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Investor reaction to earnings management

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Abstract

Purpose – The purpose of this paper is to investigate whether earnings management that surpasses a threshold is associated with market mispricing.

Design/methodology/approach – The paper examines the level of discretionary current accruals (DCA) as a proxy for earnings quality. Operationally the threshold of earnings management is defined as the mean DCA, and it is assumed that highly managed firms (both income-decreasing and income-increasing) produce low-quality earnings information. It is postulated that such management may lead to mispricing errors by investors who make incorrect adjustments for lower earnings quality.

Findings – The evidence suggests that investors possess idiosyncratic perceptions toward earnings management. Investors of income-decreasing firms tend to under-adjust for analyst optimism, while investors of income-increasing firms are inclined to over-adjust for analyst optimism. In addition, investors of both types of highly managed firms appear to under-adjust for earnings management. These investor characteristics result in a post-earnings announcement upward drift of cumulative abnormal returns (CARs) for income-decreasing firms and a downward drift for income-increasing firms.

Practical implications – The findings strongly indicate that there is a significant mispricing at the earnings announcement date for the income-decreasing (P1) and income-increasing (P5) portfolios and the mispricing persists in the short run. Thus, it may be possible for investors to exploit the mispricing by holding a long position in P1 and a short position in P5.

Originality/value – Prior studies concentrate on extreme cases of earnings management that are subject to securities and exchange commission (SEC) enforcement. In contrast to these studies, this paper focuses on the market reaction to earnings management, which may or may not lead to SEC enforcement actions.

Keywords Organizational earnings, Investors, Market system

Paper type Research paper

In a segment of the CBS program, *60 Minutes*, the founder and CEO of SAS, Jim Goodnight, stated he would not take his company public because he was unwilling to play the earnings forecast game; where companies can only meet analysts' earnings forecasts by manipulating accounting data. Similarly, in 2002 the Coca Cola Company announced that it would no longer release quarterly and annual earnings estimates. Coke's COB, Douglas Draft, stated: "Our share owners are best served by this because we should not run our business based on short-term expectations. We are managing this business for the long term."

1. Introduction

Arguably, accrual accounting and the creation of financial statements, following generally accepted accounting principles (GAAP), facilitate the accurate analysis of financial performance, and companies engage in such analysis to distribute information in an efficient market. Under this argument, it is implicitly assumed that earnings management, if it occurs, does not exceed a threshold, which prevents investors from forming rational expectations about a firm's performance[1]. If the preceding statements are true, earnings based on accrual accounting should deliver significant value-relevant information about a firm's prospects. Ample evidence supports this view (Guay *et al.*, 1996; Dechow, 1994; Alexander, 1992; Hughes and Ricks, 1987; Cornell and Landsman, 1989; Givoly and Lakonishok, 1979).



However, Fridson (1996) noted, “The objectivity of GAAP-based financial statements and the desire of corporations to facilitate accurate analysis – misconstrue the motives that frequently underlie financial reporting. Corporations have substantial incentives to exploit the fact that accounting principles are neither fixed for all time nor so precise as to be open to only a single interpretation.” If earnings management exceeds a threshold that prevents investors from forming rational expectations about a firm’s prospects, e.g. excessive earnings smoothing, then accrual earnings will fail to convey true value-relevant information to investors. In such cases, earnings may reflect managers’ self-interest and/or analysts’ bias, and result in market mispricing. In this paper, we investigate whether earnings management that surpasses a threshold, which may or may not trigger securities and exchange commission (SEC) enforcement actions, is associated with market mispricing.

Our approach examines the level of discretionary current accruals (DCA) as a proxy for earnings quality. The DCA equals the difference between the total current accruals (TCA) and non-discretionary current accruals (NDCA). TCA reflects changes in the balances of various non-cash current assets and current liabilities while NDCA reflects the levels of current accruals necessary to support a firm’s sales increase. Operationally, we define the threshold of earnings management as the mean DCA, and assume that highly managed firms (both income-decreasing and income-increasing) produce low-quality earnings information that marginalizes analysts’ forecasts. We postulate that such management may lead investors to misprice stocks based on incorrect adjustments for lower earnings quality. Thus, we argue that lower earnings quality and an expected decrease in analysts’ forecast accuracy represent limiting factors in the true pricing of earnings information. We propose a null hypothesis that investors fully process both the price information and the corresponding bias in analysts’ forecasts when they determine the value of low-quality earnings.

2. Prior studies and hypotheses development

A handful of prior studies provide evidence of earnings management. Brown (2001) and Degeorge *et al.* (1999) all conclude that the frequency of small positive earnings surprises is significantly higher than that of small negative surprises, and that the frequency of zero earnings surprises is unexpectedly high. Degeorge *et al.* observe that in a distribution of forecast errors, zero forecast errors occur most frequently, while forecast errors on the left tail of the distribution are smaller than those errors on the right tail.

