.00%
Services / Media & Publishing	26	12	46.15%
Services / Professional Services	2	0	0.00%
Services / Tourism & Leisure	16	12	75.00%
Services / Transportation & Logistics	14	9	64.29%
Technology / Information & Communication Technology	25	10	40.00%
Technology / Electronic Components	12	2	16.67%
Total	**406**	**195**	**48.03%**

Historical financial statement data and its historical price of all selected firms are extracted from Datastream. For each firm, the price-to-book (PB) ratio, which is the reverse of book-to-market ratio, is calculated by using the figures on an announcement date. PB ratio is used as a filter since it compares the market's valuation of a company to the value as indicated on its financial statements. All observations are filtered by its PB of 1 which is approximately the median of all stocks. Besides, the calculation of ROE ratio will not be applied for firms with negative equity but other ratios are typically computed and delisting firms are also disqualified since they do not have sufficient data to form the strategy.

Assigning the size for each observation has an objective to examine whether size of the company has an impact on return from the portfolio selection strategy. In

practice, firm size is one of the factors that affect the stock returns as suggested by Fama and French (1995) and many other research such as Chan and Chen (1988 and 1991), Berk (1995 and 1997), and Vassalou and Xing (2004). In most studies, small stock usually outperforms large stock in terms of higher excess returns. Therefore, all selected firms will be divided into two subgroups based on the market capitalization of 2 billion baht. This cut-off level is approximately the median of all stocks based on 31-Dec-2005 data obtained from SETSMART. In addition, major group of investor for each size is different because institutional investors usually prefer large-cap stock while retail investors normally prefer small-cap stock that is much riskier.

Data: Calculation of Returns

The firm-specific returns are measured from Datastream adjusted price (adjustment of dividend payout and stock split) for various investment horizons starting from the following day after each announcement date, in order to ensure that all financial information is publicly available, through two to thirty subsequent days (step up by 2 days). The market returns are computed by using SET total return index provided by Stock Exchange of Thailand. Both firm-specific returns and market returns are calculated by employing exponential methodology. Therefore the market-adjusted return or excess return which is the returns over the SET index is calculated by subtracting the firm-specific return by the market return of each investment horizon. Only gross continuous return is measured. In other words, transaction cost is not taken into account.

Hypothesis 1: Portfolio formed on a set of financial ratios can outperform the market.

Applying financial statement analysis to separate winners from losers, the strategy would rely entirely on publicly available fundamental information. Firstly I screen all firms by the price-to-book (PB) ratio which is calculated book value per share of shareholders' equity divided by closing price on the announcement date. This ratio compares the market's valuation of a company to the value indicated on its financial statements. More precisely, stocks with PB greater than 1.00 are qualified for the test. In other words, stocks whose market value is greater than book value are selected. Then, I compute a set of financial ratios for each selected company from audited financial statements. This methodology is similar to Piotroski (2000) who

applies financial ratio analysis to high book-to-market quantile US stocks. The major differences from my methodology are that I apply financial ratio analysis to both high and low PB ratio stocks since there are many research which conclude that high book-to-market is a good signal for positive market-adjusted returns in US market but this relationship is unclear in Thai market.

The second difference is related to a set of financial ratios being used. Piotroski employs 8 financial ratios which are ROA, dROA (change in ROA), dMargin (change in gross profit margin), CFO/total assets, dLIQUID (change in current ratio), dLever (change in debt-to-assets), dTurn (change in asset turnover ratio) and Accrual (net income before extraordinary item less CFO / total assets). This study uses the ratios that are more frequently used by Thai stock analysts and investors. Moreover, I apply both level and change for all of 6 ratios. Such ratios are easy to understand and interpret. The selected financial ratios are divided into three major perspectives[1];

1. Profitability: ROE, dROE, CFS and dCFS
2. Leverage and Liquidity: CR, dCR, DE, dDE, TIE, and dTIE
3. Operating Efficiency: TATO, and dTATO

Each ratio is scored either zero or one by its own criteria which are

1. Profitability: Since profitability is the net result of a number of policies and decisions, these ratios, *ROE and CFO*, would aim to measure firm's ability to generate fund within the firm.

    1.1 ROE or Return on Equity: I define ROE as income before extraordinary items divided by the average shareholders' equity. ROE reveals the overall profitability of the firm by estimating how much profit a company can generate with the money that shareholders have invested in it. If firm's ROE is greater than 10%, I would define the ROE indicator equal to one and zero otherwise. The criterion of 10% is used because of two reasons. The first reason is that it is approximately equal to the mean value of cost of equity from Capital Asset Pricing Model given the risk free rate of 3.6%, expected market risk premium of 6.4%[2] and expected beta of 1. The risk

[1] Note that d represents the changes in each ratio on year-to-year (YOY) basis.

[2] Source: http;//pages.stern.nyu.edu/~adamodar/New_Home_Page/datagile/ctryprem.html

free rate of 3.5% is from 1-month Treasury bill as at May 2007 since my strategy is considered as short term strategy within 1 month. The second one is about the psychological impact of double digit. In addition, firms with negative equity would have a score of zero regardless the level of net income otherwise positive ROE might be due to the fact that both net income and average equity are negative.

1.2 CFO/Sales or Cash Flow from Operation/Sales (CFS): CFS is the cash flow resulted from operations scaled by sales. If firm's CFS is greater than 20%, I define the CFS indicator equal to one, zero otherwise. This threshold is equivalent to the 80^{th} percentile from total observations.

2. Financial leverage and Liquidity: Decisions about the use of debt require firms to balance higher expected returns against an increasing in risk and failures to meet its obligation. Therefore, this group of ratios which contains *CR, DE, and TIE* would aim to reflect capital structure and short-term financing.

2.1 CR or Current Ratio: I define CR as current asset divided by current liabilities. In terms of short-term liquidity, Current Ratio represents the company's ability to meet its obligations by liquidating all current assets. If the ratio is greater than 1.00, it means that book value of all current assets is enough in order to repay the coming obligations and it would get the score of one, zero otherwise. In other words, if the firm's current asset can fully cover its current liability, a score is one.

2.2 DE or Debt-to-Equity Ratio: DE represents the capital structure of the company. More precisely, it indicates whether assets are financed by debt of equity. DE is the total interest-bearing debt divided by total shareholders' equity. I view an increasing (decreasing) in financial leverage as a negative (positive) signal. By raising external capital, a financially distressed firm is signaling its inability to generate sufficient internal funds (e.g., Myers and Majluf (1984) and Miller and Rock (1985)). Hence, I assign a score to DE indicator if it is less than 0.50 and vice versa. The criterion of 0.5 is used since it can be interpreted that the firm relies on equity financing more than two times of debt financing which is very secure.

2.3 TIE or Times Interest Earned: TIE is defined as earning before interest and taxes scaled by interest expenses. TIE can be a measurement of the company's potential to raise new debt. If firm's TIE is greater than 1.00, I would define the TIE indicator equal to one, zero otherwise. If the EBIT is greater than the interest expenses, a score will be granted. This can be interpreted that the company can generate enough earnings to cover its interest expenses. In addition, zero interest expenses would be replaced by the interest expenses of 1 baht in order to avoid an undefined result.

3. Operating Efficiency: Total Asset Turnover (TATO) ratio aims to measure the firm's efficiency to generate sale by using existing assets. The idea is that given the same amount of asset, the winner should generate higher sales volume. TATO or Total Asset Turnover: It is defined as sales divided by average total assets. This ratio represents the efficiency of using total assets to generate sales. Therefore, if TATO is greater than 1, it would get a score of one, zero otherwise. The criterion of 1 is selected from the 80th percentile from total observations.

Median of each ratio and the criteria for assigning binary score of each financial ratio (including its change) can be summarized in table 3.

Table 3: Criteria for assigning binary score and its median

Ratio	Criteria		d	Median
ROE	Greater than	10%	Positive	12.08%
CFS	Greater than	20%	Positive	10.41%
CR	Greater than	1.00	Positive	1.47
DE	Less than	0.50	Negative	0.85
TIE	Greater than	1.00	Positive	8.83
TATO	Greater than	1.00	Positive	0.86

After assigning the binary score by the criteria for each financial ratio, I aggregate the SCORE of each observation and turn it into a number (SCORE).

SCORE = ROE + dROE + CFS + dCFS + CR + dCR + DE + dDE + TIE + dTIE + TATO +dTATO

As SCORE consists of the scoring from six financial ratios and its changes on the year-on-year basis, the possible aggregated scores are in the range of zero to twelve. An investment decision is based on these twelve binary signals (SCORE) and

the stocks to be bought must have the total SCORE at least 7. In this paper, short-selling is not permitted since it is neither practical nor sensible for retail investors. Even for institutional investors, short-selling or share borrowing and lending transactions incur additional cost due to collateral, margin requirements, and interest expenses.

At the end of investment horizon, both market return and firm-specific return (r) are evaluated by continuously compounded formula: $r_{0,1} = ln\,(p_1/p_0)$. This formula is employed since the shape or the distribution of stock returns is assumed to be normal. Then, by definition, the market-adjusted return or excess return is the return over the market return or SET return which is the difference between the actual return and the market return at each investment horizon.

