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Historical Accounting Information and Future Stock Returns: Thai Evidence

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ABSTRACT

Prior research demonstrates that a composite score constructed based on historical accounting information can be used to predict future stock returns. This paper employs the composite score used in Piotroski (2000). The composite score is the sum of binary scores marked from each individual financial measure related to profitability, leverage/liquidity, and operating efficiency. This paper provides empirical evidence during 1994 to 2008 for listed firms in Thailand. Our empirical evidence suggests that a portfolio of stocks with higher score earn higher one-year and two-year ahead market-adjusted returns and that a zero-investment portfolio of longing high score stocks and shorting low score earn significant positive future market-adjusted returns for both all sample firms and a subsample of high BM firms. Our results for high BM firms are consistent with Piotroski (2000).

Keywords: Accounting Information, Stock Returns, Financial Ratios

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บทคัดย่อ

งานวิจัยในอดีตพบว่าคะแนนประกอบที่สร้างขึ้นจากข้อมูลบัญชีในอดีตสามารถใช้ในการพยากรณ์ผลตอบแทนในอนาคตของหุ้นได้ งานวิจัยนี้ใช้คะแนนประกอบเช่นเดียวกับงานวิจัยของ Piotroski (2000) โดยคะแนนประกอบนี้เป็นผลรวมของคะแนนฐานสองสำหรับแต่ละตัววัดทางการเงินที่เกี่ยวข้องกับความสามารถในการทำกำไร ความสามารถในการสร้างหนี้หรือสภาพคล่อง และประสิทธิภาพของการดำเนินงาน งานวิจัยนี้แสดงหลักฐานเชิงประจักษ์ในช่วงเวลาระหว่างปี ค.ศ. 1994 ถึง ค.ศ. 2008 สำหรับบริษัทจดทะเบียนกับตลาดหลักทรัพย์แห่งประเทศไทย หลักฐานเชิงประจักษ์ดังกล่าวแสดงให้เห็นว่ากลุ่มหลักทรัพย์ที่ประกอบด้วยหุ้นที่มีคะแนนสูงกว่าจะมีผลตอบแทนผลตอบแทนเกินปกติสำหรับหนึ่งปีและสองปีในอนาคตสูงกว่า และกลุ่มหลักทรัพย์ที่สร้างโดยการซื้อหุ้นที่มีคะแนนสูงและขายชอร์ตหุ้นที่มีคะแนนต่ำจะมีผลตอบแทนผลตอบแทนเกินปกติสำหรับหนึ่งปีและสองปีในอนาคตเป็นบวกสำหรับทั้งกลุ่มตัวอย่างทั้งหมดและกลุ่มตัวอย่างย่อยเฉพาะบริษัทที่มีอัตราส่วนมูลค่าตามบัญชีต่อมูลค่าตลาดสูง นอกจากนี้สำหรับบริษัทที่มีอัตราส่วนมูลค่าตามบัญชีต่อมูลค่าตลาดสูงในงานวิจัยนี้สอดคล้องกับงานวิจัยของ Piotroski (2000)

คำสำคัญ: ข้อมูลบัญชี ผลตอบแทนของหุ้น อัตราส่วนทางการเงิน

INTRODUCTION

One of the most controversial issues in today's investment world is the challenge posed to the value of fundamental analysis as a reliable tool to reach profitable investment decisions. Despite it being supported by numerous studies as a useful means of stock trading, the fundamental analysis has raised many questions relating to the efficient market hypothesis (EMH). According to EMH, one cannot exploit both the historical and publicly available information to gain profits if a stock market is semi-strong form efficient. Specifically, if the stock market is efficient, no profitable trading strategy can be formed based on published financial statements. However, the fact that (1) numerous studies find that the fundamental analysis is a useful tool to predict future earnings and stock returns; and (2) financial ratios have long been employed by investors and financial analysts for fundamental analysis, have raised a question relating to the usefulness of historical accounting information to predict future stock returns. This question may have been extensively addressed in developed countries, but little has been done on emerging markets, and even if there have recently been some findings, the results are neither solid nor reliable due to the limited numbers of samples. Therefore, this paper aims at examining whether historical accounting information can be used to predict future stock returns for Thai stock markets.

Lev and Thiagarajan (1993) document that financial signals have predictive power in explaining contemporaneous stock returns of U.S. firms and Abarbanell and Bushee (1998) show that investment portfolios formed by longing high-

score stocks and shorting low-score stocks based on fundamental signals suggested by Lev and Thiagarajan (1993) yield significant positive returns. In addition, empirical results in Piotroski (2000) and Mohanram (2005) suggest that a portfolio with higher composite scores constructed based traditional financial measures earn higher future returns for high and low book-to-market (BM) firms in U.S. markets, respectively.