Brown and Higgins (2001) compare positive and negative earnings surprises across 13 countries, including the United States. They report that the number of small positive and negative earnings surprises for the United States is nearly twice that of other countries. In contrast, the percentage of extremely negative earnings surprises is smaller in the United States than in the 12 other countries. Assuming that the United States has a more transparent information environment – i.e. more stringent disclosure rules, more effective enforcement of rules and regulations, heavier penalties for violations, and lower information acquisition costs – than other countries, these results indicate that US managers are more adept than non-US managers at managing earnings. For example, they may be more likely to avoid reporting extreme negative surprises by forewarning analysts of bad news and/or managing earnings to meet analysts’ forecasts.

Tasker (1998) found that financial officers manage earnings expectations through conference calls, while Soffer *et al.* (2000) revealed that companies often preclude negative earnings surprises by pre-announcing earnings. Libby and Kinney (2000) provided evidence that management fails to correct quantitatively immaterial earnings

overstatements when such corrections would cause them to fall short of the consensus forecast. They confirmed that these behaviors continued even after implementation of the Statement on Auditing Standards No. 89 increased management’s exposure to possible lawsuits and sanctions if they knowingly did not correct earnings misstatements. Healy and Wahlen (1999) reviewed the earnings management literature and concluded that the major tools managers use to manipulate earnings are “big bath” restructuring charges, premature revenue recognition, and “cookie jar” reserves.

Since earnings management is difficult to detect, few existing studies focus on market reactions to its occurrence. Instead, most studies focus on the extreme cases of earnings management that are subject to SEC enforcement. Feroz *et al.* (1991) and Dechow *et al.* (1996) documented a significant negative average market reaction to earnings management that resulted in SEC enforcement. They also observed that the market reacted less negatively when companies had disclosed accounting problems prior to the earnings announcement date. In contrast to previous studies, we focus on the market’s reaction to earnings management, which may or may not lead to SEC sanctions. Based on a model that gauges both legal and illegal earnings management, we observed the market’s response over time to defined levels of such management. We argue that rational investors place a discount on the reported earnings relative to analysts’ forecasts for income-increasing firms and a premium for income-decreasing firms. Thus, the null hypothesis forecasts that the market’s reaction to earnings surprises for income-increasing firms is algebraically smaller than that of the unmanaged income firms and vice versa for income-decreasing firms. To be specific, we define the cumulative abnormal return (CAR) as the three-day cumulative period of abnormal returns occurring around the earnings announcement date, and postulate that the average CAR for income-increasing firms is less than the average CAR for unmanaged firms (Figure 1). In Figure 1, portfolios P1, P3, and P5 denote the income-decreasing, unmanaged, and income-increasing firms, respectively.

Examining the interaction between stock return momentum and return on equity (ROE), Figelman (2007) provides evidence that earnings momentum is steered by investor under-reaction to new information and by low earnings quality. Richardson *et al.* (2005) address the role of less reliable accruals in earnings momentum persistence and investors reaction to such persistence. The authors contend that less reliable accruals lead to lower earnings persistence and that investors fail to compensate for the lower persistence. These findings suggest that investors may earn abnormal returns by forming portfolios based on earnings quality. To respond to these two current studies, we postulate that the post-announcement drift of CARs fails to occur because rational investors fully adjust for low-quality earnings.

		ANALYST OPTIMISM	INVESTOR REACTION
EARNINGS MANAGEMENT	Income- Decreasing (P1)	<ul style="list-style-type: none"> ▪ Premium on Actuals ▪ Discount on Forecasts 	$DCAR_{P1} > DCAR_{P3}$
	Income- Increasing (P5)	<ul style="list-style-type: none"> ▪ Discount on Actuals ▪ Discount on Forecasts 	$DCAR_{P5} < DCAR_{P3}$

Figure 1.
Rational investors’
response to earnings
management and analyst
optimism with respect to
earnings surprises

Notes: DCAR is the Fama-French three-factor adjusted CAR from -2 to 0 (the annual earnings announcement); P1 is a portfolio containing income-decreasing earnings management firms; P3 is a portfolio including unmanaged firms; and P5 is a portfolio containing income-increasing earnings management firms

3. Measurements and empirical models

The CRSP data provide both daily and monthly stock returns and prices. We used the monthly information to conduct post-earnings announcement analysis and the daily data for the regression analysis to test the market sensitivity to earnings surprises. We collected annual reported earnings and the corresponding analysts' forecasts from I/B/E/S. COMPUSTAT data provide accounting information such as sales, inventory, accounts receivable/payable, other current assets, and total assets used to estimate the current accruals and NDCA, as well as DCA. From the discretionary accruals data, we formed portfolios of earnings managed and unmanaged firms and portfolios that represent the level of earnings management. We detail the portfolio formation process in the following section.