Testing the hypothesis 1 is simply to perform one-tailed t-test whether this cumulative excess returns of portfolios that have the total SCORE at least 7 for each holding period is significantly greater than zero given a 95% confidence level. If the null hypothesis is rejected, portfolio selection strategy based on financial ratios can give us significant positive cumulative excess return.

H_0: Mean of Cumulative Excess Returns ≤ 0

H_1: Mean of Cumulative Excess Returns > 0

The t-statistic is computed by $t = \frac{\bar{X}-\mu}{\sigma/\sqrt{n}}$

where $\bar{X}$ = Mean of Cumulative Excess Returns

$\mu = 0$

σ = Standard Deviation of Cumulative Excess Returns

n = Number of Observations

Hypothesis 2: The excess return is different across the firm size.

After acquiring such returns from hypothesis 1, the selected portfolios are divided into two subgroups based on the market capitalization of 2 billion baht. To test this hypothesis, I repeat the test as mentioned in first hypothesis to check whether the excess return of each group is significantly greater than zero or not. In addition, the returns from the strategy that are applied to each group are compared whether they are the same or not by performing the t-test. Briefly, if the mean of excess return of each group is relatively in the same level and the standard deviation of each group is

quite large, I conclude that there is no difference between the cumulative excess return obtained from each group. In other words, null hypothesis indicates that size of firm has no effect on the performance of this strategy.

H_0: Mean of Cumulative Excess Returns of Small Size Group = Mean of Cumulative Excess Returns of Large Size Group

H_1: Mean of Cumulative Excess Returns of Small Size Group ≠ Mean of Cumulative Excess Returns of Large Size Group

The t-statistic is computed by $t = \frac{\overline{X_s} - \overline{X_l}}{\sigma_p \sqrt{\left(\frac{1}{n_s} + \frac{1}{n_l}\right)}}$

where $\overline{X_s}$ = Mean of Cumulative Excess Returns for Small Size Group

$\overline{X_l}$ = Mean of Cumulative Excess Returns for Large Size Group

σ_p = Pooled Variance for Cumulative Excess Returns for both groups

n_s = Number of Observations for Small Size Group

n_l = Number of Observations for Large Size Group

The pooled variance is computed by $\sigma_p = \frac{(n_s - 1)(\sigma_s) + (n_l - 1)(\sigma_l)}{n_s + n_l - 2}$

where σ_s = Standard Deviation of Cumulative Excess Returns for Small Size Group

σ_l = Standard Deviation of Cumulative Excess Returns for Large Size Group

n_s = Number of Observations for Small Size Group

n_l = Number of Observations for Large Size Group

In order to compare the mean value of cumulative excess returns between two groups, the additional calculation for pooled variance is required. This method can be conducted if the stock returns are assumed to be normally distributed. If the mean of cumulative excess returns between two groups are largely different and the pooled or variance of the overall sample is small, we can conclude that these two groups have significantly different mean value. In other words, firm size has an effect on performance of the purposed strategy. If this is the case, we can identify whether small or large stock is more suitable for the strategy.

EMPIRICAL RESULTS

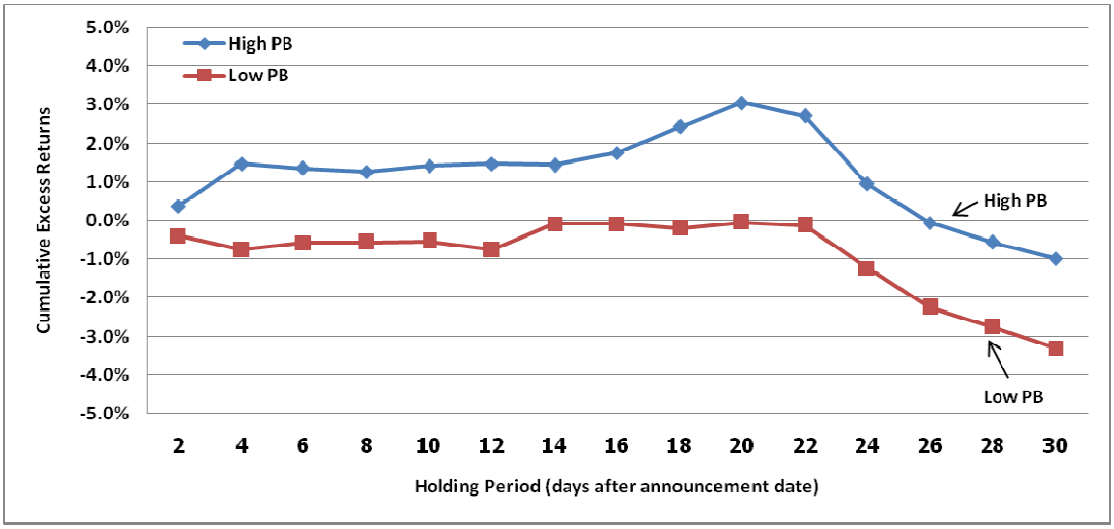
Before separating observations by PB ratio or firm size, financial ratio analysis is first applied to all 780 observations (195 firms in 4 years = 780 firm-years) in order to assess SCORE to each observation. Then 13 portfolios based on the SCORE are constructed and the equally-weighted average market-adjusted returns from 2 to 30 days holding period of each portfolio is measured. Table 4 represents number of observations and cumulative market-adjusted returns of each portfolio at the specified holding period. On average, market-adjusted returns is approximately 1.4% in 20 days holding period if financial analysis is not taken into consideration. However, the returns can be increased if high SCORE portfolios are selected. For example, market-adjusted returns of 4.4% can be achieved if the portfolio with SCORE of 9 is selected. As expected, portfolio with good fundamental factors represented by high SCORE can provide higher returns.

Table 4: Cumulative Excess Return for all observations

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	3	-0.8%	-4.6%	-3.5%	-3.2%	-2.0%	-1.1%	1.1%	-0.3%	2.0%	0.9%	8.8%	6.4%	2.8%	4.6%	4.5%
1	10	0.4%	-0.3%	-2.7%	-3.1%	-2.7%	-1.7%	-5.8%	-5.9%	-5.0%	-5.7%	-7.3%	-7.7%	-7.1%	-7.1%	-6.4%
2	31	-0.5%	-0.6%	-0.7%	-0.8%	-0.5%	-0.5%	-0.5%	0.2%	0.3%	0.8%	1.7%	0.0%	-1.3%	-0.5%	-0.4%
3	56	0.0%	0.0%	-0.7%	-1.7%	-2.2%	-2.2%	-2.2%	-1.9%	-0.8%	-0.4%	-1.0%	-1.6%	-2.3%	-2.3%	-1.3%
4	80	0.9%	0.7%	1.1%	0.5%	0.4%	0.6%	0.5%	1.0%	1.0%	1.6%	2.1%	0.5%	-0.6%	-2.0%	-3.4%
5	89	-0.5%	-0.6%	-0.6%	-0.5%	-0.3%	-0.5%	0.0%	-0.3%	-0.3%	0.1%	-0.2%	-2.4%	-3.4%	-4.4%	-5.1%
6	98	0.0%	-0.2%	0.1%	0.1%	0.2%	0.1%	-0.5%	-0.4%	0.0%	0.9%	0.4%	-1.4%	-2.0%	-2.3%	-2.4%
7	126	-0.1%	-0.1%	-0.6%	-0.6%	-0.4%	-1.1%	1.1%	1.3%	1.6%	1.4%	1.4%	0.3%	-1.1%	-1.4%	-1.8%
8	148	0.0%	0.1%	0.3%	0.6%	0.7%	0.8%	0.9%	1.4%	1.3%	1.7%	1.0%	-0.3%	-1.1%	-1.7%	-2.2%
9	93	-0.5%	1.9%	2.8%	2.9%	3.0%	3.1%	3.6%	3.3%	3.7%	4.4%	4.1%	2.7%	1.7%	1.2%	0.5%
10	39	0.3%	1.6%	1.6%	2.1%	2.2%	1.8%	1.3%	1.2%	1.4%	1.2%	1.3%	0.2%	-0.8%	-1.3%	-2.9%
11	6	0.3%	3.3%	2.6%	0.8%	0.9%	1.9%	5.0%	2.8%	1.9%	1.7%	2.6%	1.4%	-0.1%	-2.3%	-2.8%
12	1	-0.3%	-1.0%	0.0%	4.0%	4.2%	4.3%	4.8%	4.7%	6.1%	6.4%	7.1%	8.3%	4.6%	4.6%	6.2%
Total	**780**	**0.0%**	**0.3%**	**0.3%**	**0.3%**	**0.4%**	**0.3%**	**0.6%**	**0.8%**	**1.0%**	**1.4%**	**1.2%**	**-0.2%**	**-1.2%**	**-1.7%**	**-2.2%**

Next, the power of PB ratio would be analyzed in order to answer the controversial argument of the PB ratio in Thai stock market. More precisely, this would try to pinpoint whether high PB or low PB is a good signal for winners. From total observation of 780 firm-years, stocks are divided into two groups with the price-to-book ratio of 1.00 as criterion. High PB group consists of 359 observations or 46% of total sample while low PB group contains 421 observations or 54%.

