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Does Earnings Management Explain the Long-Term Performance of Capital Reduction Firms?

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Abstract: In Taiwan, firms can implement capital reduction under either the Company Act or the Securities Exchange Act. This study examines whether earnings management associated with different forms of capital reduction can partially explain long term share price underperformance. The results indicate that firms reducing their capital under the Company Act engage in earnings management for longer than those engaging in a capital reduction under the Securities Exchange Act. Furthermore, stock performance reduces with increasing aggression of accruals. The analytical results imply that managers engage in earnings management by reducing capital to boost stock prices without improving firm solvency.

Keywords: Earnings management; Capital reduction; Long-term performance.

JEL: G14; M41

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1. Introduction

Traditionally, a capital reduction involving a listed firm is considered bad news. To improve financial solvency, firms sometimes write off bad loans or assets via capital reduction. However, recently the number of firms reporting capital-decreases has increased markedly.[1] Capital reduction can improve operating quality, reduce agency problems, and increase stock prices through compliance with legal processes. Capital reduction can be achieved through decreasing cash capital or writing off treasury stock. Thus, investigating the reason managers make such decisions is interesting. Degeorge et al. (1999) constructed three established demarcations for corporate earnings, including gaining positive profits, sustaining recent performance, and meeting analyst expectations. Previous investigations show that managers have incentives to manipulate earnings to maximize their welfare. However, earnings management can trigger lawsuits.

Table 1: Number of Firms with Capital Reduction
The distribution of the number of the firms conducting capital reduction during the examination periods

Year	Number of Firms with Capital Reduction
1993	3
1994	3
1995	5
1996	6
1997	11
1998	8
1999	11
2000	19
2001	79
2002	97
2003	108
2004	141
2005	142
2006	156
2007 (January to June)	115
Total	904

Originally, capital reductions were intended to reduce numbers of outstanding shares and inflate share prices. Theoretically, firm market value remains unchanged following a

[1] Table 1 lists the results.

capital reduction, but when investors are pessimistic regarding the future profitability of the firm this does not necessarily apply. To prevent a firm from being delisted owing to a low share price, firm management may manipulate earnings before implementing the capital reduction. Earnings manipulation can not only sustain or increase share price but can also attract institutional investors. Therefore, earnings management is important for firms implementing capital reduction.

If firm profitability can be sustained, a capital reduction can improve firm earnings per share (EPS) and return on equity (ROE). Although firm market value is unchanged, the stock becomes more attractive to investors because of higher EPS and ROE. Demand for the stock will increase pushing up the share price. However, if investors and shareholders realize that earnings are inflated by generous long term use of accruals, the market will punish the share prices of firms engaging in earnings management.

This study examines whether earnings management exists in firms that have undergone capital reductions according to two different laws namely, the Company Act and the Securities Exchange Act. Furthermore, this study tests the long-term performance of firms following the announcement of capital reductions. This study identifies earnings management following the announcement of capital reductions, and also finds that this earnings manipulation is persisting. The long-term performance of firms that have undergone capital reduction is negatively related to the magnitude of the earnings management engaged in by those firms. That is, aggressive management of discretionary current accruals leads to poor long-term stock performance following capital reduction. The results of this study are consistent with the existing literature on earnings management and long-term performance. The results show that firms that have undergone a capital reduction according to the Company Act experience a longer period of earnings management than those that have undergone a capital reduction according to the Securities Exchange Act.

The remainder of this paper is organized as follows. The following section reviews the literature on earnings management and capital reduction. Section three then describes the sample, hypotheses, and models. Finally, the last two sections report empirical results and conclusions.

2. Literature Review

2.1 Earnings Management

Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) found that seasoned equity offerings (SEOs) are followed by negative abnormal returns, and that these can persist for as long as five years. Furthermore, Rangan (1998) and Teoh et al. (1998a) indicated that earnings management can explain SEO underperformance. Ragan (1998) refined the models developed by Jones (1991) and Dechow et al. (1995) to measure earnings management by

estimating discretionary accounting accruals. Ragan (1998) documented that significant discretionary accruals result not only from timing decisions, but also partly from deliberate earnings management. Operating performance is reversed following SEO due to excessive-optimism. However, Dechow et al. (1996) found that the stock market does not natively extrapolate past sales and earnings growth. Teoh et al. (1998a and 1998b) also investigated whether aggressive earnings management via income-increasing accounting adjustments leads investors to be overly optimistic about the prospects of the issuer. Consistent with Ragan (1998), the evidence suggests that discretionary current accruals predict post-issue earnings underperformance. Therefore, discretionary current accruals exert a stronger and more persistent influence on subsequent returns for SEO and IPO firms.

However, Fields et al. (2001) noted that relying on existing accruals models to examine earnings management may cause serious inference problems. Thus, Kothari et al. (2005) suggested performance-matched discretionary accruals as adjusted traditional discretionary accruals (ADTA). Following Dechow et al. (1998) and Barber and Lyon (1997), Kothari et al. (2005) used ROA as the matching variable and suggested that the superior performance of ROA performance-matched accruals measurement compared to other measurements of discretionary accruals reflects the measurements of operating performance and long-term stock returns.