To estimate the Fama-French three-factor model, for adjusted daily and monthly CARs, we obtained risk-free rates, value-weighted market returns, and spreads between small-cap and large-cap portfolios (SMB) as well as high/low book-to-market portfolios (HML) from Wharton Research Data Services (WRDS). The subsequent sample contains 13,295 firm-years over the period from 1988 to 2002. We winsorized the top and bottom one percentiles of these observations, based on the DCA, to mitigate the impact of extreme values[2].

3.1 Measurement of earnings management

To gauge earnings management, we employ a cross-sectional model used by Teoh, Welch, and Wong (Teoh *et al.*, 1998)[3]. Following Teoh *et al.*, we used DCA as proxy for earnings management. The following specifies the Teoh *et al.*'s model:

$$CA_{it} = \Delta[AR + INV + OCA] - \Delta[AP + TP + OCL] \quad (1)$$

$$\frac{CA_{it}}{TA_{i,t-1}} = \alpha_0 \left(\frac{1}{TA_{i,t-1}} \right) + \alpha_1 \left(\frac{\Delta Sales_{it}}{TA_{i,t-1}} \right) + \varepsilon_{it} \quad (2)$$

$$NDCA_{it} = \hat{\alpha}_0 \left(\frac{1}{TA_{i,t-1}} \right) + \hat{\alpha}_1 \left(\frac{\Delta Sales_{it} - \Delta AR_{it}}{TA_{i,t-1}} \right) \quad (3)$$

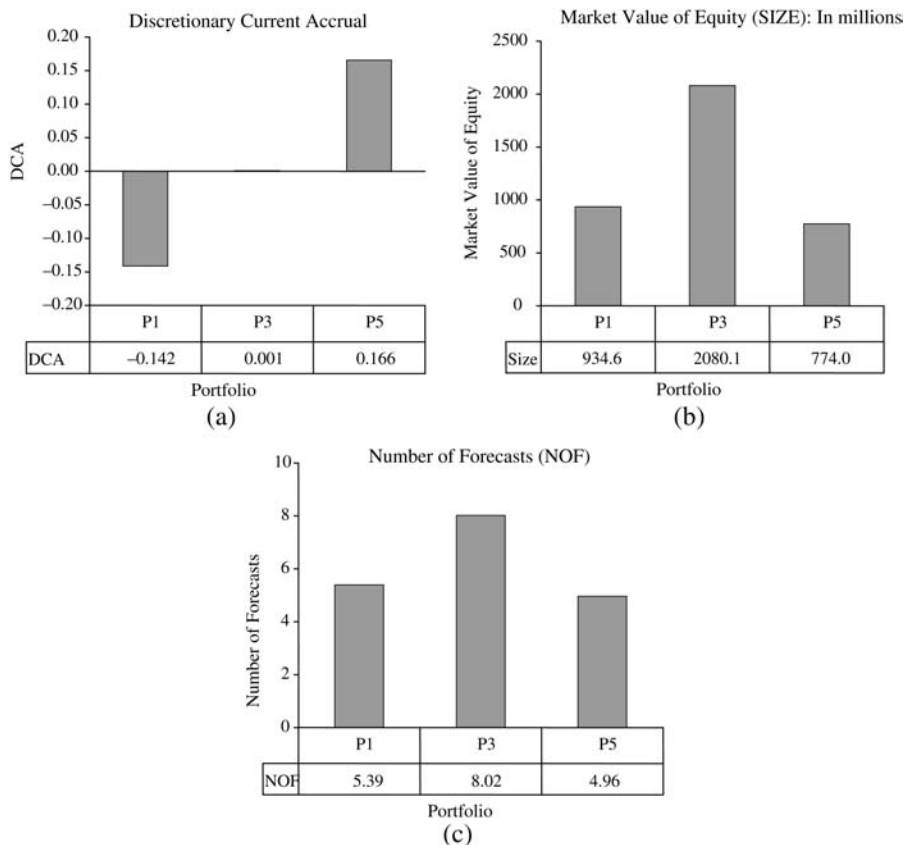
$$DCA_{it} = \frac{CA_{it}}{TA_{i,t-1}} - NDCA_{it} \quad (4)$$

where CA_{it} , current accruals for firm i in year t ; AR , accounts receivables; INV , inventory; OCA , other current assets; AP , accounts payable; TP , tax payable; OCL , other current liabilities; $\Delta Sales_{it}$, change in sales for firm i from year $t - 1$ to year t ; $TA_{i,t-1}$, total assets for firm i in year $t - 1$; α_0 , α_1 , OLS estimates of α_0 , α_1 ; $NDCA_{it}$, non-discretionary current accruals for firm i in year t ; and DCA_{it} , discretionary current accruals for firm i in year t .

