Does Investors’ Sophistication Affect Persistence and Pricing of Discretionary Accruals?

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Abstract

This paper examines whether the sophistication of market investors influences management’s strategy on discretionary accounting choice, and thus changes the persistence of discretionary accruals. The results show that the persistence of discretionary accruals for firms face with naive investors is lower than that for firms face with sophisticated investors. The results also demonstrate that sophisticated investors indeed incorporate the implications of current earnings components into future earnings in a more sufficient manner than naïve investors do.

Keywords: Managerial discretion, Discretionary accruals, Investors’ sophistication
Introduction

The role of accruals is an important issue in accounting research. Dechow (1994) points out that accrual-based earnings is a superior measure of firm performance than cash flows because it mitigates timing and mismatching problems inherent in measuring cash flows over short intervals. However, because of the flexibility provided by Generally Accepted Accounting Principles (GAAP), accrual-based earnings is subject to managerial discretion. Managements use discretionary accounting choices in two different scenarios. On one hand, managerial discretion could enhance earnings’ informativeness by communicating private information. On the other hand, misalignment of managers’ and shareholders’ incentives could induce managers to use the flexibility provided by GAAP to manage income opportunistically, thereby creating distortions in the reported earnings (Watts and Zimmerman, 1986; Healy and Palepu, 1993).

Recently, researchers investigate the link between management’s discretionary accounting choice and the pricing of earnings. They test (1) whether the market attaches value to accruals or discretionary accruals (e.g., Dechow, 1994; Subramanyam, 1996) and (2) whether the market misprices the accruals or discretionary accruals (e.g., Sloan, 1996; Collins and Hribar, 2000; Xie, 2001). Subramanyam (1996) shows that the market attaches value to discretionary accruals and that the pricing of discretionary accruals arises because managers use their discretion to improve the ability of earnings to reflect fundamental value.

Xie (2001) extends Subramanyam (1996) by demonstrating that the market not only prices, but also overprices discretionary accruals. Xie (2001) examines the market pricing of earnings components to test whether stock prices rationally reflect the one-year-ahead earnings implications of cash flow from operations,
nondiscretionary accruals and discretionary accruals components of accounting earnings. He finds that cash flow component of earnings is more persistence than the nondiscretionary accrual component, and the nondiscretionary accruals component is more persistent than the discretionary accrual component. His results indicate that discretionary accruals are the least persistent among the three earnings components. In addition, Xie (2001) shows that the market underestimates the persistence of, thus underprices, cash from operations. In contrast, the market overestimates the persistence of, and thus overprices, both nondiscretionary and discretionary accruals. He also finds that the market appears to overprice discretionary accruals to a greater extent than it does nondiscretionary accruals.

Managerial discretion could be opportunistic or could improve the ability of earnings to reflect economic value (Watts and Zimmerman, 1986; Healy and Palepu, 1993). Most recent studies focus on the opportunistic role of discretionary accruals (e.g., Rangan, 1998; Teoh et al., 1998a, 1998b; Healy and Wahlen, 1999). They show that managers choose positive discretionary accruals to opportunistically increase earnings prior to IPOs or SEOs for the purpose of misleading the market and that the market overprices these discretionary accruals. The results imply that managers believe that investors are too naïve to comprehend the informational content of earnings and will pay higher prices for the securities with inflated earnings.

However, some researchers argue that accounting choice may provide a mechanism by which better informed insiders can convey information to less informed parties about the timing, magnitude, and uncertainty of future cash flows (Field et al. 2001). For example, Beaver and Engel (1996) find that the capital market is able to decompose the allowance for loan losses in the banking industry into two components, a nondiscretionary component which is negatively priced and a
discretionary component whose incremental pricing coefficient is positive. Subramanyam (1996) also provides evidence that, on average, the market attaches value to discretionary accruals because managerial discretion improves the ability of earnings to reflect economic value.

The interesting issue arising from those incongruous empirical findings is thus to investigate why firms engaged in earnings management: Do they intend to mislead the market or to convey inside information to outside investors through discretionary accruals? It would make no sense for managers to manipulate earnings numbers if the investors are capable to tell the quality of earnings. Sophisticated investors may raise doubts about not only the integrity of the management, but also the prospective of the firm’s future performance. It is likely that the market would assess a larger discount factor in valuing the stock prices because of the greater uncertainty for firms that engaged in earnings managements. Accordingly, the stock prices may not be inflated as expected by the managers who manipulated earnings, but contrary to their expectations, would eventually be undervalued due to the enlargement of discount factor that was assessed by sophisticated investors for their valuation of stock prices. Thus, the question is, “would firms engage in earnings management when the investors they faced are sophisticated?” If so, then there must be motivations other than misleading the market.

Kao and Chien (2003) have already explored how SEO firms develop their strategies of earnings management in the face of investors with different levels of sophistication. They find that firms faced with less sophisticated investors will engage in earnings management with discretionary accruals years before SEOs issuance. The discretionary accruals then decline dramatically subsequent to the issuance. The results provide strong evidence that firms engaged in earnings
management as an opportunistic behavior by taking advantage of investors’ naivety to raise stock prices. On the other hand, firms faced with more sophisticated investors choose more aggressive accounting policies at the year of issuance. Contrary to those firms faced with less sophisticated investors, the discretionary accruals of the firms with sophisticated investors remain at a high level subsequent to the issuance. This result indicates that firms faced with more sophisticated investors also manipulate the earnings aggressively, but the purpose is to communicate inside information regarding future performance so that their stock prices might not be undervalued.