Figure 1: Average Cumulative Excess Returns of High PB and Low PB



According to figure 1, stocks with high PB ratio generate higher cumulative excess returns than stocks with low PB ratio in every holding period as expected. The highest level of returns of 3% is located in the holding period of 20 to 22 days after portfolio formation or after the announcement date of financial statement and decline significantly after 22 days. Noticeably, all stocks, both high PB and low PB, have the similar pattern in explaining cumulative excess returns since, on average, stock prices positively respond to earnings announcement. This response is quite minimal during the first two to three weeks and the positive excess returns accumulate sharply from 14 days holding period to the peak level of 20 days holding period. Then, this positive excess returns disappear after 26 days holding period.

By assigning the binary score for each observation in high PB group based on its criteria of each financial ratio, 13 portfolios with different SCORE ranging from 0 to 12 can be constructed. Zero SCORE means that none criterion is met whereas twelve SCORE signifies that the stocks are qualified for all criteria.

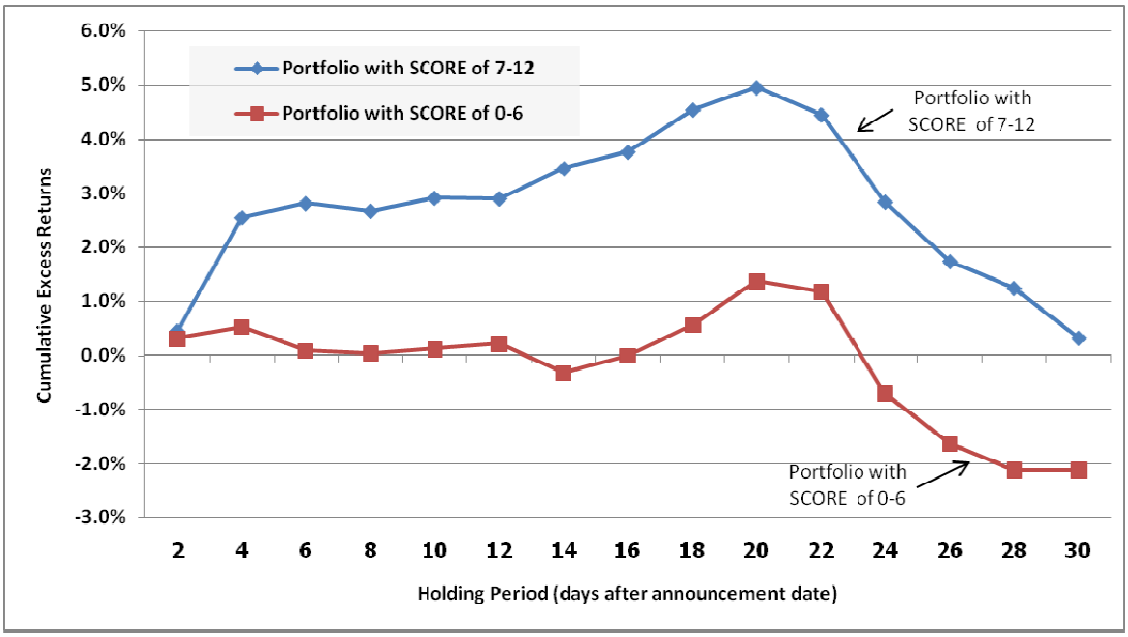
Table 5: Cumulative Excess Return for High PB Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	1	0.1%	-7.6%	-7.5%	-6.7%	-7.5%	0.9%	5.5%	3.5%	8.5%	4.9%	28.0%	24.3%	18.3%	24.2%	24.0%
1	7	-0.4%	-0.6%	-3.8%	-3.8%	-4.1%	-1.9%	-7.3%	-7.4%	-6.4%	-6.0%	-8.8%	-10.4%	-9.3%	-8.5%	-7.1%
2	21	0.5%	0.1%	0.2%	0.6%	1.0%	1.5%	1.2%	2.2%	2.6%	3.4%	4.2%	2.6%	2.1%	2.5%	3.1%
3	26	0.5%	0.8%	-1.1%	-2.4%	-2.4%	-1.9%	-2.2%	-2.5%	0.0%	0.2%	-0.7%	-1.8%	-2.8%	-3.9%	-2.1%
4	46	1.0%	1.1%	1.7%	1.4%	1.2%	1.4%	0.8%	1.5%	1.5%	2.4%	3.0%	2.1%	0.7%	-0.2%	-1.4%
5	47	0.3%	1.1%	0.6%	0.7%	1.1%	0.5%	0.5%	1.1%	1.2%	2.1%	1.4%	-1.3%	-1.9%	-3.2%	-3.3%
6	43	-0.5%	-0.3%	-0.8%	-0.2%	-0.2%	-0.4%	-1.1%	-1.3%	-0.8%	0.4%	-0.5%	-2.9%	-4.2%	-3.8%	-4.1%
7	52	0.1%	0.8%	0.2%	-0.3%	-0.6%	-0.8%	-0.3%	0.4%	1.6%	1.2%	0.9%	-0.5%	-1.6%	-1.7%	-2.6%
8	71	0.6%	0.9%	0.9%	1.1%	1.7%	2.1%	2.5%	3.0%	3.6%	4.4%	3.8%	2.0%	1.0%	0.2%	-0.6%
9	27	0.2%	9.0%	11.6%	11.3%	11.6%	11.1%	12.9%	12.2%	13.0%	14.2%	12.9%	11.5%	10.2%	9.6%	8.7%
10	16	0.9%	4.2%	4.7%	4.9%	4.5%	4.5%	3.1%	3.3%	4.2%	4.1%	4.0%	2.9%	1.8%	1.2%	-0.3%
11	2	6.4%	7.1%	3.6%	2.6%	4.5%	3.8%	11.2%	6.3%	3.6%	4.5%	7.7%	3.0%	2.0%	0.8%	-1.2%
12	0															
Total	**359**	**0.4%**	**1.5%**	**1.4%**	**1.3%**	**1.4%**	**1.5%**	**1.4%**	**1.8%**	**2.4%**	**3.0%**	**2.7%**	**1.0%**	**-0.1%**	**-0.6%**	**-1.0%**

According to table 5, portfolios with high SCORE obviously generate higher cumulative excess returns than those portfolios with low SCORE and the highest cumulative excess return is concentrated on 20-22 holding period. For example, portfolio with the SCORE of 9 which contains 27 observations can generate positive cumulative excess returns of 14.2% for the holding period of 20 days. The strategy that taking a long position in high PB group can generate satisfied result in terms of superior cumulative excess returns for 20 days or Thai stock market can be beaten in terms of market-adjusted returns.

This finding can be viewed as the initial signal supporting that high PB is a good signal for Thai stock market. Therefore this paper mainly focuses on the benefit of financial statement analysis accompanied within this high PB group.

Figure 2: Average Cumulative Excess Returns of High PB with SCORE of 7-12 and SCORE of 0-6

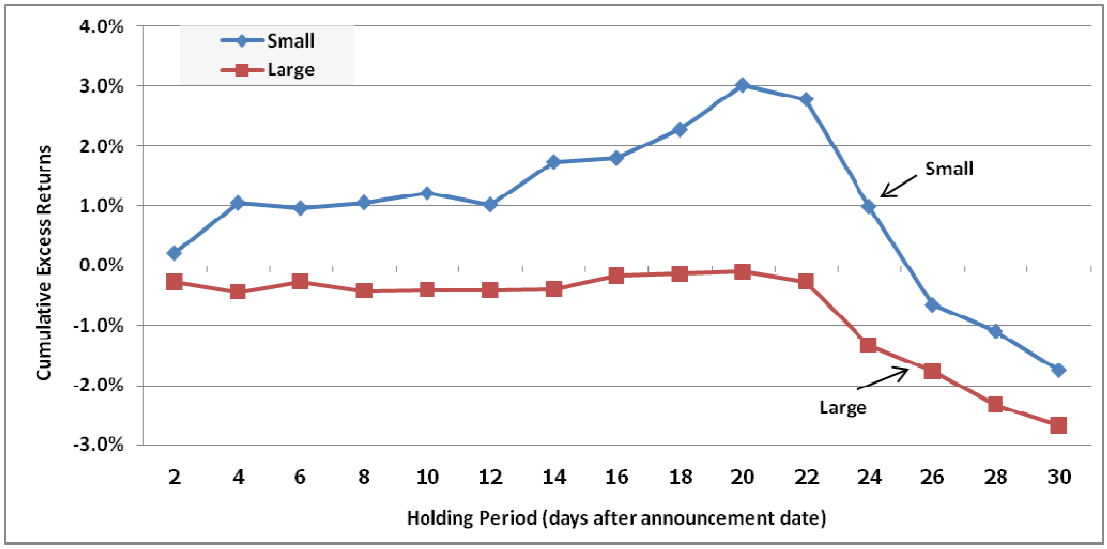


In order to examine whether good fundamental features affect the stocks return in Thai stock market, those 13 portfolios are divided into two portfolio groups by their SCORE. Not surprisingly, portfolio group with SCORE of 7-12 can substantially outperform portfolio group with SCORE of 0-6. This finding is represented in figure 2 and it also corresponds to fundamental factors that firms with good financial ratios should outperform those firms with poor ratios. Starting from the same level of 0.4% on 2 days holding period, the cumulative excess returns from these two groups gradually widen. The trend for cumulative excess returns for portfolio with SCORE of 7-12 is upward sloping in the first 20 days holding period, while the line for portfolio with SCORE of 0-6 is relatively flat and clustered around zero. After the 20 days holding period, the cumulative excess returns for both groups are gradually weaken and vanished. Nevertheless, holding period of 20 days still presents the highest returns for both high and low SCORE. These highest returns of high and low SCORE group are 5.0% and 1.4%, respectively.