Note that all the variables in equations (2) to (4) are deflated by lagged total assets ($TA_{i,t-1}$) to control for scale differences. Following Teoh *et al.*, we estimate the parameters of equation (2) over each industry classification[4]. In other words, the firms in the same industry have the same parameter estimates, $\hat{\alpha}_0$ and $\hat{\alpha}_1$, that are in turn used to estimate the NDCA for each firm-year. Since the fitted NDCA adjusts for both the firm and industry effects that influence current accruals independent of earnings management in each year, the resulting DCA defines the level of current accruals that are managed (Teoh *et al.*, 1998). A DCA of zero indicates the model detects no earnings management activity. Relative to zero, firms with more negative DCAs tend to deflate earnings, while firms with more positive DCAs tend to inflate theirs. Firms with large positive or negative DCAs are likely to issue low-quality earnings reports. We reformed quintile portfolios each year,

based on a firm's DCA level. The first quintile portfolio (P1) includes firms that decrease income by large amounts (negative DCA), while the fifth quintile portfolio (P5) contains large income-increasing (positive DCA) firms. The third quintile portfolio defines unmanaged firms expected to possess high earnings quality relative to P1 and P5.

Portfolios P1 through P5 had the same number of firm-years at the time of their formation. These firm-years reduce to 1,667, 3,258, 3,385, 3,169, and 1,816, respectively, due to the merger of COMPUSTAT, I/B/E/S, and CRSP databases. To mitigate classification errors, we focus on the three portfolios P1, P3, and P5 in the following discussions. Figures 2(a)-(c) display the average base data relative to each of the quintile portfolios including the mean DCA level, the mean market value of equity, and the mean number of analyst forecasts for each quintile.



Notes: (a) This figure presents the mean scores of DCA for the quintile portfolios formed according to the DCA level: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio), (b) This figure presents the means of market value of equity for the quintile portfolios formed on the basis of DCA scores: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio) and (c) This figure presents the means of analysts' earnings forecasts for the quintile portfolios formed on the basis of DCA scores: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio)

Figure 2.
Mean of DCA level,
market value of equity
and number of forecasts

3.2 Measurement of abnormal return

To avoid the statistical problems of using long-term buy-and-hold returns, we employed the standard Fama-French three-factor model to estimate both daily and monthly CARs (Fama and French, 1993; Fama, 1998). The three-factor monthly-adjusted CARs derive from the following time-series regression:

$$R_{it} - R_{ft} = \alpha_i + \beta_{it}[R_{Mt} - R_{ft}] + s_{it}SMB + h_{it}HML + \varepsilon_{it} \quad (5)$$

$$\bar{R}_{it} = R_{ft} + \hat{\beta}_{it}[R_{Mt} - R_{ft}] + \hat{s}_{it}SMB + \hat{h}_{it}HML \quad (6)$$

$$MAR_{iT} = R_{iT} - \bar{R}_{iT} \quad (7)$$

$$MAAR_{PT} = \frac{\sum_{j=1}^n MAR_{jPT}}{n} \quad (8)$$

$$MCAR_{Ps} = \sum_{\tau=1}^s MAAR_{P\tau} \quad (9)$$

where R_{it} is the monthly return for firm i in month t , R_{Mt} is the monthly return on the CRSP value-weight market portfolio in month t , R_{ft} is the one-month treasury bill rate for month t , SMB is the difference between the portfolio returns for small-cap and large-cap stocks in month t , HML is the difference between the portfolio returns of high and low book-to-market stocks in month t , MAR_{it} is the Fama-French three-factor adjusted monthly abnormal return at the annual earnings announcement period T , n is the number of firms in portfolio P , where $P = P1, P3$, and $P5$, $MAAR_{PT}$ is the monthly mean of abnormal returns for portfolio P , and $MCAR_{Ps}$ is the CAR for s months after the earnings announcement month, where $s = 1, 2, \dots, 24$. The estimation of the slope coefficients for the market risk premium, SMB , and HML includes the 36-month period prior to the contemporaneous month t . We then used the parameter estimates, $\hat{\beta}_{it}$, \hat{s}_{it} , and \hat{h}_{it} , to calculate the expected monthly return which is subtracted from the actual monthly return in month t to get the abnormal return. We followed the above procedures to obtain the Fama-French three-factor daily CARs. In the daily procedures, the time reference “ t ” indicates day t and the estimation of the slope coefficients in equation (5) occurs over the 260-day period prior to the annual earnings announcement day t . To differentiate daily figures from monthly figures, we use DAR_{it} , $DAAR_{PT}$, and $DCAR_{Ps}$ to indicate the three-factor daily abnormal return, the mean of daily abnormal returns for portfolio P , and the three-day CAR from two days prior to the annual earnings announcement to the announcement day[5].