In this paper, I extend Kao and Chien (2003) which explores how SEO firms develop their strategies of earnings management to reexamine the motivation of managerial discretion in more general setting and further test the market efficiency. This paper also extends Xie (2001) which tests the pricing of discretionary accruals without considering the investors’ sophistication and shows that the persistence of discretionary accruals is low and that market overprices these accruals. I examine how the sophistication of market investors influences the motivations of management’s discretionary accounting choices, and thus changes the persistence of discretionary accruals. I also examine whether sophisticated investors incorporate the implications of discretionary accruals components for future earnings in a more sufficient manner than naïve investors. I expect that the persistence of discretionary accruals will be higher for firms faced with sophisticated investors than firms faced with naïve investors. I also expect that the naïve investors will overprice the discretionary accruals, which is consistent with Xie’s (2001) argument, while the sophisticated investors will correctly price the discretionary accruals.

This paper contributes to the existing literature on pricing of discretionary accruals and market efficiency (Sloan, 1996; Xie, 2001), by adding the prospective of
the degree of investors’ sophistication and motivation of management to manipulate earnings to the issue. Previous studies examine whether the market participants, no matter the degree of investors’ sophistication, incorporate the implications of accruals for future earnings and whether they rationally price the accruals (Sloan, 1996; Xie, 2001). This paper incorporates the motivation of managerial discretion when managements face with investors with different degree of sophistication to the pricing of accruals.

**Research Design**

**Development of Hypotheses**

Sloan (1996) regresses future profitability, defined as one-year-ahead ROA, on the accrual and cash flow components of current ROA. He finds that the accrual component of current earnings is less persistent than the cash flow component, and that investors fail to fully appreciate their differing implication for future profitability. Xie (2001) further decomposes the totals accruals into discretionary and nondiscretionary accruals and tests the market pricing of discretionary accruals. He finds that the persistence of discretionary accruals is lower than cash flow and nondiscretionary components of current earnings and that the market overprices discretionary accruals because investors overestimate the persistence of these accruals. Those findings are consistent with the argument that market is not sophisticated enough to tell the persistence of abnormal accruals and that the managers could have opportunistic incentives to manipulate earnings to mislead the investors.

To date, literature addressing the issue of earnings management has focused on the mechanism of investor behavior. Evidence provided by previous studies on earnings management of SEOs and IPOs indicates that investors respond to earnings
numbers mechanically since they are not sophisticated enough to distinguish the quality of earnings from one firm to another. However, it is not difficult to find that some investors are abundant in human and financial resources. They can collect and analyze information beyond the reported earnings numbers. The extended functional fixation hypothesis (EFFH) provided by Hand (1990) is to explain how the degree of investors’ sophistication can affect the mechanism of stock price setting. The EFFH suggests that a firm’s stock price is sometimes set by a sophisticated marginal investor, and sometimes set by an unsophisticated marginal investor depending on the relative proportion of a firm’s stocks held by sophisticated (unsophisticated) investor as a whole.

The management, on the other hand, should have a clear picture of the structure of the corporate ownership by examining the registry of shareholders. This would provide the management with an idea of how sophisticated the investors might be. The management may regard the investors are naïve in nature if individual investors constitute the majority of the corporate ownership; whereas, the investors may be sophisticated if there is a large proportion of institutional investors. Thus, the strategy of engaging in earnings management depends on management’s perception of investor sophistication. More specifically, the motivation of engaging in earnings management in the face of sophisticated investors may be different from either opportunistic behavior or inflating stock prices.

The heterogeneity of the investors’ level of expertise could influence the strategy of managerial discretion. Therefore, the persistence of discretionary accruals would be quite different between firms faced with naïve investors and firms faced with sophisticated ones. Under the context of information asymmetry, if the majority of the corporate ownership is constituted of unsophisticated investors, then the
management would take the advantage of their naivety as well as their mechanistic behavior toward earnings numbers. In this scenario, managerial discretion is opportunistic and is used to mislead the investors. As the result, the persistence, or one-year-ahead earnings implications, of discretionary accruals would be low. In addition, due to naivety, the investors would misprice the discretionary accruals. Consistent with Xie (2001), I expect discretionary accruals will be overpriced in this scenario since the investors are too naive to tell the reversal effect of these accruals.

On the other hand, if the majority of the corporate ownership were constituted of sophisticated investors, then with its virtuosity the management should understand that the investors couldn’t be misled easily. The optimal strategy would then be to communicate inside information about the firm’s prospective to the sophisticated investors and to help them fairly value the stock prices. As a result, the persistence or one-year-ahead earnings implications of discretionary accruals will be high. In addition, since the investors are sophisticated, they can understand one-year-ahead earnings implications of discretionary accruals. Thus, the discretionary accruals can be correctly priced by the investors in this scenario.

Based on the previous arguments, I develop one hypothesis about the persistence of discretionary accruals and two hypotheses about the pricing of discretionary accruals for firm faced with naïve and sophisticated investors as follows:

Hypothesis 1: The persistence of discretionary accruals for firms faced with naïve investors is lower than that for firms faced with sophisticated investors.

Hypothesis 2: For firms faced with naïve investors, the persistence of discretionary accruals is mispriced due to investors’ naivety.

