Do Thai Capital Markets Accurately Price Cash Flows and Normal and Abnormal Accruals?*

ตลาดทุนในประเทศไทยรับรู้เกี่ยวกับความคงอยู่ของกระแสเงินสด รายการคงค้างปกติ และรายการคงค้างเกินปกติ ในกำไรในอนาคตอย่างถูกต้องหรือไม่

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ABSTRACT

This study empirically investigates the earnings persistence and the market pricing of three earnings components: cash flows from operations, normal (nondiscretionary) accruals, and abnormal (discretionary) accruals in Thailand during 2009-1999. Results on the earnings persistence reveal that, of all three earnings components, cash flows from operations are the most persistence and abnormal accruals are the least persistence with respect to one-year-ahead earnings. The market pricing results from the Mishkin (1983) test suggest that Thai stock market does not rationally price the persistence of all three earnings components. Specifically, Thai stock markets overprice the abnormal accruals persistence while underprice the persistence of cash flows and normal accruals.

Keywords: Earnings Persistence, Market Mispricing, Cash Flows, Accruals, Abnormal Accruals, Discretionary Accruals

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บทคัดย่อ

งานวิจัยนี้ศึกษาเชิงประจักษ์เกี่ยวกับความคงอยู่ในกำไรในอนาคต (Earnings Persistence) และการรับรู้ของตลาดทุนเกี่ยวกับความคงอยู่ในกำไรในอนาคต (Market Pricing) ขององค์ประกอบของกำไร 3 องค์ประกอบ ได้แก่ กระแสเงินสดจากการดำเนินงาน รายการคงค้างปกติ และรายการคงค้างเกินปกติของบริษัทในประเทศไทย ระหว่างปี พ.ศ. 2542 ถึงปี พ.ศ. 2552 ผลวิจัยเกี่ยวกับความคงอยู่ในกำไรในอนาคตพบว่า กระแสเงินสดจากการดำเนินงานมีความคงอยู่ในกำไรในอนาคตมากที่สุด และรายการคงค้างเกินปกติมีความคงอยู่ในกำไรในอนาคตน้อยที่สุด และผลวิจัยเกี่ยวกับการรับรู้ของตลาดทุนเกี่ยวกับความคงอยู่ในกำไรในอนาคตโดยใช้วิธีทดสอบที่เสนอโดย Mishkin (1983) พบว่าตลาดทุนในประเทศไทยไม่ได้มีการรับรู้ความคงอยู่ในกำไรในอนาคตอย่างสมเหตุสมผล กล่าวคือตลาดทุนในประเทศไทยรับรู้ว่ากระแสเงินสดและรายการคงค้างปกติมีความคงอยู่ในกำไรในอนาคตน้อยเกินไป แต่รับรู้ว่ารายการคงค้างเกินปกติมีความคงอยู่ในกำไรในอนาคตมากเกินไป

คำสำคัญ : ความคงอยู่ในกำไรในอนาคต การรับรู้ของตลาดทุนเกี่ยวกับความคงอยู่ของกำไรในอนาคต กระแสเงินสด รายการคงค้าง รายการคงค้างปกติ และรายการคงค้างเกินปกติ

1. INTRODUCTION

Prior research has shown that accounting earnings can be decomposed into two main components: cash flow and accrual components. Sloan (1996) investigates the earnings persistence and the market pricing of the cash flow and accrual components of earnings in the United States and finds that the accrual component is less persistent than the cash flow component and that the U.S. stock markets overprice accruals while underprice cash flows. In other words, the U.S. stock markets seem to fail to fully reflect the lower (higher) persistence of accruals (cash flows) with respect to future earnings.

Pincus et al. (2007) provide empirical evidence on the earnings persistence and the market pricing of cash flow and accrual components of earnings in 20 countries, including Australia, Canada, Denmark, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, the Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, and United States. The accrual components seem to be less persistent than the cash flow components in most countries. Moreover, stock prices in developed markets (e.g., Australia, Canada, the United Kingdom and the United States) overweight the accruals persistence while stock prices in emerging markets (e.g., India, Malaysia, Taiwan, and Thailand) do not seem to overweight the accruals persistence.

Empirical results on the earnings persistence of cash flow and accrual components of earnings in Thailand are mixed. Vivattanachang and Supattarakul (2013) investigate the earnings persistence and the market pricing of cash flow and accrual components of earnings. Their empirical results on the earnings persistence suggest the higher persistence of the cash flow component, relative to the accrual component while Pincus et al. (2007) find an insignificant difference between the persistence parameters of cash flows and accruals.

Moreover, empirical results on the market pricing of the cash flow and accrual components in Thailand are weak. Specifically, results in Vivattanachang and Supattarakul (2013) suggest that Thai stock markets underprice both cash flow and accrual components. Pincus et al. (2007) also find that Thai stock markets underprice cash flows. However, their results on the mispricing of the accruals persistence are insignificant.