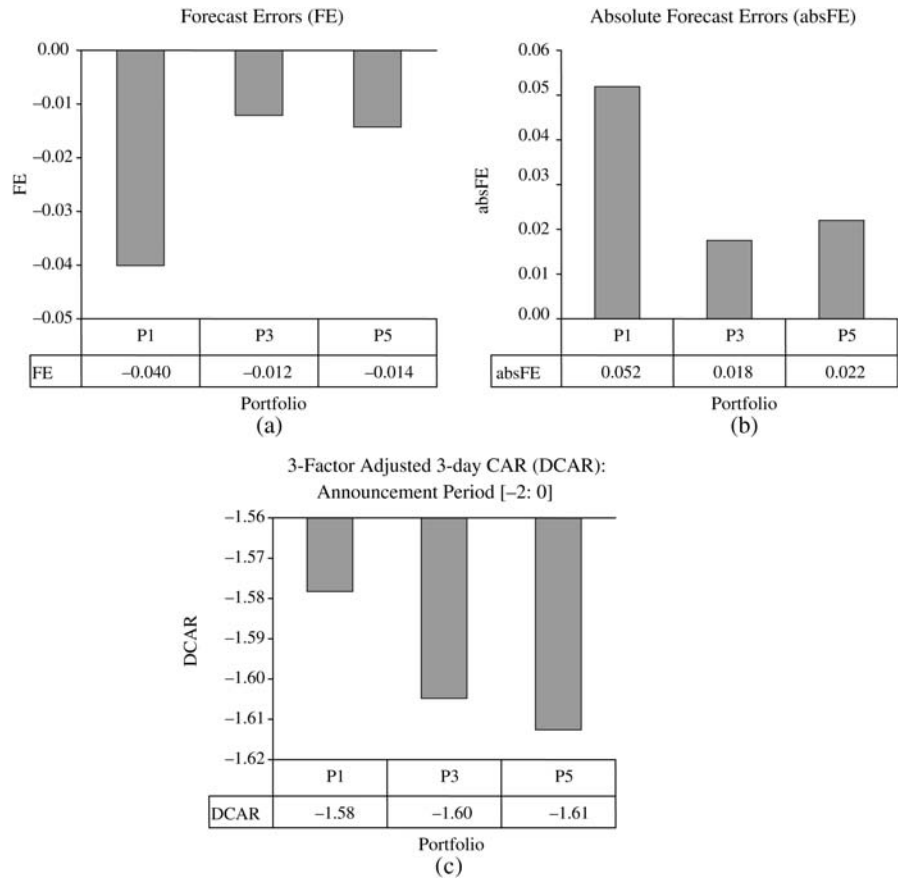
4. Empirical results

4.1 Descriptive statistics and regression analysis

Figure 2(a) presents the mean DCA, the market value, and the number of analyst forecasts for each of the three portfolios. The mean DCA follows expected patterns for managed and unmanaged firms. The mean market value of unmanaged firms (P3), \$2,080 million, is more than twice the market values of managed firms (P1 and P5) and approximately one-and-a-half times as many analysts follow P3 firms.

Figure 3(a) displays the mean forecast errors of P1 and P5, -0.04 and -0.014 , respectively, both of which are more negative than that of P3, -0.012 . These data indicate that analysts tend to issue more optimistic forecasts for earnings managed firms than they do for unmanaged firms suggesting that managed firms have a higher forecast

bias (i.e. greater analyst optimism and less accuracy) than unmanaged firms because of the differences in earnings quality. We performed both the parametric *t*-test and the non-parametric Wilcoxon rank sum test to evaluate the differences between P1 and P3 as well as between P3 and P5. These tests show a significant variance between P1 and P3 at the 1 percent level, but insignificance between P3 and P5 at the conventional significance levels indicating P5's forecasts are not more optimistic than those of unmanaged firms. We further tested the mean difference between P1 and P5. Both the *t*-test and the Wilcoxon test rejected the null hypothesis. These results imply that income-decreasing firms have more optimistic analyst forecasts than income-increasing firms. Figure 3(b) presents similar data for the absolute mean forecast error. Stated more precisely, analysts



Notes: (a) This figure presents the means of FE for the quintile portfolios formed according to the DCA: P1 (managed; income-decreasing portfolio), P3 (unmanaged; income-increasing portfolio), (b) This figure presents the means of absFE for the quintile portfolios formed according to the DCA: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio) and (c) This figure presents the Fama-French three-factor adjusted three-day CARs at the earnings announcement for the quintile portfolios formed on the basis of DCA: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio)

Figure 3.
Mean of forecast error,
absFE and DCAR

tend to miss the actual earnings at a greater magnitude when they forecast earnings for income-decreasing firms as opposed to those of income-increasing firms.

The regression results displayed in Panel A of Table I show that the forecast error is negatively associated with the absolute earnings management ($|DCA|$). The slope coefficient ($\beta_1 = -0.071$) is significant at the 1 percent level, indicating optimistic forecasts are positively associated with more highly managed firms. This information also indicates that analysts are optimistic about earnings forecasts. The intercept ($\alpha = -0.012$) is negative and significant at the 1 percent level. This result confirms the evidence located in Figure 3(a) which shows the mean forecast errors of P1, P3, and P5 to be negative and significant at the 1 percent level, while the grand mean of forecast errors is -0.017 and significant at the 1 percent level[6].