Hypothesis 3: For firms faced with sophisticated investors, the persistence of
discretionary accruals is correctly priced.

Sample Selection and Variable Definition

I obtain all data from the Taiwan Economic Journal (TEJ) database. The sample consist of firms listed in the Taiwan Stock Exchange for the 1994~2003 period. I delete firm-year observation with (1) missing beginning-of-year total assets or insufficient data to calculate accruals as defined below; (2) missing monthly stock returns; (3) fewer than six observations in any industry and year combination; (4) operating cash flows, discretionary accruals, or nondiscretionary accruals are more than three standard deviations away from their respective means. In addition, firms in the banking industry are also excluded because the nature of their financial reports is different from those of firms in other industries. The final sample consists of 4109 firm-year observations.

The Measurement of Earnings Management.

Previous research typically uses the Jones (1991) model-estimated discretionary accruals as “discretionary accruals,” and then uses these discretionary accruals as a proxy for managerial discretion (e.g., Jones 1991; DeFond and Jiambalvo, 1994; Subramanyam 1996; Erickson and Wang 1999). In this paper, I adopt the same method and use the discretionary accruals to measure the extent of earnings management. Discretionary accruals are defined as the difference between total accruals and nondiscretionary accruals. The nondiscretionary accruals are estimated with the employment of a cross-sectional version of modified Jones model proposed by Dechow et al. (1995):

\[ \frac{ACCR_i}{TA_{i-1}} = a_1 \left( \frac{1}{TA_{i-1}} \right) + a_2 \left( \frac{\Delta REV_i}{TA_{i-1}} \right) + a_3 \left( \frac{PPE_i}{TA_{i-1}} \right) + e_i \]
where $ACCR_i$ is total accruals measured as the difference between earnings and cash flow operations. $TA_{t-1}$ is beginning-of-year total assets. $\Delta REV_i$ is the change in sales revenues in year $t$ and $PPE_i$ is gross property, plant, and equipment in year $t$. I denote the predicted values of the modified Jones model as nondiscretionary accruals ($NDAC$) and the residuals as discretionary accruals ($DAC$). $DAC$ is therefore the key component that should be used to examine the strategy of earnings management in the face of investors with different degree of expertise.

**The Measurement of Investor’s Sophistication.**

The institutional ownership is employed as the proxy for investor’s sophistication according to the empirical findings of previous studies. The investors in Taiwan are classified as individuals, government, local companies, local financial institutions, local trusts, foreign institutions, and others. During the sample period, individual investors own 66% of the common shares traded at the stock markets in Taiwan, while the institutional investors hold around 34% of the common shares. Among the institutional holdings, local companies own 20.17% of common shares, while foreign institutions, local financial institutions, local trusts, and other institutions hold 5.9%, 1.63%, 1.56%, and 3% of common shares, respectively. Due to the popularity of cross-holdings and pyramid structures in Taiwan, most of the local company investors are regarded as insiders and do not rely much on the public accounting information to make the investment decisions as financial institutions, trusts, and foreign institutions do. As a result, I exclude the company holding when calculate institutional ownership. Besides, since other institutions are not clearly defined, their ownership is also excluded. According to those selection criteria, only
the ownership of local financial institutions, local trusts, and foreign institutions is included as a proxy for investors’ sophistication. I employ the ending proportion of shares for a specific company owned by local financial institutions, local trusts and foreign institutions as the proxy variable for the measurement of investors’ sophistication.

**The Mishkin Test**

To test the one-year-ahead earnings implication of discretionary accruals and market pricing of these accruals in the same time, I apply the Mishkin (1983) framework employed by a number of recent studies to investigate whether accounting information is fully impounded in stock prices (e.g., Sloan 1996; Burgstahler et al. 2002; Xie 2001).

The Mishkin framework here is used to (1) measure the predictive ability of three components (cash flow from operation, nondiscretionary accruals, and discretionary accruals) of current earnings for one-year-ahead earnings and (2) test whether the market rationally prices discretionary accruals with respect to their one-year-ahead earnings implications. Specifically, I estimate the following regression systems.

\[
EARN_{it+1} = \gamma_0 + \gamma_1 \times CFO_t + \gamma_2 \times NDAC_t + \gamma_3 \times DAC_t + u_{it+1}
\]  

(2)

\[
AR_{it+1} = \alpha + \beta \times (EARN_{it+1} - \gamma_0 + \gamma_1 \times CFO_t - \gamma_2 \times NDAC_t - \gamma_3 \times DAC_t) + v_{it+1}
\]

(3)

where \(EARN\) is income before extraordinary items deflated by beginning-of-year total assets. \(CFO\), \(NDAC\) and \(DAC\) are cash flow from operation, nondiscretionary accruals and discretionary accruals, respectively. Those three variables are also deflated by beginning-of-year total assets. Since the empirical analysis involve the cross-sectional and temporal comparisons, those four variables are all standardized by firm size to facilitate the comparison. The measure of firm size employed is
beginning-of-year total assets. \( AR \) denotes market adjusted abnormal returns computed as annual buy-and-hold raw return minus annual buy-and-hold return on the market portfolio of firms over 12 months period ending four months after the firm’s fiscal year end.