Several studies further decompose the accrual components of earnings into two additional components: (i) nondiscretionary or normal accruals and (ii) discretionary or abnormal accruals. Specifically, Subramanyam (1996) and Xie (2001) examine the earnings persistence of cash flow component and two accrual components and Xie (2001) further examines the market pricing of these components in the United States. Subramanyam (1996) documents a positive association between abnormal accruals and future earnings, suggesting the earnings persistence of abnormal accruals. Furthermore, empirical evidence in Xie (2001) suggests that abnormal accruals are less persistent than normal accruals, and normal accruals are less persistent than cash flows and that the U.S. stock markets overprice both normal and abnormal accruals but underprice cash flows.

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The earnings persistence of abnormal accruals of listed firms in Thailand has not been addressed and it may not be implied from empirical results in the United States since financial reporting quality of Thai firms may be different from that of firms in the United States. Specifically, Thai firms are required to prepare financial reports in accordance with Thai Financial Reporting Standards (TFRSs) which are consistent with International Financial Reporting Standards (IFRSs) with some exceptions and there are apparent differences between TFRSs and Generally Accepted Accounting Principles used in the United States (U.S. GAAP). Therefore, the objective of this study is to provide empirical evidence on the persistence of cash flows, normal accruals, and more importantly, abnormal accruals with respect to one-year-ahead earnings in Thailand.

Furthermore, the market pricing of the abnormal accruals persistence in Thailand has never been addressed and it may not be implied from results in the United States. Stock markets in Thailand are emerging markets with much smaller market capitalization and trading volume, relative to stock markets in other developed countries, e.g., the United States, and are not efficient [e.g., Islam et al. (2007) and Tantipanichkul and Supattarakul (2013)]. Additionally, empirical evidence on the market mispricing of the cash flows and accruals persistence in Thailand is inconsistent with that in United States [Sloan (1996), Pincus et al. (2007) and Vivattanachang and Supattarakul (2013)]. Therefore, this study aims at providing empirical evidence on the market pricing of cash flows, normal accruals, and more importantly, abnormal accruals in Thailand.

Consistent with Subramanyam (1996) and Xie (2001), this study decomposes reported earnings into three components: (i) cash flows from operations, (ii) nondiscretionary or normal accruals, and (iii) discretionary or abnormal accruals. The Nonlinear Generalized Least Squares Estimation [the Mishkin (1983) Test] is used to investigate the market pricing of these components with respect to their implications of one-year-ahead earnings. Specifically, the forecasting and valuation models are jointly estimated and the forecasting parameter represents the persistence parameter of the earnings components while the valuation parameter represents the market pricing of their persistence.

Sample firms in this study include firms listed in the Stock Exchange of Thailand (SET) and the Market for Alternative Investments (mai), excluding financials, financial-distressed firms, and property funds. The final sample consists of 2,743 firm-year observationsduring 1999-2009.

Results on the earnings persistence reveal that, of all three earnings components, cash flows from operations are the most persistence and abnormal accruals are the least persistence with respect to one-year-ahead earnings. This is consistent with the U.S. evidence documented in Subramanyam (1996) and Xie (2001).

Results on the market pricing of three earnings components from the Mishkin test suggest that Thai stock markets misprice the persistence of all three earnings components. Specifically, the results indicate that Thai stock markets underprice the persistence of cash flows and normal accruals but overprice the abnormal accruals persistence. Xie (2001) finds that the U.S. stock markets underprice the persistence

of cash flows but overprice both the persistence of normal and abnormal accruals while Pincus et al. (2007) finds that Thai stock markets underprice the cash flows persistence but they do not find significant results for normal and abnormal accruals. The market overpricing of the abnormal accruals persistence potentially implies that a firm's management choose an income-increasing earnings management approach to opportunistically increase the firm's earnings and investors are unable to detect the earnings management opportunities and consequently overweight the persistence of abnormal accruals.

This study contributes to the accounting literature by providing empirical evidence on the earnings persistence of cash flows, normal accruals, and abnormal accruals and the market pricing of their persistence in Thailand. Moreover, results on the earnings persistence are beneficial to financial analysts and investors when they are predicting a firm's future earnings in an estimation of the firm's stock price while results of the market pricing are beneficial to them when they are making stock investment decisions in order to possibly earn abnormal returns. Moreover, the mispricing of the persistence of the earnings components in this study contributes to the market efficiency literature.

The remainder of this study is organized as follows. Section 2 reviews the literatures on the earnings persistence and the market pricing of cash flows and accruals. Section 3 describes the sample selection criteria and variable measurements. Empirical tests are discussed in Section 4. Section 5 discusses empirical results. Finally, section 6 concludes.

2. PRIOR RESEARCH

2.1. The Earnings Persistence of Cash Flows, Normal Accruals, and Abnormal Accruals

A common use of financial statement information is to assess a company's future cash flows generating capability. There is considerable research investigating whether cash basis or accrual basis is a superior predictor of future cash flows and stock returns. Dechow et al. (1998) and Dechow and Dichev (2002) show that accrued accounting earnings are superior to cash accounting earnings in reflecting the firm performance. Although some argue that accruals contain numerous estimates with respect to the defferal and accrual of revenues and expenses embeded into financial statements and consequently, a firm's management may opportunisticlly manipulate firm operating performance. As a result, the quality of accrual accounting earnings is compromised, relatively cash accounting earnings.