4.2 Analysis of market reaction to earnings management

Figure 3(c) presents the Fama-French three-factor adjusted three-day CARs (DCARs) for P1, P3, and P5, which are -1.58 , -1.60 , and -1.61 , respectively. The parametric t -test suggests, in contrast to the data presented in Figure 3(a), that the DCAR for P5 is not significantly different from that of P1. Explicitly, while the DCAR is nominally higher for P1 (-1.58) than for P5 (-1.61), showing no significant statistical difference, the average forecast errors for P1 (-0.04) and for P5 (-0.014) are significantly different. In other words, for income-increasing managed firms, rational investors should discount reported earnings. Thus, the observed abnormal returns that occur at the earnings announcement for the income-increasing firms tend to be algebraically smaller than those of income-decreasing managed firms. The opposite results hold true for income-decreasing managed firms. Under the null hypothesis of full adjustment for low-quality earnings, we expected that the DCAR of P1 would be significantly greater than that of P5. However, neither the parametric t -test nor the non-parametric Wilcoxon test support the null hypothesis, implying that investors fail to adjust fully for low-quality earnings[7]. The magnitude by which investors miss the target is the next empirical question we address.

Panel B of Table I displays the parameter estimates and test results of a regression of DCAR on the two managed portfolio dummies including their forecast errors. The intercept ($a + b_1$) and slope ($c_1 + c_2$) for P1 are -1.62 and -1.03 , respectively (not shown), with p -values of <0.0001 and 0.3026 . The intercept ($a + b_2$) and slope ($c_1 + c_3$) for P5 are -1.77 and -10.74 , respectively (also not shown), both with p -values of <0.0001 . While the intercepts of P1 and P5 are not statistically different, the slope coefficients indicate P1's DCAR dominates P5's in the domain of positive forecast errors and vice versa in the domain of negative errors. This finding suggests that investors fully adjust for low-quality earnings in response to positive forecast errors, but fail to adjust in response to negative forecast errors. As a result, the test of the null hypothesis is inconclusive.

To reach a meaningful conclusion, we extended the analysis to examine long-term CARs. Figure 4 presents the results of our analysis of post-announcement median MCARs[8]. Using a period of $+1$ month to $+24$ -months after the earnings announcement month, we found a marked difference in MCARs between portfolios, P1, P3, and P5. While P1 shows a persistent upward trend after the earnings announcement, P5 displays a conspicuous downward drift. As expected, P3 does not show any persistent trend. To assess the significance of the MCARs during the 24-month post-announcement period, we used both a non-parametric significance test (sign test) and a parametric test (Student t -test suggested by Asquith (1983))[9]. The tests showed consistent results.

Coefficient	Estimate	Pr > t
<i>Panel A. Regression of FE on DCA </i>		
$FE_{it} = \alpha + \beta_1 DCA _{it} + u_{it}$		
α	-0.0124	<0.0001
β_1	-0.0713	<0.0001
Number of observations	13,295	
F-value	23.19	
Pr > F	<0.0001	
R-square	0.0017	
Adj R-square	0.0017	
<i>Panel B. Regression of DCAR on FE and DCA portfolios</i>		
$DCAR_{it} = a + b_1D_{P1} + b_2D_{P5} + c_1FE_{it} + c_2FED_{P1} + c_3FED_{P5} + v_{it}$		
a	-1.6610	<0.0001
b_1	0.0413	0.8741
b_2	-0.1052	0.6765
c_1	-4.6642	0.0006
c_2	3.6354	0.0306
c_3	-6.0817	0.0303
<i>Pair-wise comparison</i>	<i>F-value</i>	<i>Pr > F </i>
$a + b_1 = 0$	55.61	<0.0001
$a + b_2 = 0$	72.91	<0.0001
$c_1 + c_2 = 0$	1.06	0.3026
$c_1 + c_3 = 0$	19.08	<0.0001
Number of observations	6,868	
F-value	6.41	
Pr > F	<0.0001	
R-square	0.0046	
Adj R-square	0.0039	