Equation (2) is a forecasting equation that estimates the forecasting coefficients (\( \gamma \)'s) of discretionary accruals (\( DAC \)) and other earnings components for predicting one-year-ahead earnings. The coefficients (\( \gamma \)'s) represent the predictive ability of three current earnings components for next year earnings. Equation (3) is a valuation equation that estimates the valuation coefficients (\( \gamma^* \)'s) that the market assigns to discretionary accruals and other earnings components. Market efficiency with respect to the earnings components imposes the constraint that \( \gamma^*_j \) (j = 1, 2, and/or 3) from equation (3) is the same as \( \gamma_j \) (j = 1, 2, and/or 3) from equation (2). That is, by comparing the coefficients in equations (2) and (3), I can infer the rationality of market. Equations (2) and (3) are jointly estimated using iterative weighted non-linear least squares (Mishkin, 1983). Mishkin (1983) shows that the following likelihood ratio statistic (LR) is asymptotically \( \chi^2(q) \) distributed under the null hypothesis that the market rationally prices one or more earnings components with respect to their associations with one-year-ahead earnings (\( q \) is the number of constraints imposed by market efficiency). The LR is explicitly defined as:

\[
LR = 2 \times N \times \ln(SSR^c / SSR^u)
\]

where:

\( N \) = the number of sample observations;

\( \ln \) = natural logarithm operator;

\( SSR^c \) = the sum of squared residuals from the constrained weighted system;
SSRu= the sum of squared residuals from the unconstrained weighted system.

The rational pricing of one or more earnings components (i.e. $\gamma_j^* = \gamma_j$, j = 1, 2, and/or 3) will be rejected if LR is sufficiently large.

**Empirical Analysis**

I develop three hypotheses under the theoretical framework of EFFH addressed by Hand (1990) to examine (1) how the sophistication of investors can affect the strategy of earnings management and thus influence the persistence of managerial discretion and (2) whether the sophisticated investors comprehend the information in more efficient way than the naïve investors.

**Descriptive Statistics**

Table 1 shows the descriptive statistics of the variables examined in this paper. Panel A reports the descriptive statistics of the entire sample, while Panels B and C report the descriptive statistics of the firms owned by less sophisticated investors, and firms owned by more sophisticated investors, respectively. The sophistication of investors is measured by the proportion of shares held by institutional investors defined in the section of “The measurement of investor’s sophistication”. The cut-off point used to differentiate investors’ sophistication is the institutional ownership of 4.72%, which is the median of the institutional ownership of the entire sample. Finally, panel D tests the equality of means reported in panel B and C.

Panel A indicates that the average total accruals (ACCR) are -1.4% during the sample period, while the average nondiscretionary accruals (NDAC) and discretionary accruals (DAC) are -1.4% and 0.1%, respectively. Total accruals and nondiscretionary accruals are negative on average because of depreciation. Mean and median
discretionary accruals are close to zero. The average abnormal return ($AR$) is 13.6%.

The level of institutional ownership ($INSTI$) is to measure investor sophistication. The mean of $INSTI$ is 9.16%, with minimum= 0%, Q1=0.74%, median=4.72%, Q3=13.08% and maximum=79.79%. 10% of the entire sample has institutional holding over 25%, about 15% has institutional ownership between 13.08% and 25%, and about 10% do not have any institutional ownership (not reported in the table).

The sample firms are categorized into two groups by the median of the institutional ownership. Firms with institutional ownership lower than the median are categorized into the “Low Sophistication” group while firms with institutional ownership higher than the median are categorized into the “High Sophistication” group. The descriptive statistics of the variables for both groups are reported in panels B and C of table 1 and the tests of equality of means of the variables for both groups are reported in panel D. Panels B and C show that the discretionary accruals ($DAC$) for the firms faced with naïve and sophisticated investors are -0.7% and 0.8%, respectively. Panel D indicates that on average, “High sophistication” group has significantly higher $DAC$ than “Low sophistication” group. That is, even though the investors are sophisticated enough to see through the discretionary components of earnings, the firm managers still manage income.

Panels B and C of table 1 also indicate that the average levels of $EARN$ and $CFO$ variables for the Low Sophistication group are 1.5% and 4.2%, respectively. The average levels of $EARN$ and $CFO$ variables for the High Sophistication group are 6.7% and 6.8%, respectively. Panel D indicates that the mean differences are significant and that firms with higher institutional ownership perform better than those with lower institutional ownership.

As to the institutional ownership ($INSTI$), the mean of $INSTI$ for “Low
Sophistication” group is only 1.30%, with minimum= 0%, Q1=0.04%, median=0.74%, Q3=2.26% and maximum=4.71%. While the mean of INSTI for “High Sophistication” group is 17.02%, with minimum= 4.72%, Q1=7.96%, median=13.08%, Q3=21.94% and maximum=79.79%. More than one-quarter of “High Sophistication” sample has institutional holding more than 21% and half of the sample has institutional holding between 7.96% and 21.94% (not reported in the table).

Test of H1:

The following OLS regression is used to test whether the persistence of discretionary accruals for high sophistication group is higher than that for low sophistication group (Hypothesis 1):

\[ EARN_{it} = \gamma_0 + \gamma_1 \times CFO_i + \gamma_{10} \times (CFO \times HIGH)_i + \gamma_2 \times NDAC_i + \gamma_{20} \times (NDAC \times HIGH)_i + \gamma_3 \times DAC_i + \gamma_{30} \times (DAC \times HIGH)_i + \gamma_4 \times HIGH_i + u_{it} \]  

(4)

where CFO, NDAC and DAC are cash flow from operations, nondiscretionary accruals, and discretionary accruals, respectively. Those three variables are deflated by the beginning-of-year total assets. HIGH is equal to 1 if sample observations belong to “High Sophistication” group; and 0 otherwise.