In Japan, Nguyen (2003) constructs a simple financial score for each sample firm and finds that the financial scores exhibit a strong correlation with contemporaneous and future market-adjusted returns. In Thailand, Sukanjanapong (2007) documents that historical financial ratios can be used to form profitable stock portfolios, particularly in the small low BM stocks.

This paper empirically examines whether the composite score constructed based on historical accounting information can help investors earn excess future stock returns for listed firms in the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (mai) during 1994 to 2008. Consistent with Piotroski (2000), this paper employs simple, yet comprehensive sets of financial measures to construct the composite score. The composite score is the sum of binary scores (1 or 0) earned from each individual financial measure. The score represents nine financial measures suggested by Piotroski (2000). These financial measures include signals related to profitability, leverage/liquidity, and operating efficiency.

Our empirical results indicate that firms with higher composite score earn higher one-year and two-year market-adjusted buy-and-hold returns than do firms with lower composite score without additional risk and that a zero-investment portfolio of longing high score stocks and shorting low score stocks earn significant positive market-adjusted returns. This suggests that historical accounting information can be used to predict future stock returns.

Piotroski (2000) suggests that his composite score is appropriate for high BM firms. This paper then examines whether the score is associated with future stock returns for subsamples of high BM firms. Firms with BM ratio above 70th percentile are classified as high BM firms. Consistent with results for our full sample, our empirical results for high BM firms show that portfolios of stocks with higher score earn higher one-year and two-year market-adjusted buy-and-hold returns than do those with lower score without additional risk and zero-investment portfolios of longing high score stocks and shorting low score stocks earn significant positive market-adjusted returns.

Our empirical results contribute to the literature on the usefulness of historical accounting information in predicting future stock returns. While prior research finds that financial ratios are associated with future stock returns, our study, together with Piotroski (2000), provide empirical evidence suggesting that the composite score constructed based mainly on historical accounting information can be used to choose stocks to invest to earn positive abnormal returns and they can

be applied for not only high BM firms, but also for all firms. Moreover, our results contribute to the literature on the efficient market hypothesis. Specifically, our results that investors can use publicly available, historical accounting information to choose stocks and earn abnormal stock returns seem to suggest that Thai stock markets are not semi-strong form efficient.

The next section of this paper discusses literature review. Section 3 discusses a construction of composite scores, stock return calculation as well as sample selection and data collection. Section 4 present empirical results. Finally, section 5 concludes the paper.

LITERATURE REVIEW

1. The Book-to-Market Effect

A large number of studies demonstrate that book-to-market (BM) ratio is strongly positively associated with future stock returns. Chan et al. (1990) document that BM ratio, along with earnings-to-price ratio, among others, exhibits an important role in explaining future stock returns in Tokyo Stock Exchange. In the U.S. stock markets, high (low) BM firms generally earn significant positive (negative) returns. Chen and Zhang (1998) also explore the relationship between BM ratio and stock returns from both developed and emerging markets during 1970-1995 and find that BM ratio is highly positively correlated to stock returns in the United States, Japan, Hong Kong and Malaysia, while the relationship is not observed in Thailand and Taiwan.

Although Fama and French (1992) and Lakonishok et al. (1994) show that a portfolio of high BM firms outperforms that of low BM firms, they provide two different explanations, namely, risk and mispricing explanations, respectively. Fama and French (1992) explain that the basic argument underlying risk-based conjecture is simply the fact that different types of stocks are exposed to different amount of systematic risk; and therefore, carry different expected returns. Specifically, they show that the variation of cross-sectional stock returns can be explained by two different factors, namely BM ratio and firm size. They claim that bankruptcy risk or financial distress risk is represented by BM ratio, while firm size acts as a proxy of liquidity risks. High BM ratio means the market judges firm's prospects to be poor relative to the entire market, so BM ratio may capture financial distress effect. Thus, high BM firms are likely to have greater bankruptcy risks; and hence, higher excess returns in compensation for higher additional risk. Nevertheless, this explanation is less valid for low BM firms, since it is contrary to the fact that low BM stocks are more risky than the stock market as a whole; and therefore, should generate high returns.

Alternatively, Lakonishok et al. (1994) argue that there is little evidence that high BM stocks are fundamentally riskier. They claim that high BM stocks produce superior returns because typical investors consistently overestimate future growth of low BM stocks relative to high BM stocks. In other words, investors are extremely pessimistic (optimistic) about high (low) BM stocks

as they tie expectations of future growth to past bad (good) growth/earnings; hence, they put excessive weight on the recent past for prediction of future returns. They oversell the stocks that have recently performed poorly and overbuy the stocks that have performed well. Therefore, these stocks are either underpriced and have a high BM, or overpriced and have a low BM. This mispricing explanation implies that typical investors make systematic errors in predicting future growth earnings of stocks; therefore, one can exploit the mistakes of typical investors by purchasing high BM stocks and shorting low BM stocks. This is a common judgment error and may explain the investor preference of low BM stocks (growth stocks) over high BM stocks (value stocks). Their empirical evidence also suggests that institutional investors prefer low BM stocks over high BM stocks, and are willing to pay them at a premium price because they represent prudent investments. LaPorta (1996) also supports this mispricing explanation.