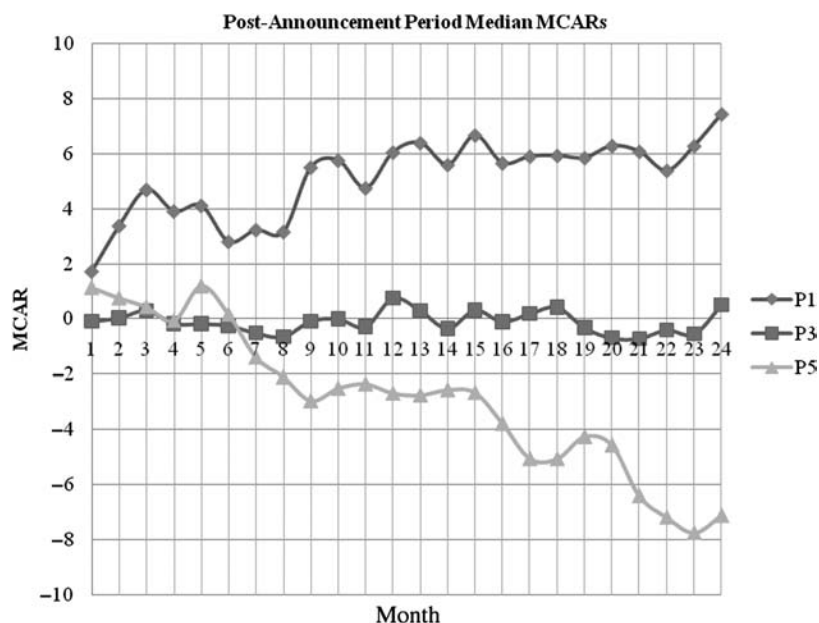
Notes: This table reports the relationships between the discretionary current accrual (DCA), the forecast error (FE), and the DCAR on the FE and DCA portfolios, after compiling the regression results using the following models:

$$FE_{it} = \alpha + \beta_1|DCA|_{it} + u_{it}$$

$$DCAR_{it} = a + b_1D_{P1} + b_2D_{P5} + c_1FE_{it} + c_2FED_{P1} + c_3FED_{P5} + v_{it}$$

where FE_{it} is the analysts' earnings forecast error for firm i , scaled by stock price one month prior to the earnings announcement for year t ; $|DCA|_{it}$ is the absolute discretionary current accrual for firm i in year t (a measure of earnings management regardless of the sign); $DCAR_{it}$ is the Fama-French three-factor adjusted three-day $[-2; 0]$ CAR for the earnings announcement for year t ; D_{P1} is a dummy variable that equals one if an observation belongs to the income-decreasing portfolio (P1) and zero otherwise; D_{P5} is a dummy variable that equals one if an observation belongs to the income-increasing portfolio (P5) and equals zero otherwise[10]; FED_{P1} is the interaction term between FE_{it} and P1; FED_{P5} is the interaction term between FE_{it} and P5; finally u_{it} and v_{it} are identically and independently distributed random error terms

Table I.
Multiple regression
models



Notes: This figure presents the medians of MCARs for the quintile portfolios based on the DCA: P1 (managed; income-decreasing portfolio), P3 (unmanaged), and P5 (managed; income-increasing portfolio)

Figure 4.
Median MCAR across
DCA portfolios

The p -values displayed in Table II indicate that all of P1's MCARs are significant at the 1 percent level. Similarly, the sign test indicates that 20 of 24 MCARs are significantly different from zero for P5 and the parametric test confirms this finding with two exceptions. P3's MCARs remain insignificant during the post-announcement period and all p -values of the sign test and parametric test are greater than the conventional significance levels except for two of the parametric tests in post-announcement months 2 and 3. Overall, the significant post-announcement drift of the MCARs strongly indicates that mispricing occurs at the earnings announcement for P1 and P5 and that mispricing persists over the 24-month period. These results confirm the findings of Figelman (2007) and Richardson *et al.* (2005). Thus, it may be possible for informed investors to exploit the mispricing by a long position in portfolio P1 or a short position in P5.

P1 drifts upwardly for three plausible reasons. First, at the earnings announcement investors might under-adjust for analysts' optimism and place an insufficient premium on earnings forecasts, while fully adjusting for earnings-decreasing earnings management. Second, investors might place an insufficient premium on the reported earnings to adjust for income-decreasing earnings management. Third, both an under-adjustment for income-decreasing earnings management and an over-adjustment for analysts' optimism can cause a steep upward drift. Since the evidence indicates that analyst optimism prevails, the third explanation is more convincing.

The downward drift of P5 occurs for three plausible reasons. First, at the earnings announcement investors might fully adjust for income-increasing managed firms, but apply an excessive discount for analysts' optimism. Second, investors might under-adjust for income-increasing earnings management by placing an insufficient discount on reported earnings. Third, both an under-adjustment for income-increasing earnings