If the persistence of the three earnings components for high sophistication group are higher than that for low sophistication group, then coefficients of interaction terms \( CFO \times HIGH \), \( NDAC \times HIGH \) and \( DAC \times HIGH \) should be significantly greater than zero. The empirical results are shown in table 2. Table 2 indicates that coefficients of \( CFO \times HIGH \) and \( DAC \times HIGH \) are significantly positive (the estimates are 0.062 and 0.103 with t-values are 2.37 and 3.39, respectively) which implies that the persistence of cash flow from operations and discretionary accruals is
higher for high sophistication group. The evidence supports the hypothesis 1. However, the persistence of non-discretionary accruals for those two groups is not significantly different.

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Table 2 is about here.
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Tests of H2 & H3:

A Mishkin system in equation (2) and (3) is used to test the hypotheses (2) and (3). To test whether the heterogeneity of the investors’ level of sophistication could influence the efficiency in impounding the persistence in discretionary accruals, I categorize the firms into two groups according to the institutional ownership and run the Mishkin (1983) framework independently for each sub-sample. The sub-sample results are shown in tables 3 and 4.

The forecasting equation (equation (2)) in Mishkin framework measures the persistence of discretionary accruals for future earnings. The valuation equation (equation (3)) in Mishkin framework examines whether the stock market is efficient in impounding the information contained in discretionary accruals. I infer mispricing if the coefficient in valuation equation attributed to discretionary accruals component by market participants, either naïve or sophisticated, is different from the corresponding coefficient in forecasting equation.

Hypothesis 2 is about firms faced with less sophisticated investors. The empirical results are shown in table 3. For those firms categorized to “Low Sophistication” group, Panel A shows the forecasting coefficients of cash flow from operations ($\gamma_1$), nondiscretionary accruals ($\gamma_2$), and discretionary accruals ($\gamma_3$) are 0.610, 0.529, and 0.487, respectively. In addition, the valuation coefficients that
market assigns to cash flow from operations ($\gamma_1^*$), nondiscretionary accruals ($\gamma_2^*$), and discretionary accruals ($\gamma_3^*$) are 0.865, 0.956, and 0.9356, respectively. These valuation coefficients are all larger than their forecasting counterparts ($\gamma_1 = 0.610$, $\gamma_2 = 0.529$, $\gamma_3 = 0.487$) suggesting that market overprices the persistence of all three components of current earnings. From Panel B of table 2, I test whether the overpricing is statistically significant. The likelihood ratio statistics reject three null hypotheses: $\gamma_1^* = \gamma_1$, $\gamma_2^* = \gamma_2$, and $\gamma_3^* = \gamma_3$, indicating the market significantly overprices the cash flow from operations (p-value=0.0005), nondiscretionary accruals (p-value=0.0002), and discretionary accruals (p-value <0.0001). Especially, the overpricing is more severe for nondiscretionary accruals. These results are consistent with the findings of Xie (2001) and support Hypothesis 2. Finally, the likelihood ratio statistic of 46.546 rejects the null hypothesis that the less sophisticated investors rationally price all three current earnings components (p-value <0.0001).

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Table 3 is about here.
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Hypothesis 3 is about firms faced with sophisticated investors. Panel A of table 4 reports the coefficients estimation of equation (2) and (3) for “High Sophistication” group. Panel A shows that the valuation coefficients of cash flow from operations ($\gamma_1^*$), nondiscretionary accruals ($\gamma_2^*$), and discretionary accruals ($\gamma_3^*$) are 0.716, 0.303, and 0.677, respectively. Their forecasting counterparts of cash flow from operations ($\gamma_1$), nondiscretionary accruals ($\gamma_2$), and discretionary accruals ($\gamma_3$) are 0.671, 0.568, and 0.590, respectively. I further test whether sophisticated investors misprice the persistence (or one-year-ahead earnings implication) of current earnings components. The likelihood ratio statistic in Panel B of table 3 indicate that the null hypotheses:
$\gamma_1^* = \gamma_1$ or $\gamma_3^* = \gamma_3$ cannot be rejected, indicating the sophisticated investors’ rational pricing cash flow from operations (p-value=0.464) and discretionary accruals (p-value=0.286). These results are supportive of hypothesis 3. That is, the institutional investors can correctly price the information content of discretionary accruals. However, the likelihood ratio statistic of 5.307 rejects the null hypothesis of $\gamma_2^* = \gamma_2$ (p-value=0.021) indicating that market significantly underprices the nondiscretionary accruals. In addition, the likelihood ratio statistic of 6.473 cannot reject the null hypothesis that the more sophisticated investors rationally price all three current earnings components at 10% significance level.

Table 4 is about here.