From previous results, PB ratio is considered to be a good variable in screening stocks. High PB group outperform low PB group. Subsequently, the size effect in Thai stock market is explored in the same fashion. More precisely, the samples are divided into two groups by their market capitalization. The cut-off level is

2 billion. The objective is to examine whether the firm size can be used as another variable in explaining stock returns or in stock screening.

Figure 3: Average Cumulative Excess Returns of Small and Large Size Stocks



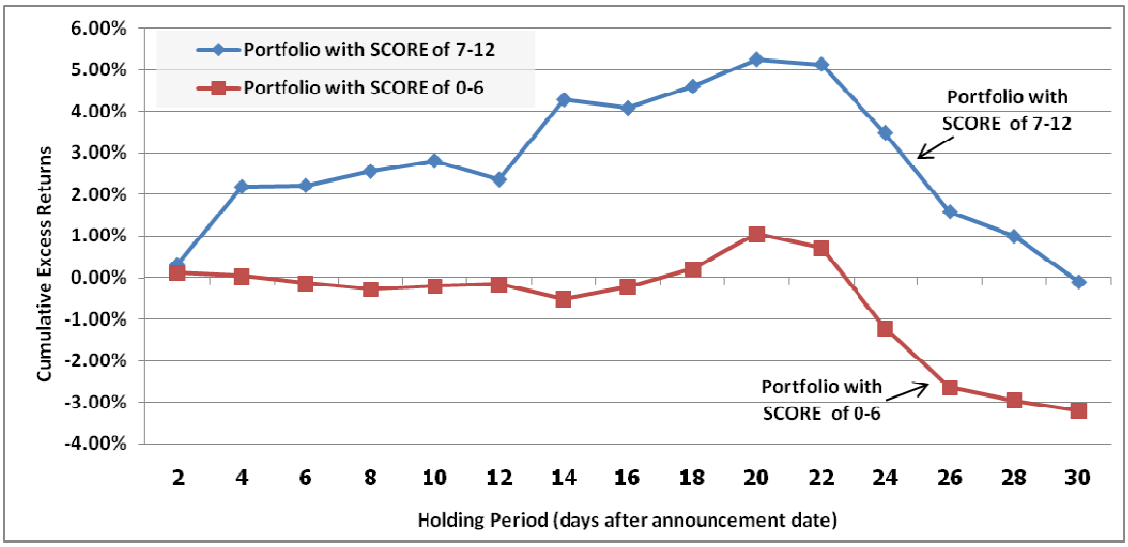
From figure 3, small firms have higher excess returns compared to large firms. The different between these two groups are largest in the holding period of 20 days. More precisely, the cumulative excess returns of small and large groups are 3.0% and -0.1%, respectively. However, this gap is eliminated after holding period of 26 days and evaporated at 30 day holding period.

Table 6: Cumulative Excess Return for Small Size Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	3	-0.8%	-4.6%	-3.5%	-3.2%	-2.0%	-1.1%	1.1%	-0.3%	2.0%	0.9%	8.8%	6.4%	2.8%	4.6%	4.5%
1	7	0.1%	-1.9%	-4.8%	-5.7%	-4.7%	-3.7%	-9.1%	-8.7%	-9.0%	-10.8%	-13.5%	-15.4%	-14.8%	-14.5%	-13.4%
2	23	-0.4%	-0.5%	-0.5%	-0.5%	-0.1%	0.3%	-0.1%	1.2%	0.9%	1.7%	2.6%	0.5%	-1.2%	-0.1%	0.1%
3	35	-0.3%	-0.3%	-1.5%	-2.9%	-3.3%	-3.3%	-3.2%	-2.9%	-1.1%	-0.8%	-1.4%	-2.7%	-3.6%	-3.4%	-2.1%
4	43	1.2%	1.3%	2.1%	1.6%	1.3%	1.1%	-0.1%	0.3%	0.4%	1.3%	1.0%	-0.5%	-2.6%	-3.3%	-4.7%
5	48	0.0%	-0.1%	-0.4%	0.2%	0.8%	0.7%	1.2%	1.0%	1.1%	2.2%	1.8%	-1.4%	-2.7%	-3.8%	-4.4%
6	36	-0.2%	0.2%	0.3%	0.8%	0.7%	0.6%	0.6%	0.8%	1.3%	2.8%	1.9%	0.5%	-0.6%	-1.2%	-1.7%
7	52	0.6%	0.6%	-0.7%	-0.4%	-0.2%	-1.5%	4.1%	4.3%	4.5%	4.5%	4.8%	3.2%	0.7%	0.9%	0.2%
8	57	0.7%	0.8%	0.8%	1.3%	1.8%	2.1%	1.9%	1.9%	2.8%	3.8%	2.8%	0.7%	-0.9%	-2.0%	-3.2%
9	41	-0.7%	5.4%	6.9%	7.5%	7.6%	7.4%	8.6%	7.6%	7.9%	9.2%	9.8%	8.2%	6.5%	6.0%	4.9%
10	20	0.7%	3.1%	3.5%	3.7%	3.6%	2.8%	2.1%	2.2%	2.8%	2.7%	2.6%	1.9%	0.4%	-0.4%	-2.6%
11	2	0.6%	9.5%	7.7%	0.7%	2.5%	3.3%	12.3%	8.1%	6.7%	9.7%	8.7%	6.1%	2.9%	-1.2%	-1.8%
12	1	-0.3%	-1.0%	0.0%	4.0%	4.2%	4.3%	4.8%	4.7%	6.1%	6.4%	7.1%	8.3%	4.6%	4.6%	6.2%
Total	**368**	**0.2%**	**1.0%**	**1.0%**	**1.1%**	**1.2%**	**1.0%**	**1.7%**	**1.8%**	**2.3%**	**3.0%**	**2.8%**	**1.0%**	**-0.7%**	**-1.1%**	**-1.7%**

Small size group contains 368 observations or 47% of total sample whereas 53% of total observations are within the large size group. Number of days that reaches the supreme cumulative excess returns is located at 22 days holding period of 9.8% with SCORE of 9. Overall, the average cumulative excess returns is positively driving from 0.2% to 3.0% until 20 days of investment horizon. Then it sharply declines after 22 holding period and turns out to be negative at -1.7%. Compared to the large size group, those cumulative abnormal returns are, on average, quite flat and depressing and the worst one is still after 20 holding periods. If this small size stocks are divided by the SCORE, figure 4 is constructed in order to check whether fundamental scoring can generate higher cumulative excess returns.

Figure 4: Average Cumulative Excess Returns of Small stocks with SCORE of 7-12 and SCORE of 0-6

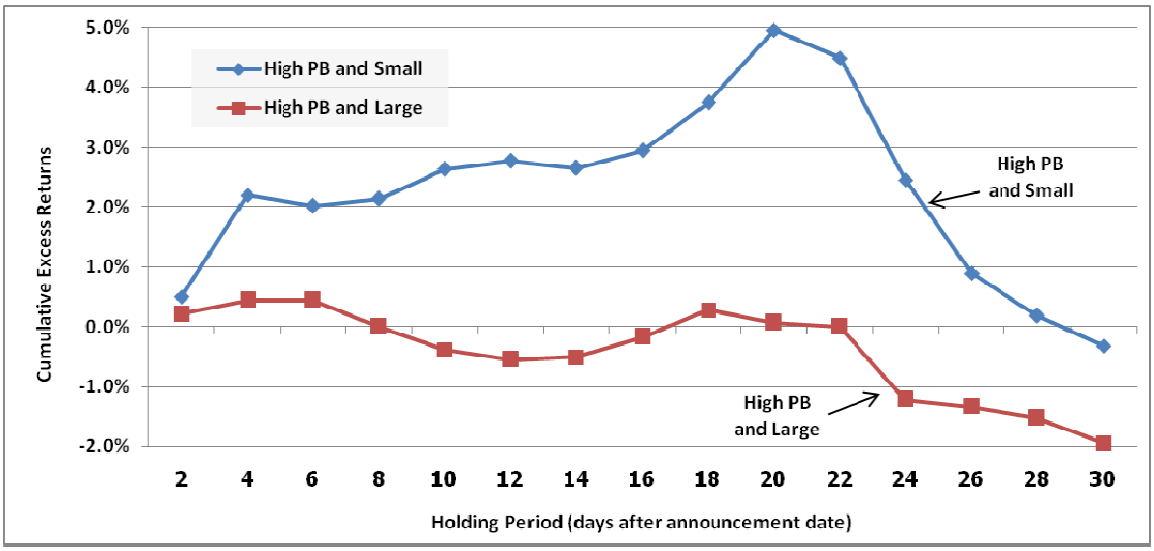


Within small size firms or firms with market capitalization less than 2 billion baht, Figure 4 can guarantee that good fundamental stock or portfolio with SCORE of 7-12 can provide higher excess returns compared to portfolio with SCORE of 0-6. This gap is relatively constant throughout all holding periods.

