The Earnings Persistence and the Market Pricing of Cash Flows, Normal and Abnormal Accruals: Thailand's Capital Markets

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Abstract

This study empirically investigates the earnings persistence of and the market pricing of the persistence of three earnings components: cash flows from operations, normal (nondiscretionary) accruals, and abnormal (discretionary) accruals in Thailand during 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. 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. Moreover, the market pricing results from the OLS test of future stock returns on three earnings components, suggested by Kraft et al. (2007), are identical to those from the Mishkin test.

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

Data Availability: Data used in this study are available from public sources identified in the study.

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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 of and the market pricing of the persistence 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 US stock markets overprice accruals while underprice cash flows. In other words, the US 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. Supattarakul and Vivattanachang (2010) investigate the earnings persistence of and the market pricing of the persistence 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 persistence of the cash flow and accrual components in Thailand are weak. Specifically, results in Supattarakul and Vivattanachang (2010) 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 the persistence 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.

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 (US 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 State, and are not efficient [e.g., Islam et al. (2007) and Tantipanichkul and Supattarakul (2011)]. 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 Supattarakul and Vivattanachang (2010)]. Therefore, this study aims at providing empirical evidence on the market pricing of the persistence 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.

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. Consequently, this study also uses the Ordinary Least Squares (OLS) Estimation suggested in Kraft et al. (2007) to examine the market pricing of the persistence of the earnings components.
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 observations during 1999-2009.

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

Results on the market pricing of the persistence 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 US 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 also uses the OLS regression of one-year-ahead abnormal returns on three earnings components to investigate the market pricing of the persistence of three earnings components as suggested by Kraft et al. (2007). As expected, the OLS results are identical to results from the Mishkin test.
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 of 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 of the cash flows and accruals persistence 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. Finally, this study contributes to the accounting literature on regression-based tests of the market pricing of accounting numbers since it compares empirical results based on the Mishkin test and the OLS test.

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 deferral and accrual of revenues and expenses embedded into financial statements and consequently, management may
opportunistically 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.


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 are less 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.

Supattarakul and Vivattanachang (2010) 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 accounting 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 Supattarakul and Vivattanachang (2010)] 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 significantly different from the persistence
parameter from the forecasting model (i.e., the forecasting parameter). 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 comparison 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 the persistence 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 the persistence 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, Supattarakul and Vivattanachang (2010) use the Mishkin test to investigate the market pricing of the persistence 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.

Supattarakul and Vivattanachang (2010) 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 (2011) 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 Supattarakul and Vivattanachang (2010)].

As a result, the market pricing of the persistence 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 the persistence 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). However, the sample excludes firms in the financials sectors (i.e., banking, finance and securities, and

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1The 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.
insurance), as well as property funds, and companies under rehabilitation. 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.

3.2. 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:

\[ \text{EARN}_{it} = \frac{\text{Net income before extraordinary items}}{\text{beginning-of-year total assets}} \]  

\[ \text{CFO}_{it} = \frac{\text{Cash flows from operating activities}}{\text{beginning-of-year total assets}} \]  

\[ \text{TAC}_{it} = \text{Total accruals} = \text{EARN}_{it} - \text{CFO}_{it} \]  

\[ \text{NAC}_{it} = \text{Normal or nondiscretionary accruals} \]  

\[ \text{ABNAC}_{it} = \text{Abnormal or discretionary accruals} \]

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

\[ \text{TAC}_{it} = \alpha_1 + \alpha_2 \left[ \frac{1}{\text{TA}_{t-1}} \right] + \alpha_3 \left[ \frac{\Delta \text{REV}_{it}}{\text{TA}_{t-1}} \right] + \alpha_4 \left[ \frac{\text{PPE}_{it}}{\text{TA}_{t-1}} \right] + \epsilon_t \]  \hspace{1cm} (1)

\footnote{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.}

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where $\Delta \text{REV}_t$ is the change in sales revenues in year $t$, $\text{PPE}_t$ is gross property, plant and equipment in year $t$, and $\text{TA}_{t-1}$ 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 the persistence 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. The market capitalization at the beginning of the return period is used to classify each firm into a size decile.

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.

$$E\text{ARN}_{t+1} = \beta_0 + \beta_1 \text{CFO}_t + \beta_2 \text{NAC}_t + \beta_3 \text{ABNAC}_t + \epsilon_{t+1}$$ (2)

$\beta_1$ is the persistence parameter of cash flows while $\beta_2$ and $\beta_3$ 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.