Conclusion

This paper contributes to the existing literature on pricing of discretionary accruals and market efficiency (Sloan, 1996; Xie, 2001), by adding the prospective of the degree of investors’ sophistication and motivation of management to manipulate earnings to the issue. Assuming market investors are homogeneous, previous studies examine whether the market participants incorporate the implications of accruals for future earnings and whether they rationally price the accruals (e.g., Dechow, 1994; Subramanyam, 1996; Sloan, 1996; Xie, 2001). This paper extends Xie (2001) which tests the pricing of discretionary accruals without considering the investors’ sophistication and shows that the persistence of discretionary accruals is low and that market overprices these accruals. This paper also extends Kao and Chien (2003) which explores how SEO firms develop their strategies of earnings management to reexamine the motivation of managerial discretion in more general setting and further
test the market efficiency.

In this paper, I examine how the sophistication of market investors influences the persistence of discretionary accruals and whether sophisticated investors incorporate the implication of discretionary accruals component for future earnings in a more sufficient manner than naïve investors do. I find that the persistence of discretionary accruals for firms faced with naïve investors is lower than that for firms faced with sophisticated investors. In addition, the sophisticated investors incorporate the implications of discretionary accruals for future earnings in a more sufficient manner than naïve investors do.
References


NJ: Prentice-Hall.

### TABLE 1 Descriptive statistics

#### Panel A: Entire sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Max.</th>
</tr>
</thead>
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<tr>
<td>EARN$_t$</td>
<td>4109</td>
<td>0.041</td>
<td>0.093</td>
<td>-0.484</td>
<td>0.000</td>
<td>0.035</td>
<td>0.083</td>
<td>0.820</td>
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<td>CFO$_t$</td>
<td>4109</td>
<td>0.054</td>
<td>0.100</td>
<td>-0.559</td>
<td>0.007</td>
<td>0.050</td>
<td>0.101</td>
<td>0.777</td>
</tr>
<tr>
<td>ACCR$_t$</td>
<td>4109</td>
<td>-0.014</td>
<td>0.049</td>
<td>-0.247</td>
<td>0.040</td>
<td>-0.016</td>
<td>0.010</td>
<td>0.256</td>
</tr>
<tr>
<td>NDAC$_t$</td>
<td>4109</td>
<td>-0.014</td>
<td>0.049</td>
<td>-0.427</td>
<td>0.041</td>
<td>0.001</td>
<td>0.039</td>
<td>0.432</td>
</tr>
<tr>
<td>DAC$_t$</td>
<td>4109</td>
<td>0.001</td>
<td>0.087</td>
<td>-0.428</td>
<td>0.041</td>
<td>0.001</td>
<td>0.039</td>
<td>0.432</td>
</tr>
<tr>
<td>AR$_t$</td>
<td>4109</td>
<td>0.136</td>
<td>0.793</td>
<td>-0.897</td>
<td>-0.304</td>
<td>0.018</td>
<td>0.366</td>
<td>22.206</td>
</tr>
<tr>
<td>INSTI$_t$(%)</td>
<td>4109</td>
<td>9.159</td>
<td>11.742</td>
<td>0.000</td>
<td>0.74</td>
<td>4.72</td>
<td>13.08</td>
<td>79.79</td>
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</tbody>
</table>

#### Panel B: "Low Sophistication" group

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARN$_t$</td>
<td>2054</td>
<td>0.015</td>
<td>0.083</td>
<td>-0.484</td>
<td>-0.023</td>
<td>0.017</td>
<td>0.055</td>
<td>0.483</td>
</tr>
<tr>
<td>CFO$_t$</td>
<td>2054</td>
<td>0.042</td>
<td>0.090</td>
<td>-0.559</td>
<td>-0.001</td>
<td>0.042</td>
<td>0.089</td>
<td>0.507</td>
</tr>
<tr>
<td>ACCR$_t$</td>
<td>2054</td>
<td>-0.026</td>
<td>0.100</td>
<td>-0.472</td>
<td>-0.075</td>
<td>-0.032</td>
<td>0.015</td>
<td>0.595</td>
</tr>
<tr>
<td>NDAC$_t$</td>
<td>2054</td>
<td>-0.021</td>
<td>0.047</td>
<td>-0.247</td>
<td>-0.046</td>
<td>-0.020</td>
<td>0.002</td>
<td>0.218</td>
</tr>
<tr>
<td>DAC$_t$</td>
<td>2054</td>
<td>-0.007</td>
<td>0.090</td>
<td>-0.429</td>
<td>-0.048</td>
<td>-0.003</td>
<td>0.033</td>
<td>0.408</td>
</tr>
<tr>
<td>AR$_t$</td>
<td>2054</td>
<td>0.129</td>
<td>0.769</td>
<td>-0.897</td>
<td>-0.333</td>
<td>-0.040</td>
<td>0.374</td>
<td>9.771</td>
</tr>
<tr>
<td>INSTI$_t$(%)</td>
<td>2054</td>
<td>1.299</td>
<td>1.432</td>
<td>0.00</td>
<td>0.04</td>
<td>0.74</td>
<td>2.26</td>
<td>4.71</td>
</tr>
</tbody>
</table>