Month	Median MCAR			Sign test			<i>t</i> -test		
	P1	P3	P5	P1	P3	P5	P1	P3	P5
1	1.73	-0.09	1.13	<0.01	0.62	0.01	<0.01	0.26	<0.01
2	3.39	0.04	0.75	<0.01	0.99	0.23	<0.01	0.04	<0.01
3	4.70	0.31	0.43	<0.01	0.32	0.47	<0.01	0.02	<0.01
4	3.92	-0.17	-0.07	<0.01	0.62	0.89	<0.01	0.45	0.08
5	4.12	-0.18	1.20	<0.01	0.60	0.09	<0.01	0.23	0.02
6	2.81	-0.25	0.16	<0.01	0.53	0.81	<0.01	0.24	0.09
7	3.24	-0.52	-1.40	<0.01	0.48	0.03	<0.01	0.53	<0.01
8	3.17	-0.65	-2.10	<0.01	0.24	0.01	<0.01	0.41	0.06
9	5.51	-0.08	-2.96	<0.01	0.87	0.01	<0.01	0.58	0.02
10	5.76	0.00	-2.51	<0.01	1.00	0.04	<0.01	0.93	0.02
11	4.76	-0.29	-2.35	<0.01	0.76	0.08	<0.01	0.64	0.01
12	6.06	0.76	-2.68	<0.01	0.17	0.02	<0.01	0.13	0.02
13	6.40	0.30	-2.75	<0.01	0.76	<0.01	<0.01	0.56	0.02
14	5.60	-0.35	-2.56	<0.01	0.60	0.03	<0.01	0.53	0.02
15	6.67	0.32	-2.66	<0.01	0.55	0.03	<0.01	0.24	0.05
16	5.66	-0.10	-3.78	<0.01	0.90	<0.01	<0.01	0.50	0.01
17	5.91	0.19	-5.06	<0.01	0.81	<0.01	<0.01	0.57	0.01
18	5.94	0.42	-5.07	<0.01	0.59	<0.01	<0.01	0.59	<0.01
19	5.86	-0.33	-4.26	<0.01	0.72	<0.01	<0.01	0.86	<0.01
20	6.29	-0.70	-4.57	<0.01	0.38	<0.01	<0.01	0.29	<0.01
21	6.08	-0.72	-6.42	<0.01	0.22	<0.01	<0.01	0.26	<0.01
22	5.39	-0.41	-7.20	<0.01	0.64	<0.01	<0.01	0.26	<0.01
23	6.29	-0.56	-7.76	<0.01	0.47	<0.01	<0.01	0.16	<0.01
24	7.44	0.51	-7.13	<0.01	0.56	<0.01	<0.01	0.45	<0.01

Table II.
Significance tests for
median MCAR

Notes: The table shows the values of median MCARs across DCA portfolios over the 24-month period after the earnings announcement. Both parametric and non-parametric significance test results in *p*-values are also provided

management and an over-adjustment for analysts' optimism can cause a steep downward drift. Given the presence of a steep downward drift and the large MCARs, the third explanation is again persuasive.

5. Conclusion

Many early studies report that earnings management decreased the frequency of negative earnings surprises, but resulted in significant negative market reactions. This argument is counterintuitive. In this paper, we directly investigated the relationship between earnings management and the market's reaction to such management during both the earnings announcement period and the post-earnings announcement period. The evidence suggests that investors may possess idiosyncratic perceptions toward different types of earnings management. They tend to under-adjust for analysts' optimism about income-decreasing managed firms, while over-adjusting for analysts' optimism about income-increasing managed firms. Additionally, those who invest in highly managed firms appear to under-adjust for earnings management. Such investor characteristics result in persistent upward and downward drifts of both the income-decreasing and income-increasing managed firms after the earnings announcement. For sophisticated investors, this result may create an opportunity to earn an abnormal return by taking a long position in the income-decreasing and/or a short position in the

income-increasing managed firms. An extension of our research may examine the profitability of earnings-management-based portfolio formation.

Notes

1. The SEC and the FASB do not attempt to define what this threshold might be. See Fridson (1996, p. 4).
2. Five percent winsorization does not change the major findings. An anonymous referee suggested that we use medians for the analyses instead of winsorizing the full sample. The major findings are robust to the different samplings – i.e. both the winsorized and the full sample with medians provide consistent results.
3. Beneish (1997) has also developed a model to detect earnings manipulation. While the Beneish model shows a superior performance in identifying earnings management, it has a limitation that makes it unsuitable for this research. The Beneish model seeks to detect firms that have illegally violated accounting laws and/or rules while Teoh *et al.*'s model identifies firms that have managed earnings either legally or illegally, and more closely fits our research objective.
4. We use the “DNUM” variable – four-digit industry code used in COMPUSTAT – to classify the sample firms into different industries.
5. We also did several robustness checks using two other event windows: $[-1:0]$ and $[0]$ and found the results to be robust across the choice of event windows.
6. The grand mean of forecast errors is the mean forecast error of the sample including all of the three portfolios of interest, P1, P3, and P5.
7. The p -values of the Wilcoxon rank sum test range from 0.1614 to 0.5007. The t -test results indicate that none of the pair-wise comparisons between P1, P3, and P5 shows a significant difference at the conventional levels of significance.
8. The use of mean CARs leads to consistent results. In addition, the results are not sensitive to the choice of the abnormal return estimation models. Both market-adjusted and market-model adjusted MCARs (not shown) show similar drift patterns.
9. The authors thank the anonymous referee for the thoughtful suggestions with regard to the significance test of the MCARs. Following Asquith (1983, pp. 56-7), we estimated the standardized abnormal returns and their standard deviation and calculated t -statistics and corresponding p -values. We also applied the Wilcoxon signed rank test and obtained the similar results.
10. Note that the reference group is the middle, unmanaged portfolio, P3.

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