Subsequently, I investigate how to improve those cumulative excess returns given the previous findings which show that high PB and small size are good factors in determining positive cumulative excess returns. As a result, stocks with high PB ratio are divided into 2 subgroups; high PB with small size group and high PB with large size group. For high PB with small size group, the cumulative excess returns are substantially higher when compared to the high PB with large size group. In addition,

holding period of 20-22 days are still the best period in terms of highest cumulative excess returns.

Figure 5: Overall Cumulative Excess Returns for High PB Group with Small and Large Size



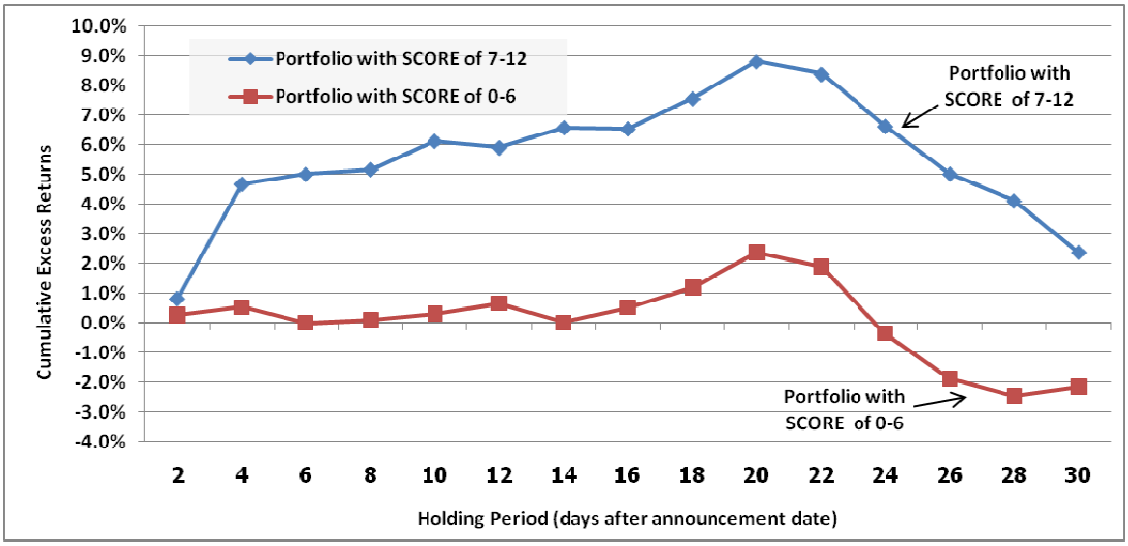
Within the high PB and small size group, high SCORE portfolios generate superior cumulative excess returns. The increase in returns exists due to the fact that small and large firms attract different group of investors. An institutional investor such as a fund manager who benchmarks his investment with the SET index returns may focus mainly on large firms. Typically, he uses an earnings forecast in order to make a decision rather than waiting for the audited financial statement. Therefore, the cumulative excess returns after announcement date of high PB with large size is relatively flat and even negative. In contrast, small firm with higher risk usually attracts retail investors who are more sensitive to financial statement announcement. As a result, the benefit from financial statement analysis is concentrated in small firms rather than large firms.

Table 7: Cumulative Excess Return for High PB with Small Size group

Score	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	1	0.1%	-7.6%	-7.5%	-6.7%	-7.5%	0.9%	5.5%	3.5%	8.5%	4.9%	28.0%	24.3%	18.3%	24.2%	24.0%
1	4	-1.5%	-3.7%	-8.3%	-8.8%	-8.8%	-5.6%	-14.2%	-13.4%	-14.4%	-15.2%	-20.7%	-25.8%	-24.6%	-22.6%	-19.9%
2	16	0.8%	0.7%	1.0%	1.5%	2.4%	3.5%	2.6%	4.0%	3.9%	5.0%	6.0%	3.9%	2.5%	3.2%	4.3%
3	23	-0.1%	0.1%	-2.1%	-3.0%	-2.8%	-2.2%	-2.2%	-2.6%	0.4%	0.4%	-0.2%	-1.4%	-2.4%	-3.5%	-1.3%
4	32	0.8%	0.9%	1.7%	1.6%	1.4%	1.8%	0.6%	1.3%	1.3%	2.5%	2.1%	0.7%	-1.7%	-2.4%	-3.2%
5	32	0.5%	1.1%	0.6%	1.0%	1.5%	1.0%	1.4%	2.1%	2.3%	3.8%	2.8%	-0.8%	-1.8%	-3.4%	-3.2%
6	22	-0.4%	0.7%	0.0%	0.7%	0.8%	0.6%	0.0%	0.3%	0.9%	3.5%	2.5%	0.3%	-1.7%	-1.7%	-2.5%
7	26	0.3%	1.0%	-0.3%	0.0%	0.6%	-0.5%	0.2%	1.3%	2.1%	1.9%	1.8%	-0.2%	-1.8%	-1.8%	-2.9%
8	33	1.3%	1.7%	1.6%	2.1%	3.8%	4.4%	4.6%	4.3%	5.9%	8.2%	7.3%	5.3%	3.9%	2.1%	-0.1%
9	16	-0.1%	15.3%	19.3%	18.5%	19.4%	18.5%	20.8%	19.8%	20.1%	21.9%	21.7%	20.7%	18.8%	18.1%	16.4%
10	11	1.4%	6.5%	7.0%	7.3%	6.7%	7.1%	5.3%	5.5%	6.5%	6.9%	7.0%	6.2%	4.5%	3.7%	1.9%
11	1	8.3%	10.0%	6.2%	6.2%	10.1%	10.2%	23.6%	18.6%	15.9%	19.0%	16.1%	8.5%	7.1%	4.7%	2.2%
12	0															
Total	**217**	**0.5%**	**2.2%**	**2.0%**	**2.1%**	**2.6%**	**2.8%**	**2.7%**	**2.9%**	**3.7%**	**5.0%**	**4.5%**	**2.5%**	**0.9%**	**0.2%**	**-0.3%**

From table 5, cumulative excess returns from high SCORE portfolio is improved when the large stocks are filtered out. Recall from previous analysis where only high PB is taken into consideration, portfolio with the score of 9 can enhance the cumulative excess returns from 14.2% to 21.9% in the holding period of 20 days.

Figure 6: Average Cumulative Excess Returns for High PB and Small Size with SCORE of 7-12 and SCORE of 0-6



Given high PB and small size characteristic, portfolios with SCORE of 7-12 generate cumulative excess returns of 8.8% for 20 days holding period. These excess returns are substantially higher than excess returns obtained from low SCORE

portfolio. The shape for high PB group with small size group is similar to high PB group but the cumulative excess returns can be significantly increased.

Table 8: Number of Observations in high PB with small size group by industry and SCORE

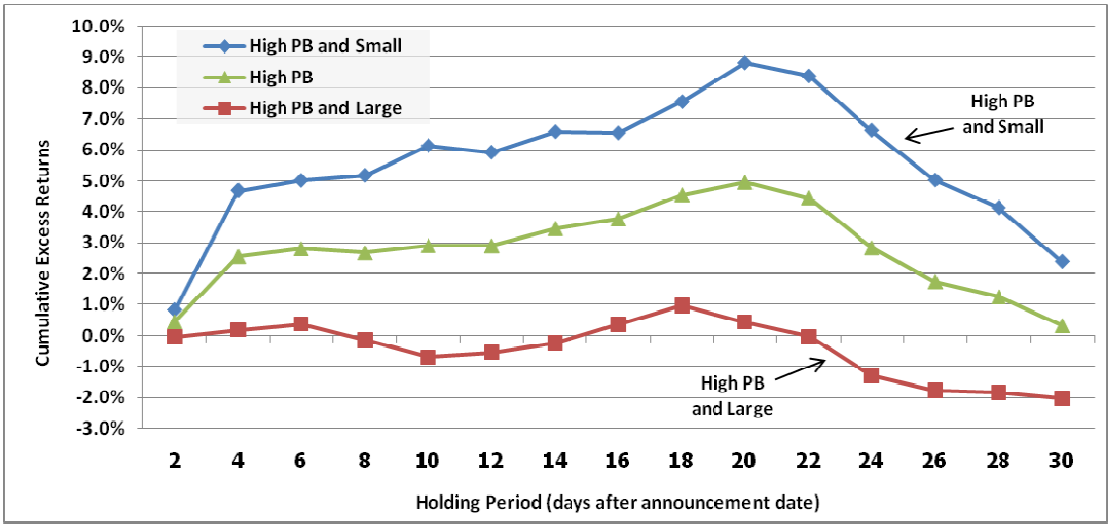
Industry / Sector	SCORE												
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**
Agro & Food Industry / Agribusiness	1	1	3	4	7	6	4	2	3	5	1	1	38
Agro & Food Industry / Food and Beverage			1	1	3	5	2		1				13
Consumer Products / Fashion			1	1	1	9	1	3	5	1	2		24
Consumer Products / Home & Office Products		1	2	2	2	1	1	3	2	1	2		17
Consumer Products / Personal Products & Pharmaceuticals					1			2	1				4
Industrials / Automotive		1	1	1		2	3		1				9
Industrials / Industrial Materials & Machinery				1			1						2
Industrials / Packaging			1	3	3	2	3	1	2	2	2		19
Industrials / Petrochemicals & Chemicals							1		2	1			4
Property & Construction / Construction Materials			3		4		1		4				12
Property & Construction / Property Development				4	4	4		6	2	2			22
Resources / Energy & Utilities		1						3	2	2			8
Services / Commerce			2			1			1				4
Services / Health Care Services					1	1	1	1	1	1	1		7
Services / Media & Publishing			1	1		1	2		2				7
Services / Tourism & Leisure			1	1	4		1	3	3	1			14
Services / Transportation & Logistics				2	1			2					5
Technology / Electronic Components				2	1		1				2		6
Technology / Information & Communication Technology									1		1		2
Grand Total	**1**	**4**	**16**	**23**	**32**	**32**	**22**	**26**	**33**	**16**	**11**	**1**	**217**