#### Panel C: "High Sophistication" group

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARN$_t$</td>
<td>2055</td>
<td>0.067</td>
<td>0.095</td>
<td>-0.343</td>
<td>0.018</td>
<td>0.056</td>
<td>0.105</td>
<td>0.820</td>
</tr>
<tr>
<td>CFO$_t$</td>
<td>2055</td>
<td>0.068</td>
<td>0.108</td>
<td>-0.428</td>
<td>0.015</td>
<td>0.060</td>
<td>0.117</td>
<td>0.777</td>
</tr>
<tr>
<td>ACCR$_t$</td>
<td>2055</td>
<td>-0.000</td>
<td>0.098</td>
<td>-0.434</td>
<td>-0.053</td>
<td>-0.010</td>
<td>0.039</td>
<td>0.644</td>
</tr>
<tr>
<td>NDAC$_t$</td>
<td>2055</td>
<td>-0.008</td>
<td>0.050</td>
<td>-0.219</td>
<td>-0.035</td>
<td>-0.011</td>
<td>0.015</td>
<td>0.256</td>
</tr>
<tr>
<td>DAC$_t$</td>
<td>2055</td>
<td>0.008</td>
<td>0.083</td>
<td>-0.381</td>
<td>-0.033</td>
<td>0.006</td>
<td>0.045</td>
<td>0.432</td>
</tr>
<tr>
<td>AR$_t$</td>
<td>2055</td>
<td>0.143</td>
<td>0.816</td>
<td>-0.894</td>
<td>-0.273</td>
<td>0.005</td>
<td>0.356</td>
<td>22.206</td>
</tr>
<tr>
<td>INSTI$_t$(%)</td>
<td>2055</td>
<td>17.015</td>
<td>12.254</td>
<td>4.72</td>
<td>7.96</td>
<td>13.08</td>
<td>21.94</td>
<td>79.79</td>
</tr>
</tbody>
</table>

#### Panel D: Tests of the equality of means

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\mu_{Low} - \mu_{High}$</th>
<th>t value</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARN$_t$</td>
<td>-0.053</td>
<td>-18.96</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>CFO$_t$</td>
<td>-0.026</td>
<td>-8.48</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ACCR$_t$</td>
<td>-0.026</td>
<td>-8.56</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>NDAC$_t$</td>
<td>-0.012</td>
<td>-8.14</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>DAC$_t$</td>
<td>-0.014</td>
<td>-5.22</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>AR$_t$</td>
<td>-0.014</td>
<td>-0.56</td>
<td>0.5788</td>
</tr>
<tr>
<td>INSTI$_t$</td>
<td>-15.72</td>
<td>-57.75</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

---

*a Panel A is based on the original sample of 4109 firm-year observations during 1994–2003. Panel B is based on the sample of observations with institutional holding less than median of 4.72%; Panel C is based on the sample of observations with institutional holding greater than median of 4.72%.

*b Variable definitions:
- EARN$_t$ = income before extraordinary items;
- CFO$_t$ = cash flow from operations;
- ACCR$_t$ = total accruals = EARN$_t$ – CFO$_t$;
- NDAC$_t$ = nondiscretionary accruals = predicted values of the Jones (1991) model estimated in cross-section for each two-digit SIC code and year combination;
- DAC$_t$ = discretionary accruals = residual values of the Jones (1991) model estimated in cross-section for each two-digit SIC code and year combination;
- AR$_t$ = market adjusted abnormal returns computed as annual buy-and-hold raw return over a 12-month period ending four months after the fiscal year end minus annual buy-and-hold return on the market portfolio of firms over 12 months period ending four months after the firm’s fiscal year end;
- INSTI$_t$ = ending proportion of shares held by institutional investors including foreign institutions, local trusts and local financial institutions.

All variables except AR$_t$ and INSTI$_t$ are deflated by beginning-of-year total assets.
TABLE 2
Results from Ordinary Least Squares Regression of One-Year-Ahead Earnings on the Cash Flow, Nondiscretionary Accruals and Discretionary Accruals Components of Current Earnings between "Low Sophistication" and "High Sophistication" groups

\[
EARN_{i,t+1} = \gamma_0 + \gamma_1 \times CFO_i + \gamma_{1D} \times (CFO \times HIGH_i) + \gamma_2 \times NDAC_i + \gamma_{2D} \times (NDAC \times HIGH_i) + \gamma_3 \times DAC_i + \gamma_{3D} \times (DAC \times HIGH_i) + \gamma_4 \times HIGH_i + \epsilon_{i,t+1}
\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Estimate</th>
<th>Standard error</th>
<th>t-Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma_0)</td>
<td>-0.002</td>
<td>0.002</td>
<td>-1.26</td>
<td>0.209</td>
</tr>
<tr>
<td>(\gamma_1)</td>
<td>0.609</td>
<td>0.020</td>
<td>30.63</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(\gamma_{1D})</td>
<td>0.062</td>
<td>0.026</td>
<td>2.37</td>
<td>0.018</td>
</tr>
<tr>
<td>(\gamma_2)</td>
<td>0.529</td>
<td>0.031</td>
<td>17.09</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(\gamma_{2D})</td>
<td>0.038</td>
<td>0.044</td>
<td>0.87</td>
<td>0.383</td>
</tr>
<tr>
<td>(\gamma_3)</td>
<td>0.487</td>
<td>0.020</td>
<td>23.76</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(\gamma_{3D})</td>
<td>0.103</td>
<td>0.030</td>
<td>3.39</td>
<td>0.001</td>
</tr>
<tr>
<td>(\gamma_4)</td>
<td>0.020</td>
<td>0.003</td>
<td>7.50</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