Jo and Kim (2007) demonstrated earnings management in SEO firms using discretionary total accruals (DTA), discretionary current accruals (DCA) and performance-matched discretionary accruals (ADTA). The evidence suggests that ADTA is the most conservative among three accruals-based measures of earnings management. Furthermore, managers typically manage earnings more actively after the SEO than previously. Furthermore, Jo and Kim (2007) also suggested that more frequent disclosure helps reduce information asymmetry, increase earnings transparency, improve SEO pricing, and reduce post-issue underperformance.

2.2 Capital Reduction

Capital reductions according to the Company Act can be conducted by using cash to make up for losses and capital reductions. The former approach only reduces the number of shares but leaves shareholder wealth unchanged. This approach is also called nominal capital reductions. However, firms that anticipate a downturn in the market tend to return cash to shareholders. Such events decrease shareholder wealth and thus are termed substantial capital reductions. However, when firm capital is reduced according to the Securities Exchange Act, management will buy back shares if they consider them undervalued.

The previous literature on capital reductions focuses on short-term and long-term stock returns, or the effect factors and observation indexes. The previous literature ignores the possibility that capital reduction may be a smoke-screen associated with earnings

management that does not improve firm fundamentals. Yang et al. (2005) documented that firms underperform during the one year period after implementing a capital reduction. McKee (2005) also documented that firms can window dress their financial statements or reduce their size through earnings manipulation. Wang and Chan (2014) demonstrated that companies are more likely to conduct cash refund capital reduction in a bullish market period and stock repurchase in a bear market. Chen et al. (2011) indicated that a share repurchase program conveys information regarding the improved prospects of the firm by examining total factor productivity following the announcements of repurchase intentions. Gombola et al. (2009) documented that significant earnings management exits before reserve stock splits, and that firm share price under performs following reserve stock splits. The results imply that managing earnings before reserve stock splits cannot improve subsequent stock returns. Capital reduction resembles the concept of reverse stock splits and involves reducing the number of outstanding shares to inflate both the share price and earnings per share. Therefore, long-term underperformance of firms that have undergone capital reduction might also result from earnings management. This study illuminates the link between earnings management and long-term performance of firms that have undergone capital reduction according to the Company Act or Securities Exchange Act.

3. Samples and Hypotheses

3.1 Sample Selection and Data

The data set retrieved from the Taiwan Economic Journal (TEJ) comprised all firms listed on the Taiwan Stock Exchange. The initial sample comprised 636 listed firms that conducted capital reductions from January 1993 to June 2007.[2] For clarity, the event date was fixed at the first announcement of the capital reduction. The final sample size was 387 listed firms.[3] Among the sample firms, 127 announced capital reductions in response to losses, 13 in response to cash, and 203 conducted capital reductions in accordance with the Securities Exchange Act. Some 44 sample firms announced capital reductions without providing any reasons.

Table 2 lists the distribution of the sample in terms of years and industry and descriptive statistics of the sample. Panel A indicates that announcements of capital reductions intended to make up losses and treasury stock write-offs are more frequent than those by reducing cash capital. Panel B shows that firms in the electronics industry (53.77%) are more likely to announce capital reductions than firms in other industries. Panel C lists summarized firm

[2] To prevent the noise of the subprime mortgage and the financial crisis, the sampling periods are from the beginning of 1993 (the earliest availability of the samples on TEJ) to the second quarter of 2007.
[3] Of 636 initial sample firms, 196 firms are excluded owing to quarterly accounting reports being unavailable. Since financial institutions have unique disclosure requirements, 53 financial firms are also excluded. Therefore, after dropping those firms, the final sample comprised just 387 firms.

statistics relating to assets, market values and book-to-market value ratio.

To prevent the noise of the subprime mortgage and the financial crisis, the sampling periods are from the beginning of 1993 (the earliest availability of the samples on TEJ) to the second quarter of 2007.

Table 2: Sample Distribution and Characteristics

The sample consists of 387 firms conducting capital reduction during the examination periods. The objectives are classified through making up because of losses, decreasing cash capital, and treasury stock write-off in Panel A. The industry distribution of the sample is reported in Panel B by two-digit industrial codes. Panel C presents characteristic of firms in terms of total assets, market value, and market value-to-book value ratio.