Table 8 represents the distribution of high PB with small size group in each sector and SCORE. Although there is no high concentration in any sector, Agribusiness, Fashion and Property Development are major components of the sample. In addition, there are 87 out of 217 observations (40%) whose SCORE are greater or equal to 7.

Hypothesis Testing

If the stock selection criteria are built from the high PB and small group with the SCORE of equal to or greater than 7, average cumulative excess returns of 8.8% over 20 days holding period can be achieved. More precisely, cumulative excess returns start accumulating immediately after the announcement date and hit the highest level within 20 days later. Then, the cumulative excess returns are lower and diminished. For high PB and large group, the cumulative excess returns remain in the same fashion as dictated in high PB group.

Figure 7: Cumulative Excess Returns for High PB Group with SCORE of 7 to 12



The cumulative excess returns obtained from the high PB group with the total SCORE of 7 and above are tested whether they are significantly greater than zero given 95% confidence level. From Panel A, the cumulative market-adjusted returns are significantly positive for the holding period of 2 to 24 days and the highest cumulative returns of 4.95% (63% per annum) is in the holding period of 20 days. If we split this qualified portfolio into two subgroups which are small size and large size, the cumulative excess returns of small size group is significantly positive for the holding period of 2 to 26 days and the best holding period is still 20 days with the cumulative excess returns of 8.81% (110% per annum).

Panel A: Test of Significance for High PB Group which have total SCORE at least 7

OBS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Mean	0.45%	2.55%	2.81%	2.67%	2.91%	2.90%	3.46%	3.76%	4.54%	4.95%	4.44%	2.84%	1.74%	1.24%	0.32%
STD	3.50%	19.27%	20.49%	20.31%	20.45%	19.59%	20.27%	20.16%	20.68%	20.92%	21.33%	22.09%	21.74%	22.20%	21.61%
t Stat	1.66	1.71	1.78	1.70	1.85	1.92	2.21	2.42	2.85	3.07	2.70	1.66	1.04	0.73	0.19

Panel B: Test of Significance for High PB with Small Size Group which have total SCORE at least 7

OBS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Mean	0.83%	4.69%	5.01%	5.18%	6.13%	5.92%	6.59%	6.54%	7.56%	8.81%	8.38%	6.63%	5.02%	4.12%	2.39%
STD	4.20%	26.52%	28.21%	27.73%	27.65%	26.33%	27.22%	26.98%	27.32%	27.43%	27.96%	28.93%	28.28%	28.64%	27.81%
t Stat	1.83	1.65	1.66	1.74	2.07	2.10	2.26	2.26	2.58	3.00	2.80	2.14	1.66	1.34	0.80

Panel C: Test of Significant Difference of Cumulative Excess Return between Small and Large Size Group which have total SCORE at least 7

	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Small: Mean	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%	0.83%
Large: Mean	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%
Small: Variance	0.18%	7.03%	7.96%	7.69%	7.65%	6.94%	7.41%	7.28%	7.47%	7.52%	7.82%	8.37%	8.00%	8.20%	7.74%
Large: Variance	0.06%	0.08%	0.10%	0.20%	0.27%	0.35%	0.40%	0.49%	0.70%	0.72%	0.75%	0.87%	1.03%	1.28%	1.34%
Pooled Variance	0.12%	3.69%	4.17%	4.08%	4.09%	3.76%	4.03%	4.01%	4.20%	4.24%	4.41%	4.75%	4.64%	4.87%	4.65%
t stat	1.45	1.50	1.45	1.67	2.14	2.09	2.09	1.87	1.98	2.52	2.52	2.34	2.05	1.75	1.29

As expected, this trading strategy is more suitable for small size stocks as measured by market capitalization. This confirms the existence of the size effect in Thai stock market. It also can be concluded that the benefit of financial statement analysis concentrates only in stocks with small firm size.

In favor of the test of difference between small and large size group, the mean of cumulative excess returns from two groups are significantly different for the holding period of 10, 14, 20 and 22 days at 95% confidence level.

Robustness Check

I vary the benchmark level in assigning the binary score into 3 groups. The first criteria or the predefined criteria are those as proposed in research methodology. The second criteria are median criteria meaning that the median of each ratio is set as a threshold for assigning score. For the zero criteria, all ratios have the criteria of zero. For instance, a score of 1 is added if the firm's ROE is greater than 0% and score of 0 is granted otherwise. Below is the table for summarizing all other alternative scoring criteria.

Table 9: Alternative Scoring Criteria

Ratio	Criteria				d
	Operator	Predefined Criteria	Median Criteria	Zero Criteria	
ROE	Greater than	10%	12.08%	0%	Positive
CFS	Greater than	20%	10.41%	0%	Positive
CR	Greater than	1.00	1.47	0	Positive
DE	Less than	0.50	0.85	0	Negative
TIE	Greater than	1.00	8.83	0	Positive
TATO	Greater than	1.00	0.86	0	Positive

Table 10: Cumulative Excess Returns for High PB with Small Size Group by Predefined Criteria

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
7-12	87	0.8%	4.7%	5.0%	5.2%	6.1%	5.9%	6.6%	6.5%	7.6%	8.8%	8.4%	6.6%	5.0%	4.1%	2.4%
8-12	61	1.0%	6.2%	7.3%	7.4%	8.5%	8.7%	9.3%	8.8%	9.9%	11.7%	11.2%	9.6%	7.9%	6.6%	4.6%
9-12	28	0.8%	11.6%	14.0%	13.6%	14.1%	13.7%	14.8%	14.1%	14.6%	15.9%	15.7%	14.6%	12.8%	12.0%	10.2%
10-12	12	2.0%	6.8%	7.0%	7.2%	7.0%	7.3%	6.8%	6.5%	7.3%	7.9%	7.7%	6.4%	4.8%	3.8%	1.9%
11-12	1	8.3%	10.0%	6.2%	6.2%	10.1%	10.2%	23.6%	18.6%	15.9%	19.0%	16.1%	8.5%	7.1%	4.7%	2.2%

Table 11: Cumulative Excess Returns for High PB with Small Size Group by Median Criteria

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
7-12	83	0.7%	4.8%	5.4%	5.9%	6.3%	6.5%	6.9%	6.9%	7.6%	9.0%	8.4%	6.6%	5.3%	4.0%	2.2%
8-12	55	0.6%	6.2%	6.5%	6.6%	7.1%	7.4%	7.7%	7.3%	8.2%	9.3%	8.6%	6.6%	5.0%	4.0%	2.2%
9-12	27	0.4%	11.6%	12.2%	11.9%	12.5%	12.1%	12.8%	11.9%	13.4%	13.0%	13.3%	12.0%	9.9%	8.8%	7.9%
10-12	15	0.0%	16.5%	17.6%	16.3%	16.3%	15.4%	17.5%	15.9%	16.4%	16.0%	16.7%	15.5%	13.7%	12.8%	11.4%
11-12	2	1.5%	1.6%	5.5%	3.5%	3.3%	2.6%	3.0%	1.1%	1.0%	2.4%	1.3%	1.1%	-2.4%	-2.3%	-2.5%

Table 12: Cumulative Excess Returns for High PB with Small Size Group by Zero Criteria

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
7-12	135	0.7%	3.7%	3.9%	4.0%	4.4%	4.2%	4.4%	4.7%	5.6%	7.1%	6.6%	4.6%	3.2%	2.3%	1.0%
8-12	103	0.6%	4.3%	4.5%	4.7%	5.6%	5.1%	5.4%	5.7%	6.9%	8.6%	8.1%	6.3%	4.8%	3.7%	2.1%
9-12	73	0.6%	5.5%	6.0%	6.1%	7.1%	7.1%	7.6%	7.7%	8.8%	10.5%	10.1%	8.4%	6.7%	5.9%	3.6%
10-12	42	0.8%	8.3%	9.4%	9.1%	9.6%	9.5%	9.8%	9.9%	11.1%	12.8%	12.2%	10.7%	9.1%	7.9%	6.3%
11-12	13	2.8%	6.4%	7.7%	7.5%	7.7%	7.2%	8.6%	9.5%	10.2%	11.2%	11.5%	9.0%	8.8%	7.4%	6.3%

Table 10, 11 and 12 correspond to the cumulative excess returns of selected portfolios based on different scoring criteria. First column in table 10, 11 and 12 represent SCORE of the portfolio to perform the strategy. For instance, SCORE equals to 7-12 means that the trading strategy is to take a long position for the SCORE equals to and greater than 7 which the maximum possible SCORE is 12. Second column, as stated before, displays the number of observations in each particular portfolio. The results demonstrate that all criteria help investors to get maximum cumulative excess returns in the period of 20-22 days after the announcement date. The predefined criterion generates highest profit whereas the median criterion which requires additional calculation of median provides the lowest profit. In reality, investors cannot compute the median since they have to compute the selected financial ratios and take action immediately after the announcement of financial statement. For the zero criteria, the threshold is considered to be too simple in order to apply for all ratios. For example, the calculation of ROE is useless when we use the threshold of 0% since we can simply use the level of net income instead. In other words, the criterion of ROE is greater than 0% and net income greater than 0 can be used interchangeably (applicable for positive equity case only). As a result, the predefined criterion is recommended in performing portfolio selection strategy.