Investors are often the victims of the mispricing effect. They often estimate firm's future prospect from past performance while ignoring the tendency of corporate profit growth to revert to the mean. Fuller et al. (1993) explain that earnings growth rates tend to revert to the mean quickly because of the nature of the capital markets. They find that, although earnings per share (EPS) growth rate of high price-to-earnings (PE) group substantially exceeds that of low PE group in the first year of portfolio formation, it converges closely to the mean after only 4 years. Stated differently, investors are misled by past growth and overlook the nature of business competition. Industries which are experiencing the high growth tend to attract heavy competition by other firms. This competitive process eventually results in lower growth rate and lower returns. Instead, industries with low growth rate attract less capital from the market. Therefore, in order to survive in the competition, management tries to achieve higher earnings by operating more efficiently.

Surprisingly, in an investment world, several brokerage houses do not recommend their clients to buy high BM stocks (value stocks). Stickel (1998) finds that analysts prefer recommending firms with recent strong performance (low BM stocks or growth stocks) because they anticipate high BM stocks to continuously underperform the market in the near future and they recognize the profits from the strategy that depends on purchasing low BM stocks. This is consistent to the mispricing concept discussed by Lakonishok et al. (1994) and LaPorta (1996).

2. Fundamental Analysis

Lev and Thiagarajan (1993) introduce 12 financial signals widely used in analyst's reports, and find that most fundamental signals have predictive power in explaining contemporaneous stock returns of U.S. firms. Abarbanell and Bushee (1998) show that forming investment portfolios by longing high-score stocks and shorting low-score stocks based on 9 fundamental signals suggested by Lev and Thiagarajan (1993) yields significant positive returns.

Piotroski (2000) applies fundamental analysis to develop investment strategy for high book-to-market (BM) firms in U.S. markets. He observes that although high BM firms earn high future stock returns, these high stock returns only come from a few firms suggesting that BM ratio alone might sometimes not be adequate to identify good quality stocks in which investors should invest. Hence, a binary score of financial ratios is given to each firm, with 1 indicating that firms possess strong financial status in each of these 4 aspects: profitability, operating efficiency, liquidity, and leverage, and with 0 otherwise. Firms are then ranked by total binary scores. He indicates that a simple strategy of separating winners from losers by using basic financial ratios has the ability to earn large future excess returns. Further, since weak fundamental firms, on average, generate negative excess returns, an investment strategy that buys strong fundamental firms and shorts weak fundamental firms can earn a large magnitude of positive returns.

In contrast, Mohanram (2005) documents that one can also apply a fundamentals driven strategy, appropriately modified by other measures specifically for growth firms such as the stability of earnings, sales growth, intensity of R&D, capital expenditures, and advertising on a sample of low BM stocks in U.S. markets to separate winners from losers, though a large portion of returns is conditioned by the investor's ability to short sell stocks.

In Japan, Nguyen (2003) constructs a simple financial score for each sample firm and finds that the financial scores exhibit a strong correlation with market-adjusted returns in the current and the following periods, though the longer the holding period, the lower the returns. In Thailand, Sukanjanapong (2007) documents that using historical financial ratios to form stock portfolios can provide significant positive market-adjusted returns, particularly in the small low BM stocks.

RESEARCH METHODOLOGY

1. Composite Score

The paper constructs the composite score based on financial signals. A realization of each financial signal is classified as either good or bad depending on its implication to stock future returns with 0 and 1 score representing bad and good implication, respectively. The composite score (SCORE) is the sum of binary scores (1 or 0) marked from each individual financial signals.

This paper implements all nine fundamental signals used in Piotroski (2000). These nine signals are divided into three categories: profitability, liquidity/leverage, and operating efficiency.

1.1 Profitability Signals

Albeit of its rising stock price in the previous period, growth firms are very likely to experience low earnings and negative cash flow; consequently, any firm currently generating positive cash flows or more profits than its counterparts displays a signal of improving profitability and should earn a score of 1. For value firms, given the poor historical earnings performance, any firms generating positive profits or cash flows are demonstrating stronger financial health in the future, with positive cash

flows showing improving flow of internal funds injected in operating activities, while positive earnings representing higher margins and/or improvement of cost control.