Panel A: Three Kinds of Capital Reduction in Years

Year	Capital Reduction Because of Losses	Decreasing Cash Capital	Treasury Stock Write-off
1999	1	0	0
2000	3	0	5
2001	7	0	35
2002	18	1	19
2003	19	0	23
2004	20	1	44
2005	27	2	40
2006	22	6	28
2007 (January to June)	12	3	10
Total	129	13	204

Panel B: Capital Reduction Sorted by Industries

Industrial Group	Codes	Number of Firms	Percent of Sample
Cement	11	5	1.30%
Food	12	12	3.12%
Plastic	13	9	2.34%
Textile	14；44	27	7.01%
Electric Machinery	15；45；66	11	2.86%
Electrical Cable	16	9	2.34%
Chemical, Biotechnology and Medical Care	17；41；47	16	4.16%
Glass Ceramic	18；48	4	1.04%
Paper Pulp	19	4	1.04%
Iron Steel	20；50	10	2.60%
Rubber	21	2	0.52%
Automobile	22	0	0.00%
Electronics Industry	23；24；30；31；32；33；34；35；52；53；54；61；62；80；81	207	53.77%
Building Material Construction	25；55	30	7.79%
Shipping Transportation	26；56	6	1.56%
Tourism	27	2	0.52%
Trading Consumers Goods	29	5	1.30%
Oil, Gas and Electricity	65；89	4	1.04%
Others	99	20	5.19%
Total	-	383	

Panel C: Firms Characteristics (One Month before Capital Reduction Announcement)

	Total Assets	Market Value	Market Value to Book Value Ratio
Mean	11669154	10215.4	1.004034
Median	3534460	1622	0.78
Standard Deviation	33139747	64056	0.71538

3.2 Hypotheses and Methods

3.2.1 Information Asymmetry and Earnings Management Hypotheses

Akerlof (1970) documented that information asymmetry causes adverse selection and moral hazard problems. However, information asymmetry between managers and stockholders can provide managers with an incentive to manipulate earnings. Warfielda et al. (1995) indicated that when information asymmetry is high, stockholders lack sufficient resources, incentives, or access to relevant information to monitor managerial behavior. Richardson (2000) found that information asymmetry can provide managers an opportunity to manage earnings. The likelihood that managers will manipulate earnings increases with information symmetry. Rangan (1998) also identified earnings management in relation to SEO issues. Therefore, this study posits that managers will likely engage in earnings management when information asymmetry exists between the management and shareholders of firms conducting the capital reduction.

3.2.2 Big Bath Hypothesis

McKee (2005) noted that the use of "big bath" techniques is based on the belief that if firms must report bad news, it is better to report such news all at once and thus get it out of the way. Charging large losses against current earnings typically negatively impacts current stock prices because of negative information related to firm competitiveness. However, a recovery in firm operational performance can rapidly increase firm stock price. The big bath approach is best applied when capital reduction is defined based on losses.

3.2.3 Free Cash Flow Hypothesis

Shiue and Lin (2003) found that discretionary accruals are higher for high free cash flow (FCF) firms than low FCF firms. Furthermore, firms with high debt ratio will have lower FCF or discretionary accruals than those with low debt ratio. To reduce agency problems, firms implementing capital reduction return cash to shareholders. However, managers of such firms are more likely to use discretionary accruals to manipulate earnings upward.

3.2.4 Shrink the Ship Hypothesis

McKee (2005) also observed that although a stock buyback does not influence earnings, it does impact earnings per share (EPS). Capital reduction based on the Securities Exchange Act can provide leeway for earnings management. Therefore, this study examines whether earnings management exists in association with capital reduction. Although capital reduction reduce outstanding shares, they improve EPS when earnings remain unchanged. However,

expected earnings may deteriorate following the announcement of a capital reduction. Because of the information asymmetry, managers might legally conduct discretionary accruals under GAAP to glorify expected earnings. Thus, this study develops hypothesis 1 as follows:

H 1: Earnings management exists in association with capital reduction.

However, capital reduction takes longer when performed according to the Company Act than when performed according to the Securities Exchange Act. GAAP provides firms with more leeway to manage their earnings and avoid lawsuits. Therefore, this study forms hypothesis 2, as follows:

H 2: Earnings management lasts longer following the announcement of a capital reduction according to the Company Act than after one according to the Securities Exchange Act.

3.2.5 Rational Expectations Hypothesis

The existing literature documents a weak form efficient market in Taiwan. When listed firms in Taiwan announce a "capital reduction", their stock price eventually fully responds to the publicly announced information. According to rational expectations, investors, in the long run, eventually realize the earnings manipulation by managers. That is, long-term stock prices reflect rational information expectations associated with these three different forms of capital reduction addressed in the following statements. Firms that announce capital reduction for losses without SEO in the future may underperform the matched firms. Furthermore, firms with lower growth rate will convey an unfavorable signal. However, the ability of capital reduction resulting from returning free cash to eliminate the agency problem may be good news for shareholders. Since the Securities Exchange Act requires firms engaging in capital reduction to disclose all financial information to the public, reduced information asymmetry means abnormal returns do not exist over the long term. Thus, hypothesis 3 is formed as follows:

H 3: Abnormal returns eventually shrink in all firms engaging in capital reduction.

H 3-1: Firms engaging in capital reduction for losses exhibit negative long-term abnormal returns.

H 3-2: Firms engaging in capital by reducing cash capital exhibit positive long-term abnormal returns.

H 3-3: Firms engaging in capital reduction by writing off treasury stock exhibit no long-term

abnormal returns.

This study first examines whether earnings management exists in capital reduction firms. Furthermore, this study examines how firms engaging in capital reduction associated with earnings management will perform in the long run. Appendixes A and B list the measurements of earnings management and long-term performance.