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3 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.
4.2. The Market Pricing of Cash Flows, Normal Accruals, and Abnormal Accruals

4.2.1. The Nonlinear Generalization Least Squares Estimation (The Mishkin Test)

In order to investigate the market pricing of the persistence 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 Supattarakul and Vivattanachang (2010)].

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:

**The Market Efficiency Model:**

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

where

- \( \phi_t \) = the set of information publicly available at time \( t \),
- \( E(\ldots | \phi_t) \) = the objective expectation condition on \( \phi_t \),
- \( y_{t+1} \) = 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 equilibrium and provides the “normal” return, and
- \( y_{t+1} - \hat{y}_{t+1} \) = the abnormal return which is positively correlated with historical information at time \( t \).
A model that satisfies the efficient-markets condition in equation (3) is

\[(y_{t+1} - \hat{y}_{t+1}|\phi_t) = \beta (X_{t+1} - X^e_{t+1}) + \epsilon_{t+1}\] (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, \(X^e_{t+1} = E(X_{t+1}|\phi_t)\),
- \(\beta\) = a valuation coefficient, and
- \(\epsilon_{t+1}\) = a disturbance with the property \(E(\epsilon_t|\phi_t) = 0\).

The application of above models to test the market pricing of the persistence of cash flows, normal accruals, and abnormal accruals 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 the persistence 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 respect to one-year-ahead earnings. The following system of equations is used to test the market pricing of the persistence of the earnings components.
**Forecasting Equation**:  

\[ EARN_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 NAC_t + \beta_3 ABNAC_t + \epsilon_{t+1} \]  

(5)

**Valuation Equation**:  

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

(6)

As in Mishkin (1983), I jointly estimate equations (5) and (6) using the iterative non-linear least squares estimation procedure. In the first stage, I jointly estimate equations (5) and (6) without imposing any constraint on the equations. To test whether the valuation parameter significantly differs from the forecasting parameter, in the second stage, we impose constraints that \( \beta_1 = \beta_1^* \) and/or \( \beta_2 = \beta_2^* \) and/or \( \beta_3 = \beta_3^* \).

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.

\[ 2n \ln(\frac{SSR^c}{SSR^u}) \]  

(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.

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\( ^4 \) The forecasting equation is identical to equation (2).
4.2.2. The Ordinary Least Squares (OLS) Estimation

Kraft et al. (2007) state that:

“What accounting researchers appear to have misunderstood is that Mishkin was referring to tests of market efficiency in general, but not to specific variables in the forecasting equation. More precisely, one can test whether the market is efficient with respect to earnings forecasts even if there are omitted variables. However, one cannot test whether the market is efficient with respect to specific variables in the forecasting equation (e.g., accruals) if the variables omitted from the forecasting equation are not (themselves) rationally priced and they are also correlated with the variables of interest in the forecasting equation (e.g., accruals). That is, based on the Mishkin test, one can reject efficiency (at least with respect to the assumed equilibrium model of returns) even if the forecasting equation has omitted variables, but one cannot draw inferences about which accounting variable or variables are the source of the inefficiency.” (See, Kraft et al. [2007, p. 1083-1084].)

The omission of variables from the forecasting and valuation equations in the Mishkin test results in an omitted variables problem affecting inferences drawn about the rational pricing of earnings components. As a result, Kraft et al. (2007) suggest an alternative test to the Mishkin test to directly regress one-year-ahead abnormal returns (AR_{t+1}) on three earnings components (i.e., CFO_t, NAC_t, and ABNAC_t). Specifically, the following OLS-based equation is estimated:

\[
AR_{t+1} = \varphi_0 + \varphi_1 CFO_t + \varphi_2 NAC_t + \varphi_3 ABNAC_t + \nu_{t+1} \tag{8}
\]

If one or more estimated coefficients (i.e., \(\varphi_1, \varphi_2,\) and \(\varphi_3\)) are significantly different from zero, the rational pricing of the persistence of one or more earnings components is rejected.