Many prior studies decompose reported earnings into several components. Bowen et al. (1987), Bernard and Stober (1989), and Sloan (1996) decompose reported earnings into two components: cash flows and total accruals. Subramanyam (1996) and Xie (2001) further decompose total accruals into two additional components: nondiscretionary or normal accruals and discretionary or abnormal accruals.

Sloan (1996) examines the earnings persistence of reported earnings as well as cash flows and total accruals with respect to one-year-ahead earnings in the United States during 1962-1991 and documents that an average persistence parameter of reported earnings is approximately 0.8, suggesting that accounting rates of return are mean reverting. His empirical evidence further reveals that the persistence of reported

earnings is decreasing in the magnitude of total accruals and increasing in the magnitude of cash flows. In other words, the earnings persistence parameter of total accruals is smaller than that of cash flows, suggesting that total accruals is less persistent than cash flows.

Subramanyam (1996) and Xie (2001) provide empirical evidence on the earnings persistence of cash flows, normal accruals, and abnormal accruals in the United States. Subramanyam (1996) documents a positive association between abnormal accruals and future earnings during 1973-1993, suggesting the earnings persistence of abnormal accruals. Furthermore, empirical evidence in Xie (2001) during 1971-1992 suggests that cash flows are more persistent than both normal and abnormal accruals, consistent with Sloan (1996). Xie (2001) also documents that abnormal accruals are less persistent than normal accruals.

Empirical evidence that cash flows are more persistent than accruals implies that the quality of cash flows is higher than the quality of accruals. Similarly, empirical evidence that abnormal accruals are less persistent than normal accruals implies that the quality of abnormal accruals used by management to opportunistically manage reported earnings is lower than the quality of normal accruals.

In addition to empirical evidence in the United States, Pincus et al. (2007) provide empirical evidence on the earnings persistence of reported earnings and their cash flow and accrual components during 1994-2002 in 20 countries, including Australia, Canada, Denmark, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, the Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, the United Kingdom, and the United States. The persistence parameter of reported earnings is 0.636 for all-country-pooled sample and the persistence parameters for all sample countries areless than 1.0 (ranging from 0.458 to 0.804), indicating that accounting rates of return are mean reverting. Moreover, for all-country-pooled sample, the earnings persistence parameter of accruals is smaller than that of cash flows while results are mixed among countries.

Vivattanachang and Supattarakul (2013) investigate the earnings persistence of reported earnings and their cash flow and accrual components in Thailand during 1999-2007. Consistent with Sloan (1996) and Pincus et al. (2007), their empirical results show that current earnings are persistent with a persistence parameter of less than 1.00, suggesting that accounting rates of return are also mean reverting. Moreover, their results on the earnings persistence of the cash flow and accrual components suggest the higher persistence of the cash flow component, relative to the accrual component.

The earnings persistence of abnormal accruals in Thailand has not been addressed and it may not be implied from empirical results in the United States. Thai firms are required to prepare financial reports in accordance with Thai Financial Reporting Standards (TFRSs) which are consistent with International Financial Reporting Standards (IFRSs) with some exceptions and there are apparent differences between TFRSs and Generally Accepted Accounting Principles used in the United States (US GAAP). Financial reporting quality of Thai firms thus may be different from that of firms in the United States. Therefore, this study aims at providing empirical evidence on the persistence of cash flows, normal accruals, and more importantly, abnormal accruals with respect to one-year-ahead earnings in Thailand.

2.2. The Market Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals

Prior research documents information content of reported earnings and their cash flow and accrual components with respect to contemporaneous stock returns [e.g., Bowen et al. (1987), Bernard and Stober (1989), Ou (1990), Subramanyam (1996), Abarbanell and Bushee (1997), and Chen and Zhang (2007)]. Moreover, prior research examines a relationship between future stock returns and the earnings persistence of reported earnings and their cash flow and accrual components [e.g. Sloan (1996), Xie (2001), Pincus et al. (2007), Kraft et al. (2007) and Vivattanachang and Supattarakul(2013)] to address the market pricing of their persistence.

Sloan (1996) uses the nonlinear generalized least squares estimation or the Mishkin (1983) test to examine whether stock prices fully reflect the earnings persistence of reported earnings and their cash flow and total accrual components in the United States during 1962-1991. The Mishkin test allows comparisons of the persistence parameters of reported earnings and their cash flow and total accrual components from the forecasting equations and the persistence parameters implied in future stock returns from the valuation equations. Sloan (1996) finds that the persistence parameter of reported earnings from the valuation model (i.e., the valuation parameter) is not sigificantly different from the persistence parameter from the forecasting model (i.e., the forecasting paprameter). Moreover, he documents that the valuation parameter of the accrual (cash flow) component is greater (smaller) than its forecasting parameter. The results suggest that stock markets in United States overprice (underprice) the persistence of total accruals (cash flows).

Kraft et al. (2007) use the OLS estimation of one-year-ahead returns on cash flows and accruals to investigate whether stock markets in the United States misprice the persistence of cash flow and accrual components during 1974-2003. They also provide a comparision between results from the OLS test and the Mishkin test. Results from both tests are identical and consistent with Sloan (1996).

Extending Sloan (1996), Xie (2001) uses the Mishkin test to examine the market pricing of cash flows and two accrual components (i.e., normal and abnormal accruals) in the United States during 1971-1992 and finds that the valuation parameter of cash flows is smaller than its forecasting parameter while both the valuation parameters of normal and abnormal accruals are greater than their forecasting parameters. The results suggest that stock markets in the United States underprice (overprice) the persistence of cash flows (normal and abnormal accruals). Xie (2001) also discovers that the overpricing appears more severe for the abnormal accruals persistence, relative to the normal accruals persistence.

Overall, empirical evidence on stock markets in the United States reveals that investors seem to accurately price the persistence of reported earnings while they underprice the cash flows persistence but overprice the accruals persistence, and that the accruals overpricing is mostly due to abnormal accruals.

Pincus et al. (2007) investigate the market pricing of reported earnings, cash flows, and total accruals during 1994-2002 in 20 countries, including Australia, Canada, Denmark, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, the Netherlands, Singapore, Spain, Sweden, Switzerland,

Taiwan, Thailand, the United Kingdom, and the United States. They find from the Mishkin test that stock markets in 13 countries (i.e., France, Germany, Italy, Japan, Malaysia, the Netherlands, Singapore, Spain, Sweden, Taiwan, Thailand, the United Kingdom, and the United States) misprice the persistence of reported earnings. Pincus et al. (2007) find that stock markets in the United States overprice both the persistence of cash flows and accruals while Sloan (1996) finds that they overprice the accruals persistence but underprice the cash flows persistence. Pincus et al. (2007) also document that stock markets in Germany, Malaysia, Singapore, and Spain underprice both cash flows and accruals persistence. Investors in Indonesia overprice the cash flows persistence but underprice the accruals persistence. Their empirical evidence also shows that stock markets in Australia, Canada, and the United Kingdom overprice the accruals persistence while results on the mispricing of the cash flows persistence are insignificant. Finally, stock markets in France, Italy, Japan, The Netherlands, Sweden, Switzerland, Taiwan,and Thailand underprice the cash flows persistence while results on the mispricing of the accruals persistence are insignificant.

In addition, Vivattanachang and Supattarakul (2013) use the Mishkin test to investigate the market pricing of reported earnings and their cash flow and accrual components in Thailand during 1999-2007. Consistent with Pincus et al. (2007), their results show that the valuation parameter of reported earnings are significantly lower than its forecasting parameter, suggesting that Thai stock markets underprice the persistence of reported earnings. Moreover, results show that the valuation parameters of total accruals and cash flows are significantly smaller than their forecasting parameters, suggesting that Thai stock markets also underprice both cash flows and total accruals persistence.

Vivattanachang and Supattarakul (2013) also estimate the valuation model for a profit-firm subsample [Ball and Shivakumar (2006) and Anderson et al. (2009)]. Results show that the valuation and forecasting parameters of accruals are not significantly different while the valuation parameter of cash flows is significantly smaller than its forecasting parameter, suggesting that stock prices of profit firms in Thailand seem to accurately reflect the persistence of accruals but inaccurately reflect the higher persistence of cash flows.

Stock markets in Thailand are emerging markets with much smaller market capitalization and trading volume, relative to stock markets in other developed countries, e.g., the United States. Moreover, Islam et al. (2007) and Tantipanichkul and Supattarakul (2013) empirically reveal that stock markets in Thailand are not efficient during their sample periods during 1975-2001 and 1994-2008, respectively. Specifically, their results suggest that there is an opportunity for financial analysts and investors to earn abnormal returns by using publicly available historical financial information to form hedged portfolios.

Moreover, empirical evidence on the market mispricing of the persistence of cash flows and accruals in Thailand is inconsistent with that in United States [Sloan (1996), Pincus et al. (2007) and Vivattanachang and Supattarakul (2013)].

As a result, the market pricing of abnormal accruals in Thailand which has never been addressed may not be implied from results in the United States. This study thus aims at providing empirical evidence on the market pricing of cash flows, normal accruals, and more importantly, abnormal accruals in Thailand.

3. SAMPLE SELECTION AND VARIABLE MEASUREMENTS

3.1. Sample Selection

The sample includes firms listed in two stock markets in Thailand: the Stock Exchange of Thailand (SET) and the Market of Alternative Investment (mai).[1] However, the sample excludes firms in the financials sectors (i.e., banking, finance and securities, and insurance), as well as property funds, and companies under rehabilitation.[2] All required data are obtained from Datastream database. The trimming procedures are applied to dispose extreme values at 1st and 99th percentile. The final sample consists of 2,743 firm-year observations during 1999 to 2009.[3]

3.2. Variable Measurements

An empirical analysis on the earnings persistence of cash flows, normal accruals, and abnormal accruals requires five variables: (i) earnings (EARN), (ii) cash flows from operations (CFO), (iii) total accruals (TAC), (iv) normal or nondiscretionary accruals (NAC), and (v) abnormal or discretionary accruals (ABNAC). They are defined as follows:

$EARN_{it}$ = Net income of firm i for year t deflated by beginning-of-year total assets (TA_{t-1}),

CFO_{it} = Cash flows from operating activities of firm i for year t deflated by beginning-of-year total assets (TA_{t-1}),

TAC_{it} = Total accruals of firm i for year t defined as $EARN_{it} - CFO_{it}$,

NAC_{it} = Normal or nondiscretionary accruals of firm i for year t estimated based on the Jones (1991) model, and

$ABNAC_{it}$ = Abnormal or discretionary accruals of firm i for year t estimated based on the Jones (1991) model.

Following Xie (2001), the Jones (1991) model is used to estimate normal accruals (NAC) and abnormal accruals (ABNAC) as follows:

$$TAC_t = \alpha_1 + \alpha_1[1/TA_{t-1}] + \alpha_2[\Delta REV_t/TA_{t-1}] + \alpha_3[PPE_t/TA_{t-1}] + e_t \quad (1)$$

[1] The Stock Exchange of Thailand (SET) is a juristic entity set up under the Securities Exchange of Thailand Act, B.E. 2517 (1974). Its mandate is to be a market for the trading of listed securities, a promoter of personal financial planning and provider of related services. Stocks traded in SET are classified into eight sectors: (1) Agro & Food Industry, (2) Consumer Products, (3) Financials, (4) Industrials, (5) Property & Construction, (6) Resources, (7) Services, and (8) Technology. The Market for Alternative Investment (mai) has been established under the Securities Exchange of Thailand Act. The objective is to create new fund-raising opportunities for innovative business with high potential growth as well as provide a greater range of investment alternatives for investors. It officially commenced operation on June 21, 1999.

[2] Financials sectors are excluded as their core operations are significantly different from firms in other industries and the stock markets respond differently to their reported numbers, compared to firms in other industries. The exclusion of financial sectors is consistent with prior studies. Companies under rehabilitation which are financial-distressed firms are also excluded as their stock market data are not available. 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.

[3] Thai Accounting Standards have reformed to conform to the International Accounting Standards (IAS) or International Financial Reporting Standards (IFRSs) after the economic crisis in 1997. This study examines the earnings persistence of a firm's current earnings and its one-year-ahead earnings and intends to examine the earnings persistence and the market pricing for 10 years period. Therefore, the final sample starts from 1999 and end in 2009.

where ΔREV_t is the change in sales revenues in year t, PPE_t is gross property, plant and equipment in year t, and TA_{t-1} is the beginning-of-year total assets in year t. The Jones model in cross-section for each sector and year combination is estimated. Normal accruals (NAC) are defined as the predicted values of the Jones model and abnormal accruals (ABNAC) are defined as the residuals.

In addition, the market pricing of cash flows, normal accruals, and abnormal accruals requires size-adjusted abnormal returns (AR). Following Sloan (1996) and Xie (2001), the size-adjusted abnormal returns (AR) are defined as the difference between a firm's annual buy-and-hold returns (beginning three months after the end of the fiscal year) and the annual buy-and-hold returns for the corresponding 12-month period of the market-capitalization-based portfolio decile to which the firm belongs.[4]

4. EMPIRICAL TESTS

4.1. The Earnings Persistence of Cash Flows, Normal Accruals, and Abnormal Accruals

In order to examine the persistence of cash flows and normal and abnormal accruals with respect to one-year-ahead earnings, the following regression equation is used.

$$EARN_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 NAC_t + \beta_3 ABNAC_t + e_{t+1} \qquad (2)$$

β_1 is the persistence parameter of cash flows while β_2 and β_3 are the persistence parameters of normal and abnormal accruals, respectively. The F-test is performed to examine whether the persistence parameters of the earnings components are significantly different. Specifically, it is used to test whether β_1 is different from β_2 and β_3, and whether β_2 is different from β_3.

4.2. The Market Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals

In order to investigate the market pricing of cash flows and normal and abnormal accruals with respect to one-year-ahead earnings, the nonlinear generalization least squares estimation or the Mishkin (1983) test is employed. The Mishkin test is widely used for testing the rational expectation of investors in pricing the publicly available information [e.g., Sloan (1996), Xie (2001), Fairfield et al. (2003), Hirshleifer et al. (2004), Pincus et al. (2007), Dechow et al. (2008), and Vivattanachang and Supattarakul (2013)].

The rational expectation implication indicates that the expectation assessed by the markets equals the true conditional expectation using all available historical information. If all information are fully incorporated, investors will earn zero abnormal returns. To test for application of rational expectations to financial markets which is referred as market efficiency, the following set of equations is suggested:

[4] 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. The market capitalization at the beginning of the return period of a firm is used to classify each firm into its size decile based on SET or mai size decile breakpoints.

The Market Efficiency Model:

$$E(y_{t+1}-\hat{y}_{t+1}|\phi_t) = 0 \quad (3)$$

where

ϕ_t = the set of information publicly available at time t,

$E(...|\phi_t)$ = the objective expectation condition on ϕ_t,

y_{t+1} = the return from holding a particular security from t to t+1,

$\hat{y}_{t+1}$ = the market's subjective expectation where the market is in equilibium and provides the "normal" return, and

$y_{t+1}-\hat{y}_{t+1}$ = the abnormal return which is positively correlated with historical informaion at time t.

A model that satisfies the efficient-markets condition in equation (3) is

$$(y_{t+1}-\hat{y}_{t+1}\phi_t) = \beta(X_{t+1}-X^{e}_{t+1})+\varepsilon_{t+1} \quad (4)$$

where

X_{t+1} = the vector containing variables relevant to the pricing of the security at time t+1,

X^{e}_{t+1} = the vector of one-period-ahead rational forecasts of X_{t+1}, that is, $X^{e}_{t+1} = E(X_{t+1}|\phi_t)$,

β = a valuation coefficient, and

ε_{t+1} = a disturbance with the property $E(\varepsilon_t|\phi_t)=0$.

The application of above models to test the market pricing of cash flows, normal accruals, and abnormal accruals persistence requires two equations to perform jointly estimations using the iterative non-linear least squares regressions. The forecasting equation measures a predictive ability of three earnings components to one-year-ahead earnings using a linear regression while the valuation equation measures the market pricing of these three earnings components using a non-linear regression. The persistence parameters estimated from the valuation equation (i.e., the valuation parameters) are to be compared with the persistence parameters estimated from the forecasting equation (i.e., the forecasting parameters). If the market is efficient, the differences between the forecasting valuation parameters will be insignificant. If the valuation parameters are significantly greater (smaller) than the forecasting parameters, it implies that investors overprice (underprice) the persistence of earnings components with respected to one-year-ahead earnings. The following system of equations is used to test the market pricing of the earnings components.

Forecasting Equation[5] *:*

$$EARN_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 NAC_t + \beta_3 ABNAC_t + e_{t+1} \quad (5)$$

[5] The forecasting equation is identical to equation (2).

Valuation Equation:

$$AR_{t+1} = \gamma_0 + \gamma_1 (EARN_{t+1} - \beta_0 - \beta_1^* CFO_t - \beta_2^* NAC_t - \beta_3^* ABNAC_t) + \varepsilon_{t+1} \quad (6)$$

As in Mishkin (1983), equations (5) and (6) are jointly estimated using the iterative non-linear least squares estimation procedure. Mishkin (1983) shows that the following likelihood ratio statistic is distributed asymptotically as $\chi^2(q)$ under the null hypothesis that the market rationally prices one or more earnings components with respect to their associations with one-year-ahead earnings. The likelihood ratio tests the neutrality and rationality by comparing the sum of squared residuals of the unconstrained system with that of the constrained system as follows.[6]

$$2n\ ln(SSR^c/SSR^u) \quad (7)$$

where

q	=	the number of constraints imposed for rational pricing test,
n	=	the number of sample observations,
SSR^c	=	the sum squared residuals from the constrained system, and
SSR^u	=	the sum squared residuals from the unconstrained system.

The rational pricing of one or more earnings components (i.e., cash flows $[\beta_{1\ =}\beta_1^*]$, normal accruals $[\beta_{2\ =}\beta_2^*]$, and abnormal accruals $[\beta_{3\ =}\beta_3^*]$) is rejected if the above likelihood ratio statistic is sufficiently large.

5. EMPIRICAL RESULTS

5.1. Descriptive Statistics and Correlations

Descriptive statistics and correlations among current and one-year-ahead earnings, cash flows from operations, normal and abnormal accruals of the current period, and one-year-ahead size-adjusted returns of 2,743 firm-year observations during 1999-2009 are reported in Panel A and B of Table 1, respectively.

[6] The unconstrained system is equations (5) and (6) estimated without imposing any constraint while the constrained system is equations (5) and (6) estimated with constraints that $\beta 1 = \beta 1^*$ and/or $\beta 2 = \beta 2^*$ and/or $\beta 3 = \beta 3^*$.

Table 1: Descriptive Statistics and Correlations of
2,743 Firm-Year Observations during 1999-2009

Panel A: Descriptive Statistics

	Mean	S.D.	Max	P95	P75	Median	P25	P5	Min
$EARN_t$	0.0427	0.0706	0.3472	0.1774	0.0705	0.0344	-0.0037	-0.0835	-0.2843
$EARN_{t+1}$	0.0552	0.0844	0.3415	0.1869	0.1006	0.0563	0.0131	-0.0847	-0.2972
CFO_t	0.0779	0.1409	0.5708	0.2849	0.1611	0.0880	0.0137	-0.1691	-0.5601
NAC_t	-0.0292	0.0635	0.2219	0.0995	0.0456	-0.0218	-0.0351	-0.0645	-0.1239
$ABNAC_t$	-0.0036	0.0438	0.1943	0.0564	0.0225	-0.0024	-0.0267	-0.0512	-0.1174
AR_{t+1}	-0.0761	0.5985	3.3797	0.8513	0.1386	-0.1162	-0.3540	-0.9246	-1.6786

Panel B: Correlations

	$EARN_{t+1}$	CFO_t	NAC_t	$ABNAC_t$	AR_{t+1}
$EARN_t$	0.6985 ***	0.4125 ***	0.3294 ***	0.0843 **	0.1861 ***
$EARN_{t+1}$		0.3846 ***	0.2461 ***	0.0401 **	0.1415 ***
CFO_t			0.1315 ***	-0.0545 **	0.1752 ***
NAC_t				-0.0792 **	0.1105 **
$ABNAC_t$					-0.0664 **

***Significant at the 0.01 level (2-tailed).

***Significant at the 0.05 level (2-tailed).

Variable Definitions:

$EARN_t$ is net income for year t,

$EARN_{t+1}$ is net income for year t+1,

CFO_t is cash flows from operating activities for year t,

NAC_t is normal accruals for year t,

$ABNAC_t$ is abnormal accruals for year t, and

AR_{t+1} is cumulative size-adjusted returns for year t+1.

Mean and median of current and one-year-ahead earnings are positive suggesting that the sample firms are mainly profitable firms. Mean and median of cash flows are greater than mean and median of earnings because of depreciation and amortization. As expected, mean and median of normal accruals are more negative than abnormal accruals which are close to zero. This is consistent with Subramanyam (1996) and Xie (2001).

Current and one-year-ahead earnings are positively correlated as expected. This is consistent with the fact that earnings are persistent with respect to one-year-ahead earnings. Current earnings are decomposed into three components: cash flows, normal accruals, and abnormal accruals. They all are positively correlated with one-year-ahead earnings. A comparison between correlation coefficients of three earnings components with respect to one-year-ahead earnings suggests that cash flows are more persistent than both accrual components, and normal accruals are more persistent than abnormal accruals.

Moreover, as expected, both current and one-year-ahead earnings are positively correlated with one-year-ahead size-adjusted returns. Cash flows and normal accruals (abnormal accruals) are positively (negatively) correlated with one-year-ahead size-adjusted returns, suggesting that investors underweight (overweight) the persistence of cash flows and normal accruals (abnormal accruals).

5.2. The Earnings Persistence of Cash Flows, Normal Accruals, and Abnormal Accruals

An estimation of the forecasting model provides empirical evidence on the persistence of cash flows, normal accruals, and abnormal accruals with respect to one-year-ahead earnings. Results are presented in Table 2.

Table 2: Linear and Nonlinear Regression Analysis of the Earnings Persistence and the Market Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals (the Mishkin Test)

Forecasting Equation:

$$EARN_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 NAC_t + \beta_3 ABNAC_t + e_{t+1}$$

Valuation Equation:

$$AR_{t+1} = \gamma_0 + \gamma_1 (EARN_{t+1} - \beta_0 - \beta_1^* CFO_t - \beta_2^* NAC_t - \beta_3^* ABNAC_t) + \varepsilon_{t+1}$$

Forecasting Parameters			Valuation Parameters		
Parameter	Estimate	Asymptotic Std. Error	Parameter	Estimate	Asymptotic Std. Error
β_1 (CFO)	0.672	0.0124	β_1^* (CFO)	0.618	0.0216
β_2 (NAC)	0.589	0.0191	β_2^* (NAC)	0.558	0.0165
β_3 (ABNAC)	0.519	0.0108	β_3^* (ABNAC)	0.544	0.0207
n	2,743				
Adjusted R^2	0.896				
F-statistic:					
CFO Vs. NAC	113.29				
CFO Vs. ABNAC	274.64				
NAC Vs. ABNAC	48.38				

Tests of Rational Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals

Null Hypotheses	Likelihood Ratio Statistic	Marginal Significance Level
CFO: $\beta_1 = \beta_1^*$	24.86	<0.0001
NAC: $\beta_2 = \beta_2^*$	18.35	<0.0001
ABNAC: $\beta_3 = \beta_3^*$	22.64	<0.0001
CFO, NAC and ABNAC: $\beta_1 = \beta_1^*$, $\beta_2 = \beta_2^*$ and $\beta_3 = \beta_3^*$	94.08	<0.0001

Variable Definitions:
$EARN_t$ is net income for year t,
$EARN_{t+1}$ is net income for year t+1,
CFO_t is cash flows from operating activities for year t,
NAC_t is normal accruals for year t,
$ABNAC_t$ is abnormal accruals for year t, and
AR_{t+1} is cumulative size-adjusted returns for year t+1.

The forecasting parameters or the earnings persistence parameters of CFO_t, NAC_t, and $ABNAC_t$ are significantly positive. The parameter of CFO_t (β_1 = 0.672) is significantly greater than those of NAC_t (β_2 = 0.589) with the F-statistic of 113.29 and $ABNAC_t$ (β_3 = 0.519) with the F-statistic of 274.64 and the parameter of NAC_t is significantly greater than that of $ABNAC_t$ with the F-statistic of 48.38. Consistent with Xie (2001), the empirical evidence suggests that, of the three earnings components, cash flows are the most persistence while abnormal accruals are the least persistence. This explains the higher persistence of cash flows, relative to accruals documented in Vivattanachang and Supattarakul (2013). Specifically, the lower persistence of total accruals is mainly due to the lower persistence of abnormal accruals.

5.3. The Market Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals

An estimation of the non-linear valuation model provides empirical evidence on the market pricing of cash flows, normal accruals and abnormal accruals. Results on the estimation of the non-linear valuation model are reported in Table 2.

First, this study examines whether Thai stock markets misprice the persistence of all three earnings components with respect to one-year-ahead earnings. The likelihood ratio statisticof 94.08 ($\beta_1 = \beta_1^*$, $\beta_2 = \beta_2^*$, and $\beta_3 = \beta_3^*$) rejects the null hypothesis that the persistence of all three earnings components is accurately priced.

Next, this study further examines whether Thai stock markets misprice the persistence of each earnings component. The likelihood ratio statistic of 24.86 ($\beta_1 = \beta_1^*$) rejects the null hypotheses that the persistence of cash flows is accurately priced. Specifically, the valuation parameter of cash flows (β_1^*= 0.618) is significantly smaller than its forecasting parameter (β_1=0.672). This suggests that Thai stock markets underweight cash flows from operations relative to its ability to forecast one-year-ahead earnings. This is consistent with the U.S. evidence documented in Sloan (1996), Xie (2001), and Kraft et al. (2007) and Thai evidence documented in Pincus et al. (2007) and Vivattanachang and Supattarakul (2013).

The likelihood ratio statistics of 18.35 ($\beta_2 = \beta_2^*$) and 22.64 ($\beta_3 = \beta_3^*$) reject the null hypothesis that the persistence of normal and abnormal accruals are correctly priced, respectively. Specifically, the valuation parameter of normal accruals (β_2^*= 0.558) is significantly less than its forecasting parameter (β_2=0.589). The evidence indicates that Thai stock markets also underweight normal accruals relative to its ability to forecast one-year-ahead earnings. This is inconsistent with the U.S. evidence documented in Xie (2001).

For abnormal accruals, its valuation parameter (β_3^* = 0.544) is significantly greater than its forecasting parameter (β_3=0.519), suggesting that Thai stock markets overprice the persistence of abnormal accruals with respect to one-year-ahead earnings. This is consistent with the U.S. evidence documented in Xie (2001). The market overpricing of the persistence of abnormal accruals implies that investors are unable to detect a firm's use of abnormal accruals to opportunistically manage its reported earnings and consequently overweight the predictive ability of abnormal accruals with respect to one-year-ahead earnings.

6. CONCLUSION

This study extends Vivattanachang and Supattarakul (2013) and examines the earnings persistence and the market pricing of three earnings components: cash flows, normal or nondiscretionary accruals, and abnormal or discretionary accruals in Thailand. The nonlinear generalized least squares estimation or the Mishkin (1983) test is used to investigate the market pricing of these three earnings components with respect to their implications of one-year-ahead earnings

Sample firms in this study include firms listed in the Stock Exchange of Thailand (SET) and the Market for Alternative Investments (mai), excluding financials, financial-distressed firms, and property funds. The final sample consists of 2,743 firm-year observationsduring 1999-2009.[7]

Results on the earnings persistence reveal that, of all three earnings components, cash flows from operations are the most persistence and abnormal accruals are the least persistence with respect to one-year-ahead earnings, consistent with the U.S. evidence documented in Subramanyam (1996) and Xie (2001). This explains the lower persistence of total accruals, relative to cash flows documented in Vivattanachang and Supattarakul (2013). Specifically, the lower persistence of total accruals is mainly due to the lower persistence of abnormal accruals, compared to normal accruals.

In addition, the Mishkin results on the market pricing of three earnings components with respect to one-year-ahead earnings suggest that Thai stock markets misprice all three earnings components, relative to their ability to predict one-year-ahead earnings. Specifically, Thai stock markets underprice the persistence of both cash flows and normal accruals but overprice the abnormal accruals persistence. The overpricing (underpricing) of the abnormal accruals (cash flows) persistence in Thailand is consistent with the U.S. evidence in Xie (2001). The market overpricing of the persistence of abnormal accruals implies that investors in Thailand are unable to recognize a firm's use of abnormal accruals to opportunistically manage its reported earnings and thus overweight the predictive ability of abnormal accruals with respect to one-year-ahead earnings.

[7] I also separately examine the earnings persistence and the market pricing of cash flows, normal and abnormal accruals for firms in SET and mai. Results of these two subsamples are qualitatively identical.

This study contributes to the accounting literature by providing empirical evidence on the earnings persistence and the market pricing of cash flows, normal accruals, and abnormal accruals in Thailand. Additionally, results on the earnings persistence of cash flow and accrual components of earnings are beneficial to financial analysts and investors when they are predicting a firm's future earnings in an estimation of the firm's stock price while results of the market pricing of cash flow and accrual components are beneficial to them when they are making stock investment decisions in order to possibly earn abnormal returns. This study also contributes to the literature on market efficiency. Specifically, the market mispricing of the persistence of earnings components suggests that Thai stock markets are not efficient.

This study uses the Mishkin test to examine whether Thai stock markets misprice cash flows and normal and abnormal accruals. However, Kraft et al. (2007) argue that an implementation of the Mishkin test by accounting researchers ignores potential estimation biases for the forecasting equation caused by omitted variables, and thus affects inferences drawn from the Mishkin test. Thus, future research can use the Ordinary Least Squares Estimation suggested in Kraft et al. (2007) to examine the market pricing of these earnings components.

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