4. Empirical Results

4.1 Earnings Management

Following the method of Teoh et al. (1998a, 1998b), this study decomposes accruals into four categories based on time periods and manager control. The categories include discretionary and nondiscretionary current accruals (DCA and NDCA), and discretionary and nondiscretionary long-term accruals (DLA and NDLA). However, Kothari et al. (2005) found that the performance-matched discretionary-accruals approach (ADTA), using return on assets (ROA) as the matching variable, can both accurately and effectively estimate total discretionary accruals.[4] Appendix A details the procedures involved in this approach. Based on the six accruals estimated above, this study examines whether earnings management exists in firms engaging in capital reduction.[5]

Table 3 lists the time-series distribution of accruals four quarters before and after the announcement of the capital reduction. Similar to Jo and Kim (2007), the results of this study focus on current and total discretionary accruals, and performance-adjusted discretionary accruals. Panel A shows that DCA is associated with downward earnings management. From Q_{-4} to Q_{-1}, the median of DCA is increasing; but in Q_0, the median reduces to -0.008, which is a significant decrease. The results show DCA increases following the announcement quarter. In Panel A, DCA is used as an adjustment involving short-term assets and liabilities that support firm daily operations by improving recognition of revenues with credit sales, delaying recognition of expenses after cash is advanced to suppliers, or assuming a low provision for bad debts. Consistent with Gong et al. (2008), because of the flexibility of financial reporting in current accounting standards, this study illustrates that managers can opportunistically use their reporting discretion to temporarily deflate earnings in the quarter prior to the announcement of the capital reduction. In Panel B, DTA comprises DCA and DLA, where DLA is considered an adjustment affecting long-term net assets and involving decelerating depreciation, decreasing deferred tax, and realizing unusual gains. After matching similar ROA firms, this study found that ADTA resembles DTA in Panel C.

[4] Kothari et al. (2005) estimated adjusted discretionary and nondiscretionary total accruals (ADTA and ANDTA) using the performance-matched discretionary-accruals approach. This approach can prevent the type I error, which rejects firms without earnings management.
[5] The six categories of accruals are DCA, NDCA, DLA, NDLA, ADTA, and ANDTA.

However, ADTA is more volatile than DTA from Q_{-2} to Q_0. Furthermore, firms engaging in capital reduction significantly inflate their earnings in Q_{-2} and deflate their earnings in Q_{-1}.

Table 3: Time-Series Distribution of Accruals for Capital Reduction

The asset-scaled accruals in percent, from quarter -4 to +4 relative to the quarter of capital reduction announcement (Q_0). The accruals measures are scaled by beginning-period total assets. See the Appendix A for details of the model to decompose accruals.

Quarter	-4	-3	-2	-1	0	1	2	3	4
Panel A: Discretionary Current Accruals（DCA）									
Median	-0.004[a]	-0.005[a]	-0.005[a]	-0.002[b]	-0.008[a]	-0.005[a]	-0.005[a]	-0.005[a]	-0.005[b]
Mean	-0.009[a]	-0.010[a]	-0.012[a]	-0.008[a]	-0.011	0.002	-0.011[a]	-0.013[a]	0.013
N	373	376	377	378	348	344	323	320	292
Panel B: Discretionary Total Accruals（DTA）									
Median	0.001	0.012[a]	-0.005[b]	0.011[a]	-0.004[c]	0.013[a]	-0.004[b]	-0.004	0.008[b]
Mean	-0.006	0.010[a]	-0.007[c]	0.006	0.002	0.019[a]	-0.009[b]	0.001	0.031
N	373	376	377	378	348	341	322	319	292
Panel C: Performance-Adjusted Discretionary Accruals（ADTA）									
Median	-0.001	0.017[a]	-0.005[b]	0.127[c]	-0.003	0.021[a]	-0.003	0.009	0.004
Mean	-0.010	0.021[a]	-0.007	0.009[c]	-0.008	0.030[b]	-0.009	0.002	0.012
N	170	173	176	291	157	154	138	137	122

[a] represent statistical significance at the 1% levels, using t-tests for the mean and signed rank tests for the median.
[b] represent statistical significance at the 5% levels, using t-tests for the mean and signed rank tests for the median.
[c] represent statistical significance at the 10% levels, using t-tests for the mean and signed rank tests for the median.

This study identified earnings management until Q-1, but surprisingly found that it declined in Q0, suggesting that firms engaging in capital reduction can increase EPS without earnings management. To further examine the effects of three different types of capital reduction, Table 4 lists the results of the sub-sample groups. Panel A shows that firms undergoing capital reduction according to the Company Act have downward earnings management. DCA markedly increases in Q-2, but drops considerably until Q0. Following the announcement date, DCA increases significantly until Q4. ADTA is decreasing in Q-2 and increasing until Q2. To avoid interaction between capital reduction because of losses and via cash according the results listed in Panel A, this study measures earnings management for two subsamples, reported separately in Panels C and D. This study finds that the DCA, DTA and ADTA in Panel C exhibit similar patterns to those in Panel A. However, the DCA, DTA and ADTA in Panel D are apparently different from those in Panel A. DCA and DTA decrease considerably in Q-2 and then increase until Q3. However, ADTA decreases in Q-1,

but increases until Q1, then suddenly decreases in Q2. Panel B lists the capital reduction according to the Securities Exchange Act. In Panel B, DCA does not significantly increase in Q-1 but does decrease in Q0 and then increase until Q2.