In total, there are four signals for the profitability aspects: ROA, ΔROA, CFROA, and ACCRUAL. ROA is defined as operating income divided by total assets. A binary score for ROA (bROA) equals 1 if a firm's ROA is greater than industry-median ROA and 0 otherwise. We use median ROA instead of mean ROA to avoid possible extreme values. Median is also applied to other signals where applicable.

Furthermore, being profitable is also measured by an increasing trend of profitability. Firms that exhibit a growing trend of profits are more likely to achieve higher future returns. Even if the firms have negative ROA (losses) in the previous fiscal period, but if they show an improving trend, they are potentially more likely to be profitable in the future. Therefore, a binary score for ΔROA (bΔROA) equals 1 if a ΔROA is positive, 0 otherwise.

CFROA is defined as a firm's cash flows from operations divided by total assets. Since analysts generally use operating cash flows to predict firm's financial position, in addition to earnings, a binary score for CFROA (bCFROA) equals 1 if a firm's CFROA is greater than industry-median CFROA and 0 otherwise.

According to Bernard (1994), the importance of accounting returns and cash flows, as well as their relations to each other, needs rigorous attention when assessing the future prospects of a firm. Furthermore, Sloan (1996) demonstrates that firms with greater accrual component in their earnings generally underperform in the future due to their lower quality of earnings. In other words, if earnings is greater than cash flow from operations, it may suggest a bad signal about future profitability; thus, a binary score for ACCRUAL (bACCRUAL) equals 1 if CFROA > ROA and 0 otherwise.

1.2 Leverage/Liquidity Signals

The next three signals are ΔLEV, ΔLIQ, and EQOFF. These signals are included in the composite scores to capture firm's capital structure and its ability to serve short-term debt obligation. ΔLEV is a change in financial leverage measured by firm's total interest-bearing debts divided by its common equity. A binary score for ΔLEV (bΔLEV) equals 1 if a firm's ΔLEV is negative and 0 otherwise. A decrease in financial leverage is viewed as a positive signal because it demonstrates the firm's ability to service existing debt obligations. Also, as suggested by Myers and Majluf (1984), by raising external capital, the firm is signaling its inability to generate sufficient internal funds for future operations. Besides, an increase in long-term liabilities may pose more challenges and extra constraints to the firm's financial flexibility, in addition to its current covenants. This is especially true for high BM firms, which generally experience poor performance recently; however, if they are able to decrease their leverage, this might signal that they are starting to have more capabilities to handle their financings.

ΔLIQ is a change in liquidity measured by a firm's current assets divided by its current liabilities (a.k.a. current ratio). A binary score for

ΔLIQ (bΔLIQ) equals 1 if ΔLIQ is positive and 0 otherwise, as an improvement in liquidity should imply that a firm is able to meet its short-term debts. A binary score for EQOFF (bEQOFF) is equal to 1 if a firm "registers" to issue common equity in the year before construction of portfolio (even if a firm does not issue an equity in that given year) and 0 otherwise. Common equity issuance refers to equity transactions between firms and investors that involve a firm receiving cash. Examples of these transactions include public offerings, private placement, pre-emptive rights for current stockholders, and exercises of warrant, convertible debentures. However, IPO and ESOP exercise are excluded. This signal really holds true in high BM firms. The fact that these firms are willing to issue equity even when their stock prices are likely to be depressed in the future highlights the poor condition of these firms.

1.3 Operating Efficiency Signals

The last two signals relate to operating efficiency which is the firm's ability to generate returns from its asset base. ROA can be decomposed into two components: operating profit margin and total asset turnover. ΔOPM is a change in a firm's operating profit margin measured by the firm's operating profit divided by its operating revenues, and ΔTATO is a change in a firm's total asset turnover measured the firm's operating revenues divided by its total assets. A binary score for ΔOPM (bΔOPM) equals 1 if ΔOPM is positive and 0 otherwise, and a binary score for ΔTATO (bΔTATO) is equal to 1 if ΔTATO is positive and 0 otherwise.

2. Stock Return Calculation

Raw return of each firm in each year is calculated as a buy-and-hold strategy. Buy-and-hold returns are calculated as the difference of ending and beginning stock price plus dividend per share (if any) and divided by the beginning stock price. They capture both the capital gain yield and dividend yield. We calculate returns for one year and two consecutive years starting from the beginning of fourth month after the fiscal year end and ending at the end of third month after the following one (two) fiscal year(s). For example, for the fiscal year end of December 31, 2000, the one-year and two-year future return period starts on April 1, 2001 and ends on March 31, 2002 and March 31, 2003, respectively. Moreover, this fourth month may not necessarily be April, as it depends on firm's accounting period.

Return of each portfolio formed based on the composite score is calculated by equally weighted all raw returns in the portfolio. Market-adjusted return (MAR) is also calculated by subtracting market returns from portfolio returns over the corresponding period. Market return is simply computed using value-weighted approach. Guay (2000) suggests that the use of value-weighted approach to compute market-adjusted returns in high BM stocks may contaminate the benefits of empirical results. Given that high BM firms tend to be relatively small, an equally-weighted market-adjusted return, which receives equal weights from every firm, may seem more appropriate. However, we rely on market-adjusted return throughout our paper as (1) our samples include both high and

low BM firms, and (2) to allow for consistency. We apply buy-and-hold returns throughout the paper as Blume and Stambaugh (1983) state that the buy-and-hold strategy has an advantage in explaining the portfolio performance since it does not require frequent portfolio rebalancing which leads to higher transaction costs. Therefore, this strategy is more likely to make large profits for investors.

3. Sample Selection and Data Collection

All historical financial statement data, stock price, market capitalization, and trading volume are obtained from Datastream database during 1994 to 2008. Equity issuance data are obtained from SETSMART, a sophisticated database consisting of all important news for each Thai public listed company. The sample excludes firms in the banking, finance and securities, and insurance sector, as well as property funds, and companies under rehabilitation since they require different framework for financial statement analysis. Property funds are excluded as they themselves are simply listed in the stock market for ease of investor's transferability, and hence their business nature and income are similar to the owner of the fund. Therefore, inclusion of these property funds might cause redundancy and autocorrelation of sample. We also apply the trimming procedures to dispose extreme values at 1st and 99th percentile because the distribution of stock returns is largely influenced by outliers. The final sample consists of 425 firms listed in both the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (mai).

This paper focuses not only the entire stock population, but also a group of high book-to-market (BM) stocks. BM ratio is defined as a firm's book value of equity divided by its market capitalization. We classify high BM stocks as firms with BM ratio above 70th percentile. Total final observations for the entire sample and high BM stocks consist of 3,579 firm-years and 1,075 firm-years, respectively.

EMPIRICAL RESULTS

1. Descriptive Statistics

Table 1 presents the descriptive statistics of the financial characteristics of the sample firms. Descriptive statistics are presented for the full sample as well as high BM firms. The means for most financials are greater than the medians, indicating the presence of some very large values. High BM firms are relatively smaller in size and generate relatively lower sales, operating income and cash flows from operating activities. Consistent with Fama and French (1995) and Piotroski (2000), high BM firms earn relatively lower ROA. This may partly be due to the fact that high BM portfolio consists of a vast majority of poor performing firms. Table 1 also presents the descriptive statistics of stock returns. Consistent with Lakonishok et al. (1994), stock returns of high BM firms are relatively more positive.

Table 1 Descriptive Statistics

	Mean	S.D.	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
All Firms (3,579 observations)							
Book to Market Ratio	0.6679	6.4673	0.2693	0.5236	0.9615	1.6[illegible]	2.631[illegible]
Assets (in Million Baht)	12,007.55	12,007.55	566.85	1,054.98	2,356.06	7,411.79	[illegible]
Sales (in Million Baht)	9,896.15	9,896.15	371.50	789.20	1,955.51	5,328.4[illegible]	1[illegible]83.96
Operating Income (in Million Baht)	841.12	841.12	−98.79	12.67	105.62	[illegible]	1,368.66
Cash Flow from Operations (in Million Baht)	1,061.41	1,061.41	−127.27	20.29	143.[illegible]	[illegible]4	1,901.55
Return on Assets	0.0511	0.1512	−0.0431	0.0082	0.0[illegible]56	0.1051	0.1616
One-Year Market-Adjusted Returns	0.0923	0.6106	−0.5032	−0.2621	−0.0088	0.3123	0.7170
Two-Year Market-Adjusted Returns	0.2299	0.9170	−0.5793	−0.2831	0.0438	0.4796	1.1429
High BM Firms (1,075 observations)							
Book to Market Ratio	2.5093	1.7749	1.2346	1.[illegible]52	2.[illegible]08	2.9412	4.0000
Assets (in Million Baht)	6,520.54	6,520.54	545.02	894.76	[illegible]96.23	4,760.69	13,875.66
Sales (in Million Baht)	4,182.84	4,182.84	279.95	[illegible].96	1,364.81	3,186.46	7,750.98
Operating Income (in Million Baht)	119.38	119.38	−96.92	[illegible].81	40.85	133.15	443.74
Cash Flow from Operations (in Million Baht)	269.54	269.54	−104.49	12.31	90.18	265.99	741.08
Return on Assets	0.0213	0.0777	−0.046[illegible]	−0.0047	0.0280	0.0611	0.0899
One-Year Market-Adjusted Returns	0.1565	0.6239	−[illegible]	−0.2175	0.0423	0.3648	0.8088
Two-Year Market-Adjusted Returns	0.3502	1.0147	−0.4921	−0.2075	0.1089	0.5764	1.3542

2. Correlation Analysis

Table 2 presents the correlations between the financial measures (in a binary score) as well as the one-year and two-year market-adjusted returns (MAR) for all firms. We present both Pearson's correlation and Spearman rank-order's correlation as our sample consists of both ordinal and ratio scale. In addition to positive correlations between increasing profitability (bROA) and increasing profit margin and turnover (bΔOPM and bΔTATO), denoting the evidence of Dupont ROA decomposition framework, there is also a positive relationship between the earnings-based and cash-flow based measures of profits (bROA and bCFO).

Significant correlations between the composite score (SCORE) and subsequent market-adjusted returns (MAR) provide evidence of return predictability based on past financial measures. With one-year MAR, which is corresponded to a four-month lapse after accounting period, correlations for the composite score are significantly positive, indicating that returns are predictable based on a combination of financial information that is available at the time of portfolio construction. However, the correlations between the composite score and returns decrease when the investment horizon is lengthened to 2 years. One possible reason is that the information contained in the score has already been integrated into stock prices.

Table 2 Correlations Analysis

	1-YR MAR	2-YR MAR	bROA	b∆ROA	bCFROA	b∆CFROA	b∆OPM	b∆TATO	b∆LEV	b∆LIQ	bEQOFF	SCORE
1-YR MAR		*0.581***	*0.054***	*0.016*	*0.070***	*0.076***	*–0.006*	*0.029*	*0.045***	*0.087***	*0.026*	*0.[illegible]**
2-YR MAR	0.032**		*0.042**	*0.026*	*0.060***	*0.064***	*0.002*	*0.058***	*0.051***	*0.043**	*0.01[illegible]*	*0.[illegible]**
bROA	0.016	0.004		*0.173***	*0.370***	*–0.128***	*0.096***	*0.146***	*0.716***	*0.113***	*0.17[illegible]**	*0.658***
b∆ROA	0.039*	0.048*	0.173**		*0.061***	*–0.068***	*0.138***	*0.151***	*0.141*	*0.027**	*0.[illegible]**	*0.401***
bCFROA	0.030	0.010	0.370**	0.061**		*0.356***	*0.076***	*0.236***	*0.329***	*0.11[illegible]*	*0.162***	*0.666***
b∆CFROA	0.041*	0.036	–0.128**	–0.068**	0.356**		*0.007*	*0.177***	*–0.12[illegible]*	*0.057*	*0.011***	*0.291***
b∆OPM	–0.019	0.020	0.096**	0.138**	0.076**	0.007		*0.305***	*0.073***	*0.0[illegible]**	*0.044***	*0.413***
b∆TATO	0.017	0.021	0.146**	0.151**	0.236**	0.177**	0.305**		*0.1[illegible]*	*–0.0[illegible]**	*0.045***	*0.536***
b∆LEV	0.004	0.000	0.716**	0.141**	0.329**	–0.123**	0.073**	0.133**		*0.087***	*–0.073***	*0.564***
b∆LIQ	0.066**	–0.012	0.113**	0.027	0.110**	0.057**	–0.076**	–0.03[illegible]**	–0.00[illegible]**		*0.035**	*0.230***
bEQOFF	0.007	0.004	0.171**	0.037*	0.162**	0.011	0.044**	0.00[illegible]**	0.073**	0.035*		*0.343***
SCORE	0.043**	0.033*	0.651**	0.401**	0.657**	0.305**	0.420**	0.536**	0.560**	0.235**	0.353**	

3. Composite Score and Future Stock Returns

We first examine whether SCORE are positively associated with future stock returns for all sample firms. Specifically, we empirically examine whether firms with higher SCORE earn higher future market-adjusted stock returns. Our empirical results are discussed in section 3.1. In addition, we investigate whether SCORE are positively associated with future stock returns for a subsample of high BM firms. Specifically, we empirically investigate whether High BM firms with higher SCORE earn higher future market-adjusted stock returns. The empirical results are discussed in section 3.2.

3.1 Composite Score and Future Stock Returns for All Sample Firms

Panel A of Table 3 demonstrates portfolios of all sample firms from each SCORE with the one-year and two-year investment horizons. SCORE ranges from 0 to 9 since it is constructed based on nine financial measures. The high score group consists of stocks with scores of 5, 6 and 7 while the low score group consists of stocks with scores of 0 and 1.

Our results show that higher SCORE firms significantly outperform lower SCORE firms in both one and two years after portfolio formation. Specifically, the mean (median) of one-year MAR for the high and low group is 11.98% (4.08%) and 1.98% (–11.58%), respectively, producing a significant return difference (High – Low) of 10.00% (15.66%). Similarly, the mean (median) of two-year MAR for the high and low group is 31.14% (14.70%) and 7.23% (–8.82%), producing a significant return difference (High – Low) of 23.90% (23.52%). The results suggest that SCORE constructed based on historical accounting information can be used to predict future stock returns and a zero-investment portfolio of longing high SCORE stocks and shorting low SCORE stocks earn significant positive future stock returns.

Table 3 Future Stock Returns and SCORE

Panel A: All Sample Firms

	One-Year Ahead						Two-Year Ahead					
SCORE	N	Mean MAR	Median MAR	Beta	RVOL	DE	N	Mean MAR	Median MAR	Beta	RVOL	DE
0	8	−0.0746	−0.2789	0.7584	0.6866	1.8534	8	−0.2037	−0.1633	0.8273	0.9853	1.8534
1	82	0.0335	−0.1681	0.5519	0.5436	1.2680	75	0.0087	−0.1929	0.6230	0.8092	1.3020
2	3[illegible]	0.0187	−0.1015	0.5101	0.5088	0.8517	292	0.0963	−0.0451	0.4936	0.7967	0.8554
3	486	0.1020	−0.0545	0.5354	0.5384	0.7188	434	0.1772	−0.0185	0.5234	0.7892	0.6939
4	57[illegible]	0.0782	−0.0245	0.4630	0.4756	0.5915	517	0.2273	−0.0002	0.4680	0.7168	0.6097
5	606	0.0[illegible]69	−0.0230	0.4614	0.4562	0.4386	528	0.2180	0.0302	0.4383	0.6820	0.4578
6	582	0.1[illegible]33	0.0298	0.4192	0.4231	0.4291	532	0.2914	0.0981	0.4037	0.6091	0.4339
7	454	0.120[illegible]	0.[illegible]451	0.3846	0.3867	0.2905	398	0.3081	0.0988	0.3904	0.5650	0.3046
8	322	0.1034	0.0206	0.3852	0.3936	0.2002	284	0.2417	0.1238	0.4100	0.5767	0.2047
9	135	0.1587	0.1203	0.3994	0.3843	0.1722	112	0.4881	0.2306	0.3249	0.5808	0.1554
All	3,579	0.0911	−0.0091	0.4419	0.4529	0.4740	3,180	0.2320	0.0438	0.4387	0.6666	0.4930
High (8,9)	457	0.1198	0.0408	0.3[illegible]7	0.3912	0.1938	396	0.3114	0.1470	0.3653	0.5783	0.2002
Low (0,1,2)	419	0.0198	−0.1158	0.5281	0.5184	0.9482	375	0.0723	−0.0882	0.5123	0.8011	0.9662
High–Low		0.1000	0.1566	−0.1374	−0.1272	−0.7543		0.2390	0.2352	−0.1470	−0.2228	−0.7661
p-value		0.0130	< 0.000	< 0.000	< 0.000	< 0.000		< 0.000	< 0.000	< 0.000	< 0.000	< 0.000

Panel B: Subsample of High BM Firms

	One-Year Ahead						Two-Year Ahead					
SCORE	N	Mean MAR	Median MAR	Beta	RVOL	DE	N	Mean MAR	Median MAR	Beta	RVOL	DE
0	4	−0.1090	−0.2789	0.8179	0.6378	3.2790	[illegible]	−0.0684	−0.0126	1.1454	0.9060	3.2790
1	35	0.1263	−0.0561	0.4149	0.5175	0.8571	28	0.2137	0.0115	0.4412	0.7768	0.8133
2	133	0.0398	−0.0224	0.4682	0.4983	0.5968	11[illegible]	0.185[illegible]	0.0610	0.3923	0.7693	0.5976
3	183	0.1514	0.0298	0.4660	0.5726	0.6453	164	0.26[illegible]1	0.0354	0.4499	0.8336	0.6446
4	188	0.2002	0.0466	0.3815	0.5133	0.5111	172	0.35[illegible]	0.0787	0.3665	0.7263	0.5529
5	198	0.1703	0.0165	0.3538	0.5033	0.3309	175	[illegible].[illegible]823	[illegible].1557	0.3796	0.7445	0.3471
6	151	0.1720	0.1203	0.3222	0.5092	0.3808	137	0.40[illegible]	0.15[illegible]6	[illegible].3089	0.6859	0.3658
7	88	0.1796	0.0411	0.2660	0.4575	0.4273	80	0.5050	[illegible].[illegible]619	[illegible].2739	0.6446	0.4122
8	63	0.2281	0.0499	0.3326	0.4863	0.2213	54	0.4451	0.348[illegible]	[illegible].3124	0.6823	0.2551
9	32	0.2661	0.2250	0.2432	0.5254	0.2365	26	0.6222	0.434[illegible]	[illegible].[illegible]00	0.8333	0.1863
All	1075	0.1609	0.0424	0.3779	0.5125	0.4573	959	0.3504	0.1089	[illegible].[illegible]359	0.7[illegible]7	0.4740
High (8,9)	95	0.2409	0.1297	0.3149	0.4967	0.2213	80	0.5027	0.3511	0.2[illegible]1	0.7133	0.2303
Low (0,1,2)	172	0.0539	−0.0382	0.4421	0.5086	0.6455	151	0.1871	0.0389	0.4095	[illegible].[illegible]7[illegible]	0.6553
High–Low		0.1870	0.1678	−0.1272	−0.0119	−0.4241		0.3156	0.3122	−0.1505	[illegible].[illegible]79	−0.42[illegible]
p-value		0.0130	0.0080	0.0140	0.4700	< 0.000		0.0080	0.0050	0.0080	0.0[illegible]00	< [illegible].000