The variables except \(HIGH\) are defined in table 1. \(HIGH\) is a dummy variable. \(HIGH\) is equal to 1 if \(INSTI\) is greater than or equal to 4.72% (the median of \(INSTI\)); \(HIGH\) is equal to 0, otherwise. \(HIGH\) is equal to 1 if sample observations belong to “High Sophistication” group; and 0 otherwise.
TABLE 3
Nonlinear Generalized Least Squares Estimation (the Mishkin Test) of the Market Pricing of Cash Flow from Operations, Nondiscretionary Accruals, and Discretionary Accruals with Respect to Their Implications for One-Year-Ahead Earnings—“Low Sophistication” group

Panel A: Market Pricing of Earnings Components with Respect to Their Implications for One-Year-Ahead Earnings

\[ EARN_{t+1} = \gamma_0 + \gamma_1 \times CFO_t + \gamma_2 \times NDAC_t + \gamma_3 \times DAC_t + u_{t+1} \]  
\[ AR_{t+1} = \alpha + \beta \times (EARN_{t+1} - \gamma_0 - \gamma_1^* \times CFO_t - \gamma_2^* \times NDAC_t - \gamma_3^* \times DAC_t) + v_{t+1} \]  

<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>( \gamma_1 ) (CFO)</td>
<td>0.610</td>
<td>0.019 *</td>
<td>( \gamma_1^* ) (CFO)</td>
<td>0.865</td>
<td>0.106</td>
</tr>
<tr>
<td>( \gamma_2 ) (NDAC)</td>
<td>0.529</td>
<td>0.030</td>
<td>( \gamma_2^* ) (NDAC)</td>
<td>0.956</td>
<td>0.166</td>
</tr>
<tr>
<td>( \gamma_3 ) (DAC)</td>
<td>0.487</td>
<td>0.020</td>
<td>( \gamma_3^* ) (DAC)</td>
<td>0.935</td>
<td>0.117</td>
</tr>
</tbody>
</table>

Panel B: Tests of Rational Pricing of Earnings Components

<table>
<thead>
<tr>
<th>Null Hypotheses</th>
<th>Likelihood ratio statistics</th>
<th>Marginal significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFO: ( \gamma_1^* = \gamma_1 )</td>
<td>12.251</td>
<td>0.0005</td>
</tr>
<tr>
<td>DNAC: ( \gamma_2^* = \gamma_2 )</td>
<td>14.092</td>
<td>0.0002</td>
</tr>
<tr>
<td>DAC: ( \gamma_3^* = \gamma_3 )</td>
<td>35.422</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>CFO,NDAC,DAC: ( \gamma_1^* = \gamma_1 ), ( \gamma_2^* = \gamma_2 ), and ( \gamma_3^* = \gamma_3 )</td>
<td>46.546</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

* Equations (2) and (3) are jointly estimated using an iterative generalized nonlinear least squares estimation procedure based on 2054 observations during 1994-2003. The variables are defined in Table 1.
Nonlinear Generalized Least Squares Estimation (the Mishkin Test) of the Market Pricing of Cash Flow from Operations, Nondiscretionary Accruals, and Discretionary Accruals with Respect to Their Implications for One-Year-Ahead Earnings—“High Sophistication” group

**Panel A**: Market Pricing of Earnings Components with Respect to Their Implications for One-Year-Ahead Earnings

\[ EARN_{t+1} = \gamma_0 + \gamma_1 \times CFO_t + \gamma_2 \times NDAC_t + \gamma_3 \times DAC_t + u_{t+1} \]  
(2)

\[ AR_{t+1} = \alpha + \beta \times (EARN_{t+1} - \gamma_0 - \gamma_1^* \times CFO_t - \gamma_2^* \times NDAC_t - \gamma_3^* \times DAC_t) + v_{t+1} \]  
(3)

<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>( \gamma_1 ) (CFO)</td>
<td>0.671</td>
<td>0.017</td>
<td>( \gamma_1^* ) (CFO)</td>
<td>0.716</td>
<td>0.085</td>
</tr>
<tr>
<td>( \gamma_2 ) (NDAC)</td>
<td>0.568</td>
<td>0.032</td>
<td>( \gamma_2^* ) (NDAC)</td>
<td>0.303</td>
<td>0.162</td>
</tr>
<tr>
<td>( \gamma_3 ) (DAC)</td>
<td>0.590</td>
<td>0.023</td>
<td>( \gamma_3^* ) (DAC)</td>
<td>0.677</td>
<td>0.114</td>
</tr>
</tbody>
</table>

**Panel B**: Tests of Rational Pricing of Earnings Components

<table>
<thead>
<tr>
<th>Null Hypotheses</th>
<th>Likelihood ratio statistics</th>
<th>Marginal significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFO: ( \gamma_1^* = \gamma_1 )</td>
<td>0.536</td>
<td>0.464</td>
</tr>
<tr>
<td>DNAC: ( \gamma_2^* = \gamma_2 )</td>
<td>5.307</td>
<td>0.021</td>
</tr>
<tr>
<td>DAC: ( \gamma_3^* = \gamma_3 )</td>
<td>1.136</td>
<td>0.286</td>
</tr>
<tr>
<td>CFO,NDAC,DAC: ( \gamma_1^* = \gamma_1, \gamma_2^* = \gamma_2, ) and ( \gamma_3^* = \gamma_3 )</td>
<td>6.473</td>
<td>0.091</td>
</tr>
</tbody>
</table>

* Equations (2) and (3) are jointly estimated using an iterative generalized nonlinear least squares estimation procedure based on 2055 observations during 1994-2003. The variables are defined in table 1.