Consistent with the results listed in Table 3, downward discretionary current accruals (DCA) exist in all capital reduction announcements. In sum, the results of this study support hypothesis 2 that earnings management after the announcement of the capital reduction according to the Company Act lasts longer than that according the Securities Exchange Act.

Table 4: Time-Series Distribution of Accruals in Different Types of Capital Reduction

The asset-scaled accruals in percent, from quarter -4 to +4 relative to the quarter of capital reduction announcement (Q_0). The accruals measures are scaled by beginning-period total assets. Panel A reports for capital reduction under the Company Act, and Panel B reports for capital reduction under the Securities Exchange Act. To avoid overlapping or interaction effect in Panel A, we divide two types of the capital reduction into subsamples in Panel C and Panel D respectively.

Panel A: Capital Reduction under the Company Act									
Quarter	-4	-3	-2	-1	0	1	2	3	4
Discretionary Current Accruals（DCA）									
Median	-0.005[b]	-0.012[a]	-0.006[c]	-0.010[a]	-0.019[a]	-0.012[a]	-0.009[a]	-0.007[b]	-0.009[a]
Mean	-0.013	-0.018[a]	-0.021[a]	-0.021[a]	-0.015	0.010	-0.026[a]	-0.024[b]	0.038
N	136	136	137	136	120	117	108	106	97
Discretionary Total Accruals（DTA）									
Median	-0.003	0.007	-0.004	0.001	-0.010	0.006[b]	-0.007	0.003	0.010
Mean	-0.015[b]	0.005	-0.010	-0.011	0.014	0.011[c]	-0.005	-0.003	0.086
N	136	136	137	136	120	114	107	105	97
Performance-Adjusted Discretionary Accruals（ADTA）									
Median	0.010	0.015[b]	0.003	0.004	0.018	0.020	0.033	0.016	0.018
Mean	0.028	0.026[b]	-0.222[c]	0.004	0.009	-0.002	0.011	-0.013	0.055
N	32	33	34	37	26	24	19	19	15
Panel B: Capital Reduction under the Securities Exchange Act									
Quarter	-4	-3	-2	-1	0	1	2	3	4
Discretionary Current Accruals（DCA）									
Median	-0.004[b]	-0.003[c]	-0.005[c]	0.002	-0.006[a]	-0.003	-0.001	-0.003[c]	-0.003
Mean	-0.009[b]	-0.005	-0.008[b]	0.002	-0.011[a]	-0.002	-0.000	-0.008	-0.001
N	197	198	198	200	189	188	177	176	157
Discretionary Total Accruals（DTA）									
Median	0.002	0.013[a]	-0.006[c]	0.015[a]	-0.003	0.015[a]	-0.002[c]	0.006[c]	0.006
Mean	-0.003	0.012[a]	-0.002	0.016[a]	-0.004	0.015[a]	-0.010[b]	0.005	0.001
N	197	198	198	200	189	188	177	176	157
Performance-Adjusted Discretionary Accruals（ADTA）									
Median	-0.002	0.015[a]	-0.014[a]	0.010[b]	-0.003	0.020[a]	-0.006	0.009[c]	0.007
Mean	-0.002	0.020[a]	-0.009	0.013[b]	-0.005	0.017[a]	-0.006	0.004	0.012
N	144	147	150	213	137	134	120	119	104
Panel C: Capital Reduction Because of Losses									
Quarter	-4	-3	-2	-1	0	1	2	3	4
Discretionary Current Accruals（DCA）									
Median	-0.008[a]	-0.013[a]	-0.004[a]	-0.013[a]	-0.020[a]	-0.017[a]	-0.010[a]	-0.009[b]	-0.011[a]
Mean	-0.013[c]	-0.020[a]	-0.021[a]	-0.025[a]	-0.015	0.010	-0.026[a]	-0.025[b]	0.040
N	123	123	125	124	113	111	104	102	93
Discretionary Total Accruals（DTA）									
Median	-0.002	0.005	0.000	0.002	-0.010	0.007[b]	-0.008	0.005	0.008
Mean	-0.014[c]	0.002	-0.008	-0.011	0.015	0.010	-0.006	-0.002	0.088
N	123	123	125	124	113	108	103	101	93