3.2 Composite Scores and Future Stock Returns for High BM Firms

Panel B of table 3 reports portfolios of a subsample of high BM firms formed based on SCORE with the one-year and two-year investment horizons. Similar to results for all sample firms discussed earlier, our results for a subsample of high BM firms indicate that higher SCORE firms earn more positive subsequent abnormal returns than do lower SCORE firms. Specifically, the mean (median) of one-year MAR for the high and low group is 24.09% (12.97%) and 5.39% (–3.82%), respectively. Consequently, a mean (median) return difference (High – Low) is 18.70% (16.78%), respectively. Similarly, for two-year MAR, the mean (median) for the high and low group is 50.27% (35.11%) and 18.71% (3.89%). As a result, a mean (median) return difference (High – Low) is 31.56% (31.22%). Our results are consistent with Piotroski (2000).

3.3 Do Greater Returns Come with Higher Risk?

Higher returns for firms with higher SCORE may potentially come with high risks. In other words, high score portfolio may generate high returns just because of a vast majority of high-risk stocks in the portfolio, and the lower returns in the low score portfolio may solely result from a large numbers of low-risk stocks. If so, historical accounting information may not be as useful as we would hope because investors can obtain high returns merely from choosing stocks with high risks. Thus, in this section, we further examine the relationship between portfolio returns formed based on SCORE and their associated ex-post risks.

This paper employs 3 indicators as a risk proxy: beta, return volatility (RVOL), and debt-to-equity ratio (DE). These three risk proxies for each portfolio formed based on SCORE are reported in the last three columns in table 3 for each investment horizon. We compare all three risk proxies between high and low SCORE groups and find that almost all cases risk proxies for high SCORE group are significantly lower than those for low SCORE firms. In other words, high SCORE groups are not riskier than low SCORE groups. In summary, portfolios with higher SCORE earn higher future stock returns than do portfolios with lower SCORE without additional risk.

CONCLUSION

This paper shows that a simple accounting-based fundamental-driven strategy on a sample of all firms and high BM firms can effectively earn significant positive future abnormal stock returns. Our sample includes listed firms in the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (mai) during 1994 to 2008. We employ the composite score (SCORE) used in Piotroski (2000). The composite score is the sum of binary scores (1 or 0) marked from each individual financial measure. SCORE represents traditional financial measures in three areas: profitability, leverage/liquidity, and operating efficiency.

Our empirical evidence suggests that a portfolio of stocks with higher SCORE earn higher one-year and two-year ahead market-adjusted returns and that a zero-investment portfolio of longing high SCORE stocks and shorting low SCORE

earn significant positive future market-adjusted returns for both all sample firms and a subsample of high BM firms. Our results for high BM firms are consistent with Piotroski (2000).

We also further examine whether higher future stock returns for portfolios with higher SCORE come with higher risk. We employ three risk proxies: beta, return volatility, and debt-to-equity ratio. Our results show that high SCORE portfolios are not riskier than low SCORE portfolios. Overall, high SCORE portfolios earn more positive abnormal returns than do low SCORE portfolios without additional risk.

Our empirical results contribute to the literature on the usefulness of historical accounting information in predicting future stock returns. While prior research finds that financial ratios are associated with future stock returns, our study provide empirical evidence suggesting that the composite score constructed based mainly on historical accounting information can be used to choose stocks to invest to earn positive abnormal returns and they can be applied for not only high BM firms, but also for all firms. Moreover, our results contribute to the literature on the efficient market hypothesis. Specifically, our results that investors can use publicly available, historical accounting information to choose stocks and earn abnormal stock returns seem to suggest that Thai stock markets are not semi-strong form efficient.

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