Kraft et al. (2007) demonstrate that the Mishkin test and the OLS tests are equivalent. Specifically, \(EARN_{t+1}\) in the forecasting equation (equation (5)) can be substituted into the valuation equation (equation (6)) and the resulting equation is as follows:

\[
AR_{t+1} = \gamma_0 + \gamma_1 (\beta_1 - \beta_1^*) CFO_t + \gamma_1 (\beta_2 - \beta_2^*) NAC_t + \gamma_1 (\beta_3 - \beta_3^*) ABNAC_t + \gamma_1 \epsilon_{t+1} + \epsilon_{t+1} \tag{9}
\]

Equation (9) can be rewritten as follows:

\[
AR_{t+1} = \varphi_0 + \varphi_1 CFO_t + \varphi_2 NAC_t + \varphi_3 ABNAC_t + \gamma_1 \epsilon_{t+1} + \nu_{t+1} \tag{10}
\]
where \( \phi_i = \gamma_1 (\beta_i - \beta_i^*) \) for \( i = 1, 2, \) and \( 3. \)

Kraft et al. (2007) describe that estimating equation (8) is asymptotically equivalent to estimating the system of equations (5) and (6) except for the omission of \( e_{t+1}. \) By construction of equation (5), \( e_{t+1} \) is orthogonal to CFO, NAC, and ABNAC because they are included in the forecasting equation. Consequently, the omission of \( e_{t+1} \) from equation (10) does not bias coefficient estimates on CFO, NAC, and ABNAC for a large sample. Therefore, a test of a coefficient’s difference from zero in equation (8) is equivalent to a test of \( \beta_i - \beta_i^* \) in the Mishkin test since \( \gamma_1 \) is constant. The positive (negative) \( \phi_i \) indicates that the valuation parameter \( (\beta_i^*) \) is smaller (greater) than the forecasting parameter \( (\beta_i), \) and thus suggests the market underpricing (overpricing) of the persistence of a corresponding earnings component.

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.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\textbf{Variable} & \textbf{Mean} & \textbf{Median} \\
\hline
\textbf{Current Earnings} & 0.56 & 0.03 \\
\textbf{One-Year-Ahead Earnings} & 0.62 & 0.04 \\
\textbf{Cash Flows from Operations} & 0.75 & 0.06 \\
\textbf{Normal Accruals} & -0.12 & -0.01 \\
\textbf{Abnormal Accruals} & 0.02 & 0.00 \\
\hline
\end{tabular}
\caption{Descriptive Statistics of Sample Firms}
\end{table}

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.

The forecasting parameters or the earnings persistence parameters of CFOᵣ, NACᵣ, and ABNACᵣ are significantly positive. The parameter of CFOᵣ (β₁ = 0.672) is significantly greater than those of NACᵣ (β₂ = 0.589) with the F-statistic of 113.29 and ABNACᵣ (β₃ = 0.519) with the F-statistic of 274.64 and the parameter of NACᵣ is significantly greater than that of ABNACᵣ 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 persistent.
while abnormal accruals are the least persistent. This explains the higher persistence of cash flows, relative to accruals documented in Supattarakul and Vivattanachang (2010). 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

5.3.1. The Nonlinear Generalization Least Squares Estimation (The Mishkin Test)

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 statistic of 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 ($\beta_1^* = 0.618$) is significantly smaller than its forecasting parameter ($\beta_1 = 0.672$). 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 US evidence documented in Sloan (1996), Xie (2001), and Kraft et al. (2007) and Thai evidence documented in Pincus et al. (2007) and Supattarakul and Vivattanachang (2010).

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 ($\beta_2^* = 0.558$) is
significantly less than its forecasting parameter ($\beta_2=0.589$). 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 US evidence documented in Xie (2001).

For abnormal accruals, its valuation parameter ($\beta_3^{\ast} = 0.544$) is significantly greater than its forecasting parameter ($\beta_3=0.519$), suggesting that, Thai stock markets overprice the persistence of abnormal accruals with respect to one-year-ahead earnings. This is consistent with the US 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.

5.3.2. The Ordinary Least Squares (OLS) Estimation

As suggested by Kraft et al. (2007), an estimation of the OLS regression of one-year-ahead size-adjusted returns on three earnings components can also be used to examine the market pricing of their persistence. Table 3 reports the OLS results. Results from the Mishkin test reported in Table 2 are repeated in Table 3 for a comparison purpose.

The positive (negative) $\phi_i$ indicates the smaller (greater) valuation parameter ($\beta_i^{\ast}$), relative to the forecasting parameter ($\beta_i$), and thus suggests the market underpricing (overpricing) of the persistence of a corresponding earnings component.

The OLS coefficients of cash flows and normal accruals are significantly positive ($\phi_1 = 0.155$ and $\phi_2 = 0.089$), suggesting that Thai stock markets underprice both the persistence of cash flows and normal accruals. On the contrary, the OLS coefficient of abnormal accruals is significantly negative ($\phi_3 = 0.072$), suggesting that the persistence of abnormal
accruals is overpriced by Thai stock markets. The OLS results are consistent with results from the Mishkin test discussed in 5.3.1. Pincus et al. (2007) also provide results from the OLS test in Thailand. Specifically, they find that the persistence of cash flows is underpriced (i.e., the OLS coefficient of cash flows is significantly positive) but they do not find significant results on the mispricing of both the persistence of normal and abnormal accruals.

Table 3 also reports reconciliation between results from the OLS test and the Mishkin test. The coefficients from the OLS test are related to the coefficients from the Mishkin test. As shown in the last column in Table 3, \( \phi_i = \gamma_1 (\beta_i - \beta_i^*) \) where \( \phi_i \) is the OLS coefficient, \( \beta_i \) is the forecasting coefficient from the Mishkin test, \( \beta_i^* \) is the valuation coefficient from the Mishkin test, \( \gamma_1 \) is the scalar on unexpected earnings in the valuation equation from the Mishkin test, and \( i = 1, 2, \) and 3. Specifically, the OLS coefficient of cash flows \( (\phi_1 = 0.155) \) is equal to \( \gamma_1 (\beta_1 - \beta_1^*) \); the OLS coefficient of normal accruals \( (\phi_2 = 0.089) \) is equal to \( \gamma_1 (\beta_2 - \beta_2^*) \); the OLS coefficient of abnormal accruals \( (\phi_3) \) is equal to \( \gamma_1 (\beta_3 - \beta_3^*) \).

5. Conclusion

This study extends Supattarakul and Vivattanachang (2010) and examines the earnings persistence of and the market pricing of the persistence 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. In addition to the Mishkin test, this study also uses the Ordinary Least Squares (OLS) Estimation suggested in Kraft et al. (2007).

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-
of distressed firms, and property funds. The final sample consists of 2,743 firm-year observations during 1999-2009.5

Results on the earnings persistence reveal that, of all three earnings components, cash flows from operations are the most persistent and abnormal accruals are the least persistent with respect to one-year-ahead earnings, consistent with the US evidence documented in Subramanyam (1996) and Xie (2001). This explains the lower persistence of total accruals, relative to cash flows documented in Supattarakul and Vivattanachang (2010). 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 the persistence 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 underprice the abnormal accruals persistence. Moreover, the OLS results are identical to results from the Mishkin test. The overpricing (underpricing) of the abnormal accruals (cash flows) persistence in Thailand is consistent with the US evidence in Xie (2001). The market overpricing of the persistence of abnormal accruals implies that investors in Thailand are also 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.

This study contributes to the accounting literature by providing empirical evidence on the earnings persistence of and the market pricing of the persistence of cash flows, normal accruals, and abnormal accruals in Thailand. Additionally, results on the earnings persistence

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5 I also separately examine the earnings persistence and the market pricing of cash flows, normal and abnormal accruals for firms in SET and mai. Both Mishkin and OLS results of these two subsamples are qualitatively identical.
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 the persistence 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. Finally, this study contributes to the literature on regression-based tests of the market pricing of accounting numbers since it compares empirical results based on the Mishkin test and the OLS test.
References


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

Panel A: Descriptive Statistics

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

Panel B: Correlations

<table>
<thead>
<tr>
<th></th>
<th>EARN_t+1</th>
<th>CFO_t</th>
<th>NAC_t</th>
<th>ABNAC_t</th>
<th>AR_t+1</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARN_t</td>
<td>0.6985 ***</td>
<td>0.4125 ***</td>
<td>0.3294 ***</td>
<td>0.0843 **</td>
<td>0.1861 ***</td>
</tr>
<tr>
<td>EARN_t+1</td>
<td>0.3846 ***</td>
<td>0.2461 ***</td>
<td>0.0401 **</td>
<td>0.1415 ***</td>
<td></td>
</tr>
<tr>
<td>CFO_t</td>
<td>0.1315 ***</td>
<td></td>
<td>-0.0545 **</td>
<td>0.1752 ***</td>
<td></td>
</tr>
<tr>
<td>NAC_t</td>
<td>-0.0792 **</td>
<td>0.1105 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABNAC_t</td>
<td>-0.0664 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***Significant at the 0.01 level (2-tailed).
**Significant at the 0.05 level (2-tailed).