Performance-Adjusted Discretionary Accruals（ADTA）									
Median	0.006	0.015	0.005	0.012	0.019	0.021	0.007	0.039	0.016
Mean	0.010	0.015	-0.019	0.015	0.018	-0.004	0.011	-0.007	0.075
N	24	25	26	31	22	21	17	17	13
Panel D: Capital Reduction Because of Decreasing Cash Capital									
Quarter	-4	-3	-2	-1	0	1	2	3	4
Discretionary Current Accruals（DCA）									
Median	0.004	-0.000	-0.015[b]	0.001	-0.003	-0.002	0.002	0.006	0.001
Mean	-0.013	-0.006	-0.019[c]	0.017	-0.023	0.009	-0.003	0.006	0.002
N	13	13	12	12	7	6	4	4	4
Discretionary Total Accruals（DTA）									
Median	-0.019	0.033[b]	-0.024[b]	-0.009	-0.007	0.004	0.016	-0.026	0.061
Mean	-0.018	0.040[b]	-0.029[b]	-0.007	-0.000	0.020	0.012	-0.028	0.049[b]
N	13	13	12	12	7	6	4	4	4
Performance-Adjusted Discretionary Accruals（ADTA）									
Median	-0.006	0.009	-0.000	-0.042	0.048	0.112	-0.150	-0.097	0.092
Mean	-0.033	0.012	0.021	0.065	0.020	0.059	-0.150	-0.097	0.092
N	8	8	8	8	4	3	2	2	2

[a] represent statistical significance at the 1% levels, using t-tests for the mean and signed rank tests for the median.
[b] represent statistical significance at the 5% levels, using t-tests for the mean and signed rank tests for the median.
[c] represent statistical significance at the 10% levels, using t-tests for the mean and signed rank tests for the median.

4.2 Long-term Performance

Yang et al. (2005) documented that firms underperform for one year following capital reduction. Meanwhile, Rangan (1998) and Teoh et al. (1998a and 1998b) found that firms engaging in aggressive *earnings management generally* exhibit the worst *long term performance*.

Pertinent literature has undertaken various long-term performance measurements. For example, Barber and Lyon (1997) compared different measurements of long-term performance and indicated the buy-and-hold abnormal returns (BHARs) approach to be superior to other measurements. The present study thus selected the BHAR model as a measure of long-term performance.[6] Since Barber and Lyon (1997) concluded that matching sample portfolio by size and book-to-market ratios offers a better means of measuring the benchmark than the market index, this study employs the BHAR approach to match sample with closet size and book-to-market ratio. Appendix B reviews the measurements of long-term performance in detail.

Table 5 lists the long-term performance of the capital reduction firms based on three different criteria. The results are reported based on all samples and subsamples, including the capital reduction because of losses, decreasing cash capital, and treasury stock write-off. In Panel A, the first and second annual raw returns are 16.2277% and 21.5485% respectively.

[6] Although Fama (1998) criticized BHAR for being problematic, for example suffering skewed distribution and exaggerated compounding returns, as well as a lack of directional prediction, the study hypotheses apply directionally to both capital reduction and earnings management. Since long-term performance measured by BHAR is most relevant to the investors, this study uses BHAR to measure to long-term performance.

Moreover, the two-year raw return is 37.3535%. When the samples are divided into three sub-sample groups, the first and second annual raw returns and the two-year returns are similar to the results obtained for the full samples. In Panel B, firms with capital reduction because of losses exhibit negative first year abnormal returns but their second year returns increase to 4.4457% although the two-year holding return is slightly positive at 1.2196%. In Panel C, firms with capital reduction because of returning cash to shareholders exhibit the abnormal return of 29.0856% in the first holding year. However, the second year abnormal returns of such firms are 3.1808%. Abnormal returns for a two-year holding period thus are negative. In Panel D, firms with treasury stock write-off for capital reduction exhibit similar results to firms paying back cash.

The results show that investors respond differently to three different types of capital reduction. To summarize, firms with the capital reduction because of losses exhibit negative abnormal return over a one-year holding period but firms that engage in capital reduction via cash and treasury stock write-off have positive abnormal returns over one-year holding periods. The findings suggest that not all cases of capital reduction have the same abnormal long-term returns.

To examine whether long-term poor stock performance is caused by different degrees of earnings management, this study examines the long-term performance for two sub-sample groups given extremely aggressive and conservative earnings management.7 Panel A reveals that one-year raw returns in conservative firms (23.6851%) are lower than in aggressive firms (29.0964%). However, the difference in the raw returns reduces in the second year and two-year holding periods. Through matching-firm-adjusted returns, second year and two-year abnormal returns are 32.6648% and 11.0933% for conservative firms, but 4.6001% and 6.9648% for aggressive firms. In Panel D, the abnormal returns of treasury write-off firms for one-year and two-year holding periods are 61.2939% and 22.9668%, respectively, for conservative firms, and 42.5407% and 8.0483%, respectively, for aggressive firms.

The results demonstrate a negative relationship between earnings management and long-term performance. Consistent with the existing literature on earnings management, this study finds that higher discretionary current accruals lead to poor long-term stock performance following capital reduction.

[7] Aggressive earnings management refers to the first 25% of pre-announce discretionary current accruals quartiles (DCA -1). Conservative earnings management refers to the last 25% of pre-announce discretionary current accruals quartiles (DCA -1).

Table 5: Long-term Performance in Different Types of Capital Reduction

Panel A reports BHARs for all capital reduction firms. BHARs for the capital reduction because of losses, decreasing cash capital, and treasury stock write-off are separately reported in Panel B, Panel C, and Panel D respectively. Annual Returns are computed as:

$$\overline{BHAR} = \frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=m1}^{me}\left(1+r_{i,t}\right)-\prod_{t=m1}^{me}\left(1+a_{i,t}\right)\right],$$

where N is the number of firms, $r_{i,t}$ is the monthly return on security i in month t, $a_{i,t}$ is the benchmark return for similar size and book-market value to sample firms (identically 0 in the raw returns part), and m_1 is the starting month, and m_e is the ending month.

(Starting Month, Ending Month)	Raw Return (%)	Abnormal Return of Match Method (%)
Panel A: Long-term Performance of All Capital Reduction Firms		
(0, 11)	16.2277	1.0536
t-stat	0.20995	0.010008
(12, 23)	21.5485	3.7763
t-stat	0.241109	0.034839
(0, 23)	37.3535	-0.01
t-stat	0.298715	-0.000006
Panel B: Long-term Performance of Capital Reduction Because of Losses		
(0, 11)	16.2043	-4.573
t-stat	0.213277	-0.07381
(12, 23)	21.7094	4.4457
t-stat	0.241596	0.039726
(0, 23)	37.7162	1.2196
t-stat	0.300479	0.007384
Panel C: Long-term Performance of Capital Reduction Because of Decreasing Cash Capital		
(0, 11)	17.8924	29.0856
t-stat	0.221244	0.511735
(12, 23)	23.261	3.1808
t-stat	0.248258	0.029094
(0, 23)	40.4592	-1.657
t-stat	0.335437	-0.0103578
Panel D: Long-term Performance of Capital Reduction Because of Treasury Stock Written-off		
(0, 11)	16.2277	13.2653
t-stat	0.213534	0.112939
(12, 23)	21.5485	4.7826
t-stat	0.241109	0.043577
(0, 23)	38.4428	0.8775
t-stat	0.305506	0.005422

4.3 Robust Test

To demonstrate that earnings management causes the long-term underperformance associated with capital reduction, this study constructs an ordinary least-squares regression as follows:

$$BHAR_{m1}^{me} = \alpha_0 + \alpha_1(DCA_{-1}) + \alpha_2(DTA_{-1}) + \alpha_3(NDCA_{-1}) + \alpha_4(NDTA_{-1}) + \alpha_5(ADTA_{-1}) + \alpha_6(NADTA_{-1}) + \alpha_7(SIZE_{-1}) + \alpha_8(BM_{-1}) + \varepsilon_i$$

where BHAR denotes buy-and-hold abnormal return, m_1 represents the starting month, and m_e is the ending month. DCA_{-1} denotes discretionary current accruals for the quarter before the capital reduction announcement; DTA_{-1} represents discretionary total accruals for the quarter before the capital reduction announcement; and $NDCA_{-1}$ is nondiscretionary current accruals for the quarter before the capital reduction announcement. $NDTA_{-1}$ denotes nondiscretionary total accruals for the quarter before the capital reduction announcement. $ADTA_{-1}$ represents adjusted discretionary total accruals for the quarter before the capital reduction announcement. $NADTA_{-1}$ is adjusted nondiscretionary total accruals for the quarter before the capital reduction announcement. Furthermore, $SIZE_{-1}$ and BM_{-1} denote the log of market value and book-to-market ratio during the quarter before the announcement and serve as the control variable in the regression.

Table 7 shows that firms with high earnings management can boost their earnings following announcing capital reduction but experience more extreme underperformance. In Panel A, Models 1 and 2 only incorporate the traditional earnings management or adjusted earnings management proxy. The findings in Table 7 are robust and consistent with the results listed in Table 6, namely that earnings management and long-term stock performance are negatively related.

Table 6: Long-term Stock Returns after Capital Reduction Announcement by Discretionary Current Accruals Quartiles (DCA $_{-1}$)

According to DCA$_{-1}$, quartile 1 firms are conservative, quartile 4 firms are aggressive. Annual Returns are computed as:

$$\overline{BHAR} = \frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=m1}^{me}(1+r_{i,t}) - \prod_{t=m1}^{me}(1+a_{i,t})\right],$$

where N is the number of firms, $r_{i,t}$ is the monthly return on security i in month t, $a_{i,t}$ is the benchmark return for similar size and book-market value to sample firms (identically 0 in the raw returns part), and m_1 is the starting month, and m_e is the ending month.

(Starting Month, Ending Month)	Raw Return (%)		Matching Firms adjusted Returns (%)	
	conservative	aggressive	conservative	aggressive
Panel A: Long-term Performance of All Capital Reduction Firms				
(0, 11)	23.6851	29.0964	0.3249	12.6164
t-stat	0.191495	0.220159	0.001824	0.090058
(12, 23)	36.5565	33.237	32.6648	4.6001
t-stat	0.265526	0.275189	0.167273	0.037923
(0, 23)	39.2931	52.521	11.0933	6.9648
t-stat	0.257677	0.270172	0.04077	0.040693
Panel B: Long-term Performance of Capital Reduction Because of Losses				
(0, 11)	-20.987	-4.033	-31.29	-10.832
t-stat	-0.42529	-0.05588	-0.59997	-0.1476
(12, 23)	33.1392	22.7854	36.6708	4.8076
t-stat	0.278899	0.276571	0.172031	0.038469
(0, 23)	40.362	53.1778	13.9492	8.1508
t-stat	0.261916	0.272182	0.046857	0.046086
Panel C: Long-term Performance of Capital Reduction Because of Decreasing Cash Capital				
(0, 11)	-	52.5152	-	29.0856
t-stat	-	**1.384886**	-	0.511735
(12, 23)	-	45.3733	-	3.8439
t-stat	-	0.328038	-	0.03132
(0, 23)	-	59.414	-	4.9997
t-stat	-	0.296865	-	0.029044
Panel D: Long-term Performance of Capital Reduction Because of Treasury Stock Written-off				
(0, 11)	72.2844	54.1502	61.2939	42.5407
t-stat	0.325931	0.310481	0.273855	0.245586
(12, 23)	22.4935	31.1694	47.056	5.7317
t-stat	0.284634	0.28887	0.224189	0.046767
(0, 23)	42.0163	54.6174	22.9668	8.0483
t-stat	0.270898	0.278236	0.077698	0.046437

Table 7: Ordinary Least-Squares Regressions Predicting Long-term Stock Returns with Pre-Announcement Accruals

The dependent variable is BHAR (Appendix B Eq. 19). Three different holding periods are presented in Panels A, B, and C respectively. The independent accrual variables (DCA_{-1} through $NADTA_{-1}$) are computed from regressions (described in the Appendix A) and measured before the announcement (subscript -1). Log market-value and log book-to-market variables are used to control for firm characteristics and measured before the announcement (subscript -1).

		BHAR				
Panel A: one-year holding (0,11)						
Independent Variable		Model 1	Model 2	Model 3	Model 4	Model 5
Discretionary Current Accruals (DCA_{-1})	coef	4.55993		-1.7639[c]	-1.46993	-5.16764[a]
	(t)	(0.99)		(-1.66)	(-1.4)	(-4.89)
Discretionary Total Accruals (DTA_{-1})	coef	0.39004		2.65209[a]	2.06583[a]	0.93385[b]
	(t)	(0.16)		(7.55)	(5.54)	(2.53)
Nondiscretionary Current Accruals ($NDCA_{-1}$)	coef	-7.82936		-5.19048	-23.8463[a]	-47.7438[a]
	(t)	(-0.46)		(-1.06)	(-3.66)	(-7.23)
Nondiscretionary Total Accruals ($NDTA_{-1}$)	coef	4.23272		20.16282[a]	28.72638[a]	23.72646[a]
	(t)	(0.38)		(7.15)	(8.39)	(7.34)
Performance-adjusted Discretionary Accruals ($ADTA_{-1}$)	coef		1.32909[a]	0.81432[a]	0.51448[b]	0.47726[b]
	(t)		(6.52)	(3.52)	(2.16)	(2.15)
Performance-adjusted Nondiscretionary Accruals ($NADTA_{-1}$)	coef		5.22103	-18.0992[a]	-32.6231[a]	-18.3773[a]
	(t)		(1.62)	(-2.99)	(-4.75)	(-2.8)
$SIZE_{-1}$ (log market-value)	coef	0.08268[c]	-0.00564		0.05012[a]	0.01341
	(t)	(1.77)	(-0.78)		(4.27)	(1.15)
BM_{-1} (log book-to-market)	coef					1.39776[a]
	(t)					(9.11)
R^2		0.0469	0.0929	0.2407	0.2663	0.3662
adj R^2		-0.0098	0.0877	0.2321	0.2565	0.3566
Panel B: second-year holding (12,23)						
Independent Variable		Model 1	Model 2	Model 3	Model 4	Model 5
Discretionary Current Accruals (DCA_{-1})	coef	1.88475		-10.06[a]	-9.07633[a]	-9.60059[a]
	(t)	(0.91)		(-12.32)	(-11.27)	(-10.32)
Discretionary Total Accruals (DTA_{-1})	coef	0.31062		-1.798[a]	-2.12777[a]	-2.28283[a]
	(t)	(0.29)		(-6.7)	(-8.04)	(-7.65)
Nondiscretionary Current Accruals ($NDCA_{-1}$)	coef	4.80645		-59.2821[a]	-73.4587[a]	-76.2658[a]
	(t)	(0.63)		(-14.95)	(-16.39)	(-14.87)
Nondiscretionary Total Accruals ($NDTA_{-1}$)	coef	-3.92291		-22.033[a]	-11.3052[a]	-12.5618[a]
	(t)	(-0.77)		(-9.43)	(-3.95)	(-4.09)
Performance-adjusted Discretionary Accruals ($ADTA_{-1}$)	coef		0.91452[a]	-0.10852	-0.36572[a]	-0.37209[b]
	(t)		(0.15349)	(-0.7)	(-2.36)	(-2.4)
Performance-adjusted Nondiscretionary Accruