Financial Ratio Determinants on Abnormal Stock Returns: An Empirical Evidence of Thailand*

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ABSTRACT

This study examines whether profitability measures predict stock abnormal returns in the Stock Exchange of Thailand. We particularly examine gross profit, earnings, standardized unexpected earnings, accruals, and cash flows from operations. The Fama-MacBeth panel regressions show that gross profit, accruals, and cash flows from operations significantly predict stock returns. Consistently, the formed portfolios show similar results. Surprisingly, earnings and standardized unexpected earnings do not play an important role in equity valuation, inconsistent to the evidences in developed markets.

Keywords: Financial Ratios, Profitability, Abnormal Returns

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บทความวิจัย

อัตราส่วนทางการเงินที่บ่งชี้ผลตอบแทนจากราคาหลักทรัพย์เกินปกติ: หลักฐานเชิงประจักษ์ในประเทศไทย*

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บทคัดย่อ

งานวิจัยนี้ศึกษาว่า ตัวชี้วัดความสามารถในการทำกำไรช่วยพยากรณ์ผลตอบแทนเกินปกติหลักทรัพย์ในตลาดหลักทรัพย์แห่งประเทศไทยได้หรือไม่ ตัวชี้วัดการทำกำไรที่ศึกษาได้แก่ กำไรขั้นต้น กำไร กำไรที่เกินคาดการณ์มาตรฐาน รายการคงค้าง และกระแสเงินสดจากการดำเนินงาน ผลการวิเคราะห์ถดถอยตามแบบจำลอง Fama-Macbeth พบว่า กำไรขั้นต้น รายการคงค้าง และกระแสเงินสดจากการดำเนินงานพยากรณ์ผลตอบแทนได้อย่างมีนัยสำคัญ การลงทุนในหลักทรัพย์ที่จัดทำขึ้นแสดงผลที่ตลาดคล้องกัน อย่างไรก็ตาม ผลกำไรและกำไรที่เกินคาดการณ์มาตรฐานไม่มีความสำคัญในการประเมินมูลค่าหลักทรัพย์ซึ่งแย้งกับผลการวิจัยอดีตในบริบทตลาดที่พัฒนาแล้ว

คำสำคัญ: อัตราส่วนทางการเงิน ความสามารถในการทำการไร กำไรเกินปกติ

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1. Introduction

Financial variables are useful in measuring firm performance as well as in predicting failure of reorganization. Prior work establishes the evidence that book-to-market predicts the cross-sectional returns, according to value strategies, as well as profitability predicts abnormal returns. Novy-Marx (2013) suggests that adding a profitability strategy on top of an existing value strategy reduces overall portfolio volatility. This empirical evidence is primarily documented in the context of developed markets.

Our study aims to examine whether financial measures of profitability can be used to predict abnormal returns on the Stock Exchange of Thailand (SET). We examine the financial variables including gross profit (Novy-Marx, 2013), earnings (Balakrishnan, Bartov & Faurel 2010), standardized unexpected earnings (Bernard, Thomas & Wahlen, 1997), accruals (Sloan, 1996), and cash flows from operations (Desai, Rajgopal & Venkatachalam 2004; Narktabtee, Carnes, & Black 2002). The aforementioned financial variables have information content. We postulate that the financial variables predict abnormal returns. The inverse relation between accruals and abnormal returns is hypothesized. We run the Fama-Macbeth regression models to examine the association between the financial variables and the expected returns. Consequently, abnormal returns earned using trading strategies based on each of explanatory variables are constructed. To control for systematic risk factors, the analysis models control for firm size, book-to-market, and momentum.

Using stocks listed in the SET during the period of 1999 to 2009, the findings indicate that gross profit, cash flows from operations, and accruals significantly predict abnormal returns. Our results do not provide sufficient supports for the predictive power of earnings and standardized unexpected earnings. This may be resulted from the mixed attributes of accounting measurement, financing, and investing activities. The lack of power of standardized unexpected earnings is consistent with the previous literatures in Asian emerging markets.

The implications of this study are two-fold. Practically, the empirical results identify the financial ratios that predict abnormal returns on SET stocks. This will help investors to understand that they should not focus only on earnings when making investment decisions (Ball & Bartov 1996). Moreover, relevant regulators can benefit from the findings in governing the trading activities and educating unsophisticated investors to reduce overall volatility. Academically, the findings extend the body of knowledge in abnormal returns, fundamental analysis, and investment strategies by examining various financial ratios in the context of emerging capital markets. The results also add to the growing literatures in emerging capital markets which exhibit different characteristics from developed markets.

The remaining of the paper is organized as follows. Section 2 reviews relevant literature. Section 3 describes research design including data, sample, and test models. Section 4 presents the empirical findings. The last section offers summary and conclusions.

2. A review of key financial ratios to determine abnormal returns

Prior literature suggests that some key financial ratios measuring profitability predict abnormal stock returns, including gross profit-to-assets, standardized unexpected earnings, assets-scaled accruals, and assets-scaled cash flows from operations. Earnings or net income as a bottom line figure off from the statement of income is a commonly used measure of profitability. Analysts mostly focus on the earnings as a proxy of firm performance. Fama and French (2006) find that their cross sectional regressions suggest the relation between earnings and average returns according to the clean surplus accounting. Balakrishnan et al. (2010) also argue that high earnings firms provide future abnormal returns. If the earnings are not accounted for, the current firm value is likely underestimated. In other words, earnings and future abnormal returns are positively associated. Therefore, we conjecture that in an emerging market, earnings level can predict abnormal stock returns as well.

Even though earnings have been accepted as a proxy of future profitability, gross profit is a simpler and better proxy for future profitability (Novy-Marx, 2013). Gross profit possesses the role of price determination. It is the least massy measure because it is revenues reduced only by cost of goods sold and represents true economic profitability. Novy-Marx (2013) concludes that gross profit scaled by assets has more power than earnings predicting the cross-section of returns. We consistently postulate that gross profitability predicts abnormal returns in an emerging market.

Another earnings related ratio, the standardized unexpected earnings defined as the change in net income scaled by share price is a risk proxy and a product of mispricing (Bernard & Thomas 1989; 1990). Prior studies argue that the standardized unexpected earnings predict abnormal returns because the post earnings announcement drift and earnings change in the same direction (Ball, Kothari & Watts, 1993; Bernard & Thomas, 1990; Bernard, Thomas & Wahlen, 1997). In this study, we posit that the standardized unexpected earnings predict positive future abnormal stock returns.

Two components of earnings, accruals and cash flows, are proxies of earnings persistence and theoretically should be priced by markets. The persistence of current earnings reflects on increasing cash flow component and decreasing accrual component (Sloan, 1996). Desai, Rajgopal, and Venkatachalam (2004) find that cash flows from operations deflated by assets predict returns, and its effect may dominate the effect of accruals. Nonetheless, Sloan (1996) finds that the accrual component negatively associates with future stock returns. He attributes the findings to earnings

fixation by investors. Narktabtee et al. (2002) argue that in the Thai market, when cash flows are permanent and earnings are transitory, cash flows have more information content. Therefore, we hypothesize that operating cash flows predict positive future abnormal stock returns and, in contrast, the accrual component predicts negative future abnormal stock returns. In order to examine the power of the aforementioned measures of profitability, we control for firm size and book-to-market.

Prior works substantiate that firm sizes and book-to-market ratios are highly correlated with cross-sectional stock returns (*e.g.*, Berk (1995), Daniel and Titman (1997), Fama and French (1992, 1993, 2006)). Book-to-market ratio is used as a measure of optimism or pessimism toward a stock valuation (Graham & Dodd, 1934). A low book-to-market firm is considered as a growth firm. That is, a low book-to-market presents a relatively optimistic market value as well as the firm is overpriced. A high book-to-market, on the other hand, represents that the market is pessimistic toward the firm and so underprices the firm's stock relative to its fundamental value.

In conclusion, financial ratios representing profitability predict abnormal stock return. We empirically test whether these ratios well predict the cross section of abnormal returns in an emerging market.

3. Data, key financial ratios, and hypotheses

3.1 Sources and data descriptions

The sample consisting of all companies listed in the Stock Exchange of Thailand (SET) over the period of 1999–2009[1]. Empirical tests employ all firm-month observations in the SET Market Analysis and Reporting Tool (SETSMART) for which information is available to derive the financial ratios reprinted in Table 1. The sample excludes financial firms.

3.2 Key financial ratios

Based on the results from previous studies, we select major financial variables as key determinants of abnormal stock returns as follows:

[1] Narktabtee et al. (2002) provides an excellent background of Thailand's economy and accounting standards during 1980s and 1990s.

Table 1 Key Financial Ratios as Test Variables

Symbol	Financial Ratio	Formula
GP	Gross profit to assets	$\frac{(\text{Sale revenues}_{i,t} - \text{Cost of Goods Sold}_{i,t})}{\text{Asset}_{i,t}}$
NI	Net Income to assets or Earnings level to assets	$\frac{(\text{Sale revenues}_{i,t} - \text{All Expenses}_{i,t})}{\text{Asset}_{i,t}}$
SUE	Standardized unexpected earnings	$\frac{(\text{Net Income}_{i,t} - \text{Net Income}_{i,t-1})}{\text{Share Price}_{i,t-1}}$
Accrual	Assets-scaled-Accruals[2]	$\frac{(\text{Net income} - \text{CF from Operation})}{\text{Assets}}$

3.3 Hypotheses

Our aim of this study is to investigate the capabilities of the selected financial ratios to explain abnormal stock returns. Due to lacks of evidence in developing markets as well as increasing roles of developing markets in global context, it is interesting to study the relation using the stock market in Thailand. Given the evidence from seminal works mostly in developed countries, the hypotheses in alternative form are as follows:

Hypothesis I: Earnings predict positive future abnormal stock returns.

Hypothesis II: Gross profit predicts positive future abnormal returns.

Hypothesis III: Standardized unexpected earnings predict positive future abnormal stock returns.

Hypothesis IV: Cash flows from operations predict positive future abnormal stock returns.

Hypothesis V: Accruals predicts negative future abnormal returns.

4. Methodology and portfolio characteristics adjustment procedure

In this section we employ the Fama and Macbeth (1973) and a portfolio-characteristics adjustment procedure (Daniel & Titman 1997; Fama & French, 1993, 1996). Below is a brief discussion.

[2] For this study, the equation (6) is used to compute assets-scaled-accruals, which complies with SFAS No. 95, IAS No. 7 and Thai Accounting Standard No. 25 (TAS No. 25).This measure of accruals uses the balance sheet approach to avoid the measurement error (Hribar and Collins, 2002).

4.1 Fama-Macbeth Regression

We employ the Fama-Macbeth (1973) regression as follows:

$$R_{j,t} = \beta_0 + \beta_i x_i + \beta_{ME} ln(ME) + \beta_{BM} ln(MB) + \beta_{Mon} Momentum + \varepsilon_{j,t} \quad ...(1)$$

where $R_{j,t}$ is annual return of firm j from July in year t to June in year t+1; x_i is explanatory variables, namely earnings (NI), gross profit (GP), standardized unexpected earnings (SUE), accrual, and cash flows from operations; *ME* is the market capitalization of firm *j*, a proxy of firm size; *BM* is the book-to-market ratio of firm *j*; Momentum is the cumulative return of the firm over the past six months at the beginning of the firm's annual return used in computation.[3] *ln* denotes the natural logarithm.