Variable Definitions:
EARN_t is net income before extraordinary items for year t,
EARN_t+1 is net income before extraordinary items 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.
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:
\[ \text{EARN}_{t+1} = \beta_0 + \beta_1 \text{CFO}_t + \beta_2 \text{NAC}_t + \beta_3 \text{ABNAC}_t + \epsilon_{t+1} \]

Valuation Equation:
\[ \text{AR}_{t+1} = \gamma_0 + \gamma_1 (\text{EARN}_{t+1} - \beta_0 - \beta_1 \text{CFO}_t - \beta_2 \text{NAC}_t - \beta_3 \text{ABNAC}_t) + \epsilon_{t+1} \]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Asymptotic Std. Error</th>
<th>Parameter</th>
<th>Estimate</th>
<th>Asymptotic Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta_1 ) (CFO)</td>
<td>0.672</td>
<td>0.0124</td>
<td>( \beta_1^* ) (CFO)</td>
<td>0.618</td>
<td>0.0216</td>
</tr>
<tr>
<td>( \beta_2 ) (NAC)</td>
<td>0.589</td>
<td>0.0191</td>
<td>( \beta_2^* ) (NAC)</td>
<td>0.558</td>
<td>0.0165</td>
</tr>
<tr>
<td>( \beta_3 ) (ABNAC)</td>
<td>0.519</td>
<td>0.0108</td>
<td>( \beta_3^* ) (ABNAC)</td>
<td>0.544</td>
<td>0.0207</td>
</tr>
<tr>
<td>n</td>
<td>2,743</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.896</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Null Hypotheses</th>
<th>Likelihood Ratio Statistic</th>
<th>Marginal Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFO: ( \beta_1 = \beta_1^* )</td>
<td>24.86</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>NAC: ( \beta_2 = \beta_2^* )</td>
<td>18.35</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>ABNAC: ( \beta_3 = \beta_3^* )</td>
<td>22.64</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>CFO, NAC and ABNAC: ( \beta_1 = \beta_1^* ), ( \beta_2 = \beta_2^* ) and ( \beta_3 = \beta_3^* )</td>
<td>94.08</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Variable Definitions:
- EARN\(_t\) is net income before extraordinary items for year \( t \),
- EARN\(_{t+1}\) is net income before extraordinary items 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 \( t+1 \).
Table 3  
Comparison between the Ordinary Least Squares (OLS) Estimation and the Mishkin Test

The OLS Estimation:
\[ AR_{t+1} = \phi_0 + \phi_1 CFO_t + \phi_2 NAC_t + \phi_3 ABNAC_t + \nu_{t+1} \]

The Mishkin Test:

Forecasting Equation:
\[ EARN_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 NAC_t + \beta_3 ABNAC_t + \epsilon_{t+1} \]

Valuation Equation:
\[ AR_{t+1} = \gamma_0 + \gamma_1 (EARN_{t+1} - \beta_0 - \beta_1^* CFO_t - \beta_2^* NAC_t - \beta_3^* ABNAC_t) + \epsilon_{t+1} \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS Coefficient</th>
<th>Mishkin Coefficient</th>
<th>Diff. between Coef. in Forecasting and Pricing Eq.</th>
<th>( \phi_i = \gamma_1 (\beta_i - \beta_i^*) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFO</td>
<td>0.155 ***</td>
<td>0.672</td>
<td>0.054 ***</td>
<td>0.155</td>
</tr>
<tr>
<td>NAC</td>
<td>0.089 ***</td>
<td>0.589</td>
<td>0.031 ***</td>
<td>0.089</td>
</tr>
<tr>
<td>ABNAC</td>
<td>-0.072 ***</td>
<td>0.519</td>
<td>-0.025 ***</td>
<td>-0.072</td>
</tr>
<tr>
<td>( \gamma_1 ) (Mishkin)</td>
<td></td>
<td></td>
<td></td>
<td>2.869</td>
</tr>
<tr>
<td>( n )</td>
<td>2,743</td>
<td>2,743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.019</td>
<td>0.896</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Variable Definitions:
- EARN\(_t\) is net income before extraordinary items for year \( t \),
- EARN\(_{t+1}\) is net income before extraordinary items 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 \( t+1 \).