CONCLUSION

Since financial statement analysis is widely used in equity investment, my motivation is to create a simple stock selection strategy based on key financial ratios such as ROE, Current Ratio and Debt to Equity Ratio. The basic idea is that stocks with good fundamental factors reflected by good financial ratios provide positive market-adjusted returns. In addition all observations are divided by PB ratio and market capitalization in order to identify which group generates the highest returns from the strategy. The relationship between the stock returns and PB ratio has been widely investigated by many researchers but the results are different across the markets. On average, low PB is a good sign in developed market while high PB is preferred in emerging markets. Consequently, this paper examines whether high or low PB generates higher market-adjusted returns if the execution is taken immediately after the earnings announcement date. The results demonstrate that high PB stocks with good fundamental factors provide significant positive market-adjusted returns. Within this group, the returns can be amplified if small market capitalization stocks are selected. It is due to the fact that big-cap stocks are closely focused by the stock analysts. Good news which affects performance of the firms is already reflected in the stock price prior to public announcement of financial statements. In contrast, small stocks are generally less focused by the market so that there are significant reactions after the announcement date. The cumulative market-adjusted returns for good fundamental stocks with high PB and small market capitalization sharply increases during the first 4 days after announcement date to 4.69% then gradually increases to the peak level of 8.81% for the holding period of 20 days. However, I cannot find a sensible explanation for the dropping in returns after 20 days holding period except the selling pressure to take profits. Investors who follow this strategy should be aware of this downturn. Therefore, my recommendation is to buy small stocks with good financial ratios (as suggested by high scoring criteria) and high PB immediately after the earning announcement and hold it for 20 days.

APPENDIX

Table 13: Cumulative Excess Returns for Overall Observations

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
High PB	359	0.4%	1.5%	1.4%	1.3%	1.4%	1.5%	1.4%	1.8%	2.4%	3.0%	2.7%	1.0%	-0.1%	-0.6%	-1.0%
Low PB	421	-0.4%	-0.8%	-0.6%	-0.6%	-0.5%	-0.8%	-0.1%	-0.1%	-0.2%	0.0%	-0.1%	-1.2%	-2.2%	-2.8%	-3.3%
Overall	**780**	**0.0%**	**0.3%**	**0.3%**	**0.3%**	**0.4%**	**0.3%**	**0.6%**	**0.8%**	**1.0%**	**1.4%**	**1.2%**	**-0.2%**	**-1.2%**	**-1.7%**	**-2.2%**

Table 14: Cumulative Excess Return for Large Size Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	0															
1	3	1.1%	3.5%	2.3%	2.8%	2.2%	3.0%	1.8%	0.7%	4.3%	6.2%	7.2%	10.1%	11.0%	10.3%	9.9%
2	8	-0.8%	-1.1%	-1.3%	-1.7%	-1.6%	-2.9%	-1.7%	-2.6%	-1.2%	-1.6%	-0.9%	-1.5%	-1.4%	-1.6%	-1.9%
3	21	0.5%	0.6%	0.8%	0.2%	-0.4%	-0.3%	-0.7%	-0.2%	-0.2%	0.4%	-0.4%	0.3%	-0.1%	-0.5%	0.0%
4	37	0.5%	-0.1%	0.0%	-0.8%	-0.6%	-0.1%	1.3%	1.8%	1.6%	1.9%	3.4%	1.7%	1.7%	-0.4%	-1.7%
5	41	-1.1%	-1.1%	-1.0%	-1.4%	-1.5%	-1.9%	-1.4%	-1.8%	-2.0%	-2.4%	-2.6%	-3.7%	-4.3%	-5.1%	-5.9%
6	62	0.1%	-0.4%	0.0%	-0.3%	-0.1%	-0.2%	-1.2%	-1.2%	-0.8%	-0.2%	-0.5%	-2.5%	-2.8%	-3.0%	-2.9%
7	74	-0.6%	-0.7%	-0.5%	-0.8%	-0.6%	-0.7%	-1.0%	-0.8%	-0.5%	-0.8%	-1.0%	-1.7%	-2.4%	-3.0%	-3.3%
8	91	-0.4%	-0.3%	-0.1%	0.2%	0.0%	0.0%	0.3%	1.1%	0.4%	0.3%	-0.1%	-0.9%	-1.3%	-1.6%	-1.6%
9	52	-0.3%	-0.8%	-0.5%	-0.7%	-0.6%	-0.4%	-0.4%	-0.2%	0.4%	0.7%	-0.3%	-1.6%	-2.1%	-2.5%	-3.0%
10	19	-0.2%	0.1%	-0.3%	0.3%	0.6%	0.6%	0.4%	0.2%	0.0%	-0.3%	-0.1%	-1.7%	-2.2%	-2.2%	-3.3%
11	4	0.1%	0.2%	0.0%	0.9%	0.1%	1.3%	1.4%	0.1%	-0.4%	-2.4%	-0.5%	-0.9%	-1.5%	-2.8%	-3.4%
12	0															
Total	**412**	**-0.3%**	**-0.4%**	**-0.3%**	**-0.4%**	**-0.4%**	**-0.4%**	**-0.4%**	**-0.2%**	**-0.1%**	**-0.1%**	**-0.3%**	**-1.3%**	**-1.8%**	**-2.3%**	**-2.7%**

Table 15: Cumulative Excess Return for High PB with Large Size Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	0															
1	2	2.7%	6.4%	3.9%	4.3%	3.7%	4.0%	3.1%	2.5%	4.6%	7.2%	6.3%	11.9%	13.5%	12.3%	11.7%
2	5	-0.6%	-1.6%	-2.2%	-2.5%	-3.6%	-4.9%	-3.2%	-3.7%	-1.7%	-1.8%	-1.2%	-1.7%	0.6%	0.1%	-0.4%
3	3	5.3%	6.1%	6.9%	2.1%	1.2%	0.0%	-2.0%	-2.0%	-2.9%	-1.6%	-3.8%	-4.8%	-5.7%	-7.0%	-8.0%
4	14	1.5%	1.5%	1.7%	0.9%	0.8%	0.5%	1.2%	2.1%	2.0%	2.0%	5.3%	5.1%	6.2%	4.9%	2.8%
5	13	0.0%	1.7%	1.3%	0.8%	1.0%	0.2%	-0.8%	-0.5%	-0.5%	0.0%	0.1%	-1.0%	-0.9%	-1.7%	-2.3%
6	20	-0.5%	-1.1%	-1.4%	-0.8%	-0.9%	-1.2%	-2.0%	-2.6%	-2.4%	-2.6%	-3.4%	-6.2%	-6.7%	-5.8%	-5.6%
7	23	-0.4%	0.1%	0.3%	-1.3%	-2.5%	-2.0%	-1.9%	-1.5%	0.2%	-0.4%	-0.8%	-0.9%	-1.2%	-1.6%	-2.4%
8	34	-0.1%	0.4%	0.5%	0.4%	0.1%	0.3%	0.6%	1.8%	1.5%	0.9%	0.8%	-0.9%	-1.6%	-1.4%	-1.1%
9	11	0.6%	-0.3%	0.4%	0.7%	0.4%	0.3%	1.3%	1.1%	2.6%	3.0%	0.2%	-1.8%	-2.2%	-2.7%	-2.4%
10	4	-0.7%	-1.3%	-0.7%	-0.6%	-0.7%	-1.6%	-2.0%	-1.8%	-1.6%	-2.9%	-3.3%	-5.2%	-5.1%	-4.9%	-5.9%
11	1	4.5%	4.1%	1.0%	-1.0%	-1.1%	-2.6%	-1.2%	-6.1%	-8.7%	-9.9%	-0.8%	-2.6%	-3.1%	-3.1%	-4.6%
12	0															
Total	**130**	**0.2%**	**0.4%**	**0.4%**	**0.0%**	**-0.4%**	**-0.5%**	**-0.5%**	**-0.2%**	**0.3%**	**0.1%**	**0.0%**	**-1.2%**	**-1.3%**	**-1.5%**	**-2.0%**