4.2 Portfolio characteristics adjustment procedure

We form a benchmark portfolio by sequential sorting on the basis of size, book-to-market (BM), and momentum at time *t*. We group each the size and the BM into three groups (terciles) and the momentum into two groups. This procedure yields 18 size, book-to-market and momentum benchmark portfolios. The construction of characteristics-based portfolio returns are *ex ante* explanatory variables of cross sections of stock returns (Daniel and Titman 1997; Fama and French 1993; 1996).

We calculate trading strategy abnormal returns following the proceeding steps. Sample is ranked by each predictor variable into quintile portfolios. For each portfolio, the abnormal returns for each time period (annual or monthly) are calculated after the sorting period. The hedge profits to a trading strategy are estimated. The trading strategy used in this paper is a strategy of going long in the portfolio, which is predicted to have highest positive abnormal returns, and shorting the portfolio that is predicted the most negative future abnormal returns.

First, to compute the risk premium associated with the size, book-to-market and momentum group are obtained, all sample firms on SET are categorized into three groups by market capitalization. Within each size tercile, stocks are ranked into tertiles based on book-to-market. Then, stocks were ranked based on 50-percentile momentum. Therefore, 18 portfolios characterized by market capitalization, book-to-market, and momentums are derived. For each portfolio, portfolio expected returns are average stock returns of each firm that belongs to the same size, book-to-market and momentum category. We calculate abnormal returns for each test firm

[3] We allow for a six-month gap between the most recent fiscal year end and the start of the month for the accumulation of the annual return for the dependent variable. The six-month gap allows enough time for investors to obtain the accounting data from the prior fiscal year in order to form portfolios to trade on the information (Alford, Jones & Zmijewski, 1994; Fama & French, 1992). This practice is commonly used in research studies on trading strategies (see, for example, Fama and French (1992)).

and average abnormal returns for quintile portfolio sorted by each predictor variable.

For an instance, when gross profit is used as a predictor, the highest gross profit quintile should earn the highest abnormal returns and the lowest quintile earns the lowest. The investment strategy is to long the highest quintile and short the lowest quintile, so the hedge returns is calculated by subtracting the top quintile return with the bottom quintile return. For example, if the highest quintile earns an abnormal return of 6% and the lowest quintile earns an abnormal return of –7%, the hedge returns are (6% – (–7%)) = 13%. After calculating hedge returns in each period, *t*-statistic is calculated using the time series of the hedge returns over the periods for which data for stock returns and the financial ratios are used in this study.

5. Empirical results

5.1 Descriptive statistics

Table 2 reports the descriptive statistics for the sample. In general, these variables are similar in ballpark figures documented in prior works in the U.S. markets (Sloan, 1996; Balakrishnan et al., 2010; Novy-Marx, 2013).

Table 2 Descriptive Statistics for the Sample

The table summarizes descriptive statistics for the sample data. The resulting sample of 36,220 firm-month observations comprises all Thai companies listed on SET from 1999 to 2010 excluding financial firms. *ln*(ME) is a natural logarithm of market capitalization, a proxy for firm size; *ln*(BM) is a natural logarithm of book-to-market; Momentum is the cumulative return of the firm over the past six months; GP is gross profit-to-assets ratio; NI is net income-to-assets ratio; SUE, standardized unexpected earnings, is net income in fiscal year t–1 minus net income in fiscal year t–2 and deflated by price end in year t–2; CFO is cash flows from operations to assets from the most recent fiscal year end (year t–1); Accrual is net income reduced by accruals scaled by assets from the most recent fiscal year end (year t–1).

Variable	Mean	Standard deviation	Minimum	Maximum
ln(ME)	7.387	1.677	2.015	13.974
ln(BM)	0.003	0.851	–5.944	4.017
Momentum	0.125	0.571	–0.980	15.596
GP	0.236	0.162	–0.419	2.323
NI	0.054	0.113	–1.621	3.785
SUE	132.541	3041.448	–21941.590	98080.080
CFO	0.087	0.135	–1.153	1.219
Accrual	–0.032	0.130	–1.933	3.799

Table 3 reports the Spearman rank correlations. Gross profit, earnings, standardized unexpected earnings, and cash flows from operations are positively correlated. As expected, accrual is negatively correlated with cash flows from operations, consistent with results from prior works in the U.S markets (Desai et al., 2004; Sloan, 1996). Accrual is negatively correlated with momentum and book-to-market. The momentum factor is positively correlated with all earnings-related variables.

5.2 Fama-Macbeth regression results

Table 4 provides the Fama-Macbeth regressions of annual returns on earnings, gross profit, standardized unexpected earnings, cash flows from operations, and accrual. The firm size, book-to-market, and momentum are included as control variables. The coefficients of book-to-market are significant in all models. The coefficients of firm size are significant except in the regression on standardized unexpected earnings. Our statistical results do not support *Hypotheses I*, *II* and *III*.

Table 3 Spearman Rank Correlation among variables

This matrix presents the time-series average of the cross-sectional Spearman rank correlations between independent variables. The samples of 36,220 firm-month observations comprise all Thai listed companies on SET from July 1999 to June 2010 excluding firms in financial sector. *ln*(ME) is a natural logarithm of market capitalization, a proxy for firm size; *ln*(BM) is a natural logarithm of book-to-market; Momentum is the cumulative return of the firm over the past six months; GP is gross profit-to-assets ratio; NI is net income-to-assets ratio; SUE, standardized unexpected earnings, is net income in fiscal year t–1 minus net income in fiscal year t–2 and deflated by price end in year t-2; CFO is cash flows from operations to assets from the most recent fiscal year end (year t–1); Accrual is net income reduced by accruals scaled by assets from the most recent fiscal year end (year t–1). * indicates significance at the 0.01 level.

	GP	NI	SUE	CFO	Accrual	*ln*(ME)	*ln*(BM)
NI	0.671*						
SUE	0.204*	0.344*					
CFO	0.476*	0.542*	0.146*				
Accrual	0.025*	0.216*	0.126*	–0.608*			
ln(ME)	0.186*	0.358*	0.074*	0.181*	0.100*		
ln(BM)	–0.357*	–0.360*	–0.033*	–0.191*	–0.054*	–0.545*	
Momentum	0.132*	0.228*	0.204*	0.168*	–0.002	0.118*	0.185*

The coefficients on earnings in (1) and gross profit in (2) and standardized unexpected earnings in (3) are positive but not significant. This surprises us that these earnings-related variables do not possess enough power to explain abnormal returns in the SET. The coefficient on cash flows from operation is significant, consistent with *Hypothesis IV*. The coefficient on accrual is also significant, supporting *Hypothesis V*. In particular, cash flows from operations predict abnormal returns, while accruals predict negative abnormal returns.

In Panel B, the coefficients of firm size are not significant in all regressions. The momentum factor in Panel B is negative and significant, showing a contrary effect (Hong & Stein, 1999). This evidence is similar to Kang, Liu, and Ni (2002), contrasting to the evidence that exhibits a momentum behavior in the U.S. stock markets (Hong & Stein, 1999; Novy-Marx, 2013). The regression shows that earnings and standardized unexpected earnings do not significantly predict abnormal return. The coefficient of gross profit is significant, supporting Hypothesis II. The predictive power of gross profit is consistent with prior studies in the U.S. (Balakrishnan et al., 2010; Novy-Marx, 2013). The regressions on monthly returns reveal that cash flows from operation predict abnormal returns. The cash flows from operations and accruals are statistically significant on both the monthly and annual criteria, which supports the Hypotheses IV and V. These findings regarding two components of earnings confirm the results from prior evidence (Desai et al., 2004; Narktabtee et al., 2002; Sloan, 1996).

5.3 Portfolios by explanatory variables

The Fama-Macbeth regressions in Table 4 suggest that gross profit, cash flows from operations, and accruals significantly predict expected returns. To further investigate economic significance of ratios, we use the portfolio characteristics procedure to find the average abnormal returns in quintile portfolios. We then calculate the hedge profits from a zero investment strategy that goes long in the positive predictor quintile and short in the negative predicted return quintile.

Table 5 presents time-series average portfolio characteristic based on size (market capitalization in million THB) and book-to-market to control for systematic risk, sorted on various predictors. We construct portfolios using a quintile sorted by earnings (Panel A), gross profit (Panel B), standardized unexpected earnings (Panel C), cash flows from operations (Panel D) and accruals (Panel E). Portfolios are rebalanced each year at the end of June during the sample period. Table 5 reports the portfolios' equally-weighted average abnormal returns, and the time-series average of portfolios' predictor variable, market capitalization (in million THB), book-to-markets, and the average number of stocks in each quintile portfolio (*n*). The time period covers July 1999 to June 2010 and the sample excludes financial firms.

Table 4 Fama-Macbeth Regression Model of Returns on Measures of Profitability

Panel A: Fama-Macbeth Regression Model of Annual Returns on Predictors

Panel A reports results from Fama-Macbeth regressions of annual returns on (1) GP, (2) NI, (3) SUE, (4) CFO, and (5) Accrual. The regression models control for *ln*(ME) in end of June in year *t*, *ln*(BM) at the end of December in year *t–1*, Momentum. All models include fixed effects and t-statistics are in parentheses. The samples of 2,867 observations firm-year excludes financial sector firms and covers July 1999 to June 2010. *ln*(ME) is a natural logarithm of market capitalization, a proxy for firm size; ln(BM) is a natural logarithm of book-to-market; Momentum is the cumulative return of the firm over the past six months; GP is gross profit-to-assets ratio; NI is net income-to-assets ratio; SUE, standardized unexpected earnings, is net income in fiscal year t–1 minus net income in fiscal year t–2 and deflated by price end in year t–2; CFO is cash flows from operations to assets from the most recent fiscal year end (year t–1); Accrual is net income reduced by accruals scaled by assets from the most recent fiscal year end (year t–1). *, **, *** represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

Independent variables	(2)	(1)	(3)	(4)	(5)
Intercept	0.380**	0.298*	0.[illegible]**	0.340**	0.334**
	(2.82)	(1.99)	(2.61)	(2.66)	(2.64)
ln(ME)	–0.027**	–0.023*	–0.021	–0.028**	–0.0211**
	(–2.25)	(–2.00)	(–1.73)	(–2.3)	(–1.85)
ln(BM)	0.090***	0.101***	0.097**	0.100***	0.092**
	(3.17)	(3.48)	(3.04)	(3.56)	(3.17)
Momentum	0.140*	0.130	0.146*	0.124	0.132*
	(2.03)	(1.77)	(2.06)	(1.71)	(1.96)
NI	0.229				
	(1.37)				
GP		0.253			
		(1.42)			
SUE			0.0000		
			(1.47)		
CFO				0.574***	
				(3.82)	
Accrual					–0.358***
					(–4.06)

Table 4 (Cont.) Fama-Macbeth Regression Model of Returns on Individual Predictor Variables

Panel B: Fama-Macbeth Regression Model of Monthly Returns on Predictors

Panel B reports results from Fama-Macbeth regressions of monthly returns on on (1) NI, (2) GP, (3) SUE, (4) CFO, and (5) Accrual. The regression models control for *ln*(ME) in end of June in year *t*, *ln*(BM) at the end of December in year *t–1*, Momentum. The sample of 36,220 firm-month observations covers July 1999 to December 2010. *ln*(ME) is a natural logarithm of market capitalization, a proxy for firm size; *ln*(BM) is a natural logarithm of book-to-market; Momentum is the cumulative return of the firm over the past six months; GP is gross profit-to-assets ratio; NI is net income-to-assets ratio; SUE, standardized unexpected earnings, is net income in fiscal year t–1 minus net income in fiscal year t–2 and deflated by price end in year t–2; CFO is cash flows from operations to assets from the most recent fiscal year end (year t–1); Accrual is net income reduced by accruals scaled by assets from the most recent fiscal year end (year t–1). *, **, *** represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

Independent variables	(1)	(2)	(3)	(4)	(5)
Intercept	0.0298***	0.0246**	0.0287***	0.0282***	0.0286***
	(3)	(2.25)	(2.89)	(2.78)	(2.84)
ln(ME)	–0.0017	–0.0014	–0.0014	–0.0017	–0.0014
	(–1.27)	(–1.12)	(–1.08)	(–1.3)	(–1.09)
ln(BM)	0.0031	0.004*	0.0033*	0.0034*	0.0027
	(1.59)	(1.93)	(1.73)	(1.73)	(1.44)
Momentum	–0.0117***	–0.0128***	–0.0114**	–0.0124***	–0.0105**
	(–2.76)	(–3.18)	(–2.6)	(–2.91)	(–2.34)
NI	0.0167				
	(1.14)				
GP		0.0189*			
		(1.69)			
SUE			0.0000		
			(0.94)		
CFO				0.0304***	
				(2.8)	
Accrual					–0.0201**
					(–2.6)

Table 5 Portfolio Characteristic Sorted on Explanatory Variables

This table shows time-series of annual equal-weighted average abnormal returns to portfolios sorted on predictors and time-series average portfolio characteristics based on GP, NI, SUE, CFO, ACCRUAL, average firm size (ME, in million THB), BM, and the number of firms (n). The samples exclude financial sector firms and covers July 1999 to June 2010. The portfolio is rebalanced in June of each year. The hedge abnormal returns and t-statistic are shown in the table. *, **, *** represent significance at the 0.10, 0.05, and 0.01 levels (one-tailed), respectively.

Panel A: Gross Profits Portfolio

	Abnormal returns	GP	ME	BM	n
Low	–0.0478	0.0641	1069	1.34	53
2	–0.0443	0.1445	1447	1.24	52
3	–0.0029	0.2100	1310	1.15	52
4	0.0154	0.2905	1707	0.95	52
High	0.0762	0.4815	2324	0.67	53
High-Low	0.1239**				
t	1.873				

Panel B: NI Portfolio

	Abnormal returns	NI	ME	BM	n
Low	–0.0186	–0.0715	714	1.25	55
2	–0.0194	0.0198	1160	1.30	54
3	–0.0142	0.0561	1622	1.15	54
4	0.0166	0.0947	1911	0.95	54
High	0.0387	0.2131	3147	0.65	55
High-Low	0.0573				
t	0.9237				

Table 5 (Cont.)

Panel C: SUE Portfolio

	Abnormal returns	SUE	ME	BM	n
Low	0.0085	–0.5435	1923	1.01	53
2	–0.0665	–0.0082	855	1.19	52
3	–0.0417	0.0038	871	1.13	52
4	–0.0045	0.0324	1660	0.97	52
High	0.0937	1.6982	3300	0.89	53
High-Low	0.0851**				
t	1.8246				

Panel D: Cash Flows from Operations Portfolio

	Abnormal returns	CFO	ME	BM	n
Low	–0.1080	–0.0894	1269	1.03	55
2	–0.0432	0.0342	1091	1.31	54
3	–0.0276	0.0859	1654	1.18	54
4	0.1060	0.1401	1713	1.01	54
High	0.0767	0.2624	2432	0.72	55
High-Low	0.1847**				
t	3.1627				

Panel E: Accruals Portfolio

	Abnormal returns	Accrual	ME	BM	n
Low	0.1026	–0.1703	1316	0.96	55
2	0.0469	–0.0798	1488	1.01	54
3	–0.0248	–0.0401	1634	1.09	54
4	–0.0477	0.0038	1622	1.09	54
High	–0.0755	0.1659	1557	1.00	55
High-Low	0.1780***				
t	3.0226				

The gross profits portfolios' average returns are generally increasing with gross profitability (Panel A). The abnormal returns of the profitable minus unprofitable return spread is 12.39% per year (t = 1.873). Firms generating high gross profits are likely to be growth firms with relatively low book-to-market; unprofitable firms tend to be value firms with high book-to-market. Earnings portfolio shows the similar pattern of the average abnormal returns increasing with net income (Panel B). While the abnormal returns of 5.73% per year is sizeable, it is not statistically significant, t = 0.9237. It is consistent with the regression results in Table 3. For the standardized unexpected earnings portfolios, the average abnormal returns is 8.51% (t = 1.8246), inconsistent with the regression results in Table 3. Additionally, cash flows from operations portfolios' average abnormal returns are also increasing with the average cash flows from operations quintiles. The hedge returns of 18.47% per year is significant, t = 3.1627. The result subsumes the mispricing attributed to the other predictor variables, consistent with Desai et al. (2004). The accrual portfolios show that the average abnormal returns are decreasing with the average accruals, with the hedge strategy that goes long on the lowest accruals to assets portfolio (portfolio number 1) and shorts the highest accruals to assets portfolio (portfolio number 5). The hedge returns of 17.80% are significant, t = 3.023. Interestingly, in the U.S. the accrual anomalies have not been detected since the late 2000s, whereas the results suggest that the strategy continues existing in the Thai market.

In brief, our parametric and nonparametric results provide support to *Hypotheses II*, *IV*, and *V*. Consistent with *Hypothesis II*, the positive association between gross profit and the expected returns on SET stocks is significant. The gross profit portfolios confirm *Hypothesis II* and present the significant hedge returns. The predicted association between cash flows from operations and the expected returns on SET is supported with the hedge returns of 18.41%. Accrual, as expected, inversely relates with the expected returns on SET corresponding to *Hypothesis V*. The accrual portfolios yield the significant hedge returns of 17.8%.

Our results do not substantiate *Hypotheses I* and *III*. The relation between earnings and the expected returns is marginally significant. The hedge returns of the earnings portfolio are also not significant. The insignificant effect of earnings may be attributed to the characteristics of earnings. Earnings are confounded by financing and tax effects as well as accounting estimation and judgments. For *Hypothesis III*, the association between standardized unexpected earnings, a proxy of post earnings announcement drift, and the expected returns cannot be statistically detected. Though the undetected effect of standardized unexpected earnings contradicts to prior research conducted in the developed markets, it is consistent with prior literature conducted in the Asian emerging capital markets.

6. Conclusions and further research

The goal of this study is to investigate whether the set of profitability ratios well documented for the U.S. and European markets perform similarly in the Thai stock market. Based on measures used in fundamental analysis, we examine whether gross profit, earnings, standardized unexpected earnings, accruals, and cash flows from operations predict the abnormal returns on SET stocks. We perform the Fama-Macbeth panel regression and the portfolio-characteristics adjustment procedure to examine how the explanatory variables predict the cross-section of expected returns.

The regression results suggest that gross profit, accruals, and cash flows from operations predict the returns. Consistently, the trading strategies portfolio formed on the three predictive variables generate significant abnormal returns. From our empirical evidence over the year 1999 to 2009 periods, the cash flows from operations and accruals are the good predictors, earning average abnormal returns of 17.8 and 18.5 percent, respectively.

Due to the research design and the uniqueness of SET sample, the interpretation of the empirical findings should be considered with caution. The underlying mechanism of the association between the explanatory variables and abnormal returns is not main focus and open for the future research. Furthermore, future research should investigate on whether the relationship will still hold in the changing accounting and financial reporting environment.

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