Table 16: Cumulative Excess Return for Low PB Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	2	-1.3%	-3.0%	-1.6%	-1.4%	0.7%	-2.1%	-1.0%	-2.2%	-1.2%	-1.1%	-0.7%	-2.6%	-5.0%	-5.2%	-5.3%
1	3	2.3%	0.4%	-0.2%	-1.5%	0.6%	-1.3%	-2.4%	-2.4%	-1.9%	-5.0%	-3.9%	-1.4%	-1.8%	-3.6%	-4.9%
2	10	-2.5%	-2.3%	-2.8%	-3.7%	-3.6%	-4.7%	-4.2%	-3.9%	-4.4%	-4.5%	-3.7%	-5.4%	-8.3%	-6.9%	-7.9%
3	30	-0.4%	-0.7%	-0.3%	-1.2%	-2.1%	-2.4%	-2.3%	-1.4%	-1.5%	-0.8%	-1.3%	-1.4%	-1.9%	-0.9%	-0.6%
4	34	0.7%	0.1%	0.3%	-0.7%	-0.7%	-0.5%	0.2%	0.3%	0.3%	0.6%	0.8%	-1.5%	-2.4%	-4.4%	-6.0%
5	42	-1.3%	-2.4%	-2.0%	-1.9%	-1.8%	-1.6%	-0.6%	-1.8%	-2.0%	-2.1%	-2.0%	-3.6%	-5.1%	-5.7%	-7.1%
6	55	0.4%	-0.1%	0.8%	0.4%	0.5%	0.5%	-0.1%	0.2%	0.7%	1.3%	1.1%	-0.2%	-0.3%	-1.2%	-1.2%
7	74	-0.3%	-0.8%	-1.2%	-0.8%	-0.3%	-1.2%	2.1%	1.9%	1.5%	1.5%	1.8%	0.9%	-0.8%	-1.2%	-1.3%
8	77	-0.5%	-0.6%	-0.3%	0.2%	-0.2%	-0.4%	-0.6%	-0.1%	-0.8%	-0.8%	-1.6%	-2.3%	-3.1%	-3.6%	-3.8%
9	66	-0.8%	-0.9%	-0.8%	-0.5%	-0.5%	-0.2%	-0.2%	-0.4%	-0.1%	0.4%	0.5%	-0.9%	-1.8%	-2.2%	-2.9%
10	23	-0.2%	-0.1%	-0.5%	0.1%	0.5%	-0.1%	0.0%	-0.2%	-0.4%	-0.7%	-0.6%	-1.7%	-2.6%	-3.0%	-4.7%
11	4	-2.8%	1.5%	2.1%	-0.1%	-0.9%	1.0%	2.0%	1.1%	1.1%	0.2%	0.0%	0.7%	-1.1%	-3.8%	-3.6%
12	1	-0.3%	-1.0%	0.0%	4.0%	4.2%	4.3%	4.8%	4.7%	6.1%	6.4%	7.1%	8.3%	4.6%	4.6%	6.2%
Total	**421**	**-0.4%**	**-0.8%**	**-0.6%**	**-0.6%**	**-0.5%**	**-0.8%**	**-0.1%**	**-0.1%**	**-0.2%**	**0.0%**	**-0.1%**	**-1.2%**	**-2.2%**	**-2.8%**	**-3.3%**

Table 17: Cumulative Excess Return for Low PB with Small Size Group

SCORE	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	2	-1.3%	-3.0%	-1.6%	-1.4%	0.7%	-2.1%	-1.0%	-2.2%	-1.2%	-1.1%	-0.7%	-2.6%	-5.0%	-5.2%	-5.3%
1	3	2.3%	0.4%	-0.2%	-1.5%	0.6%	-1.3%	-2.4%	-2.4%	-1.9%	-5.0%	-3.9%	-1.4%	-1.8%	-3.6%	-4.9%
2	7	-3.1%	-3.2%	-4.0%	-5.2%	-6.0%	-6.9%	-6.3%	-5.2%	-6.1%	-5.9%	-5.2%	-7.2%	-9.8%	-7.9%	-9.3%
3	12	-0.7%	-1.2%	-0.4%	-2.7%	-4.2%	-5.5%	-5.0%	-3.5%	-4.0%	-3.1%	-3.6%	-5.3%	-5.9%	-3.3%	-3.6%
4	11	2.3%	2.6%	3.1%	1.6%	0.9%	-0.8%	-2.2%	-2.5%	-2.0%	-2.1%	-2.3%	-3.9%	-5.2%	-5.8%	-9.2%
5	16	-0.9%	-2.6%	-2.3%	-1.4%	-0.6%	0.1%	0.9%	-1.2%	-1.4%	-0.8%	-0.4%	-2.5%	-4.6%	-4.4%	-6.9%
6	14	0.2%	-0.7%	0.7%	1.1%	0.6%	0.6%	1.4%	1.8%	2.1%	1.8%	1.1%	0.8%	1.0%	-0.4%	-0.3%
7	26	0.8%	0.2%	-1.0%	-0.7%	-1.0%	-2.5%	8.0%	7.3%	6.8%	7.1%	7.8%	6.6%	3.2%	3.6%	3.4%
8	24	-0.1%	-0.3%	-0.2%	0.3%	-0.9%	-1.1%	-1.9%	-1.5%	-1.3%	-2.2%	-3.4%	-5.5%	-7.3%	-7.6%	-7.4%
9	25	-1.1%	-1.0%	-1.0%	0.4%	0.1%	0.3%	0.7%	-0.2%	0.1%	1.0%	2.1%	0.2%	-1.3%	-1.8%	-2.5%
10	9	-0.2%	-1.0%	-0.7%	-0.6%	-0.1%	-2.3%	-1.8%	-1.8%	-1.7%	-2.5%	-2.7%	-3.3%	-4.6%	-5.5%	-8.0%
11	1	-7.0%	9.0%	9.2%	-4.9%	-5.1%	-3.7%	1.0%	-2.4%	-2.6%	0.4%	1.2%	3.6%	-1.4%	-7.2%	-5.7%
12	1	-0.3%	-1.0%	0.0%	4.0%	4.2%	4.3%	4.8%	4.7%	6.1%	6.4%	7.1%	8.3%	4.6%	4.6%	6.2%
Total	**151**	**-0.2%**	**-0.6%**	**-0.5%**	**-0.5%**	**-0.8%**	**-1.5%**	**0.4%**	**0.2%**	**0.2%**	**0.2%**	**0.3%**	**-1.1%**	**-2.9%**	**-2.9%**	**-3.8%**

Table 18: Cumulative Excess Return for Low PB with Large Size

Score	No.	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
0	0															
1	0															
2	3	-1.2%	-0.1%	0.1%	-0.3%	1.8%	0.4%	0.8%	-0.8%	-0.4%	-1.4%	-0.3%	-1.2%	-4.8%	-4.5%	-4.4%
3	18	-0.3%	-0.3%	-0.2%	-0.1%	-0.7%	-0.3%	-0.5%	0.1%	0.2%	0.7%	0.2%	1.2%	0.8%	0.6%	1.4%
4	23	-0.1%	-1.1%	-1.1%	-1.8%	-1.5%	-0.4%	1.4%	1.6%	1.4%	1.9%	2.2%	-0.3%	-1.1%	-3.7%	-4.5%
5	26	-1.6%	-2.3%	-1.9%	-2.2%	-2.5%	-2.6%	-1.4%	-2.1%	-2.4%	-2.8%	-3.1%	-4.3%	-5.4%	-6.4%	-7.2%
6	41	0.5%	0.1%	0.8%	0.1%	0.5%	0.4%	-0.7%	-0.3%	0.2%	1.1%	1.1%	-0.5%	-0.8%	-1.4%	-1.5%
7	48	-0.8%	-1.3%	-1.3%	-0.9%	0.0%	-0.6%	-1.0%	-1.0%	-1.3%	-1.5%	-1.5%	-2.2%	-3.0%	-3.8%	-3.9%
8	53	-0.6%	-0.8%	-0.3%	0.1%	0.1%	-0.1%	0.0%	0.5%	-0.6%	-0.2%	-0.8%	-0.9%	-1.1%	-1.7%	-2.1%
9	41	-0.6%	-0.9%	-0.7%	-1.0%	-0.9%	-0.5%	-0.8%	-0.5%	-0.2%	0.0%	-0.4%	-1.5%	-2.1%	-2.4%	-3.2%
10	14	-0.2%	0.4%	-0.3%	0.6%	0.9%	1.3%	1.2%	0.8%	0.4%	0.4%	0.8%	-0.7%	-1.4%	-1.4%	-2.6%
11	3	-1.3%	-1.1%	-0.3%	1.5%	0.4%	2.6%	2.3%	2.2%	2.3%	0.1%	-0.4%	-0.3%	-1.0%	-2.7%	-3.0%
12	0															
Total	**270**	**-0.5%**	**-0.8%**	**-0.6%**	**-0.6%**	**-0.4%**	**-0.3%**	**-0.4%**	**-0.2%**	**-0.4%**	**-0.2%**	**-0.4%**	**-1.3%**	**-1.9%**	**-2.7%**	**-3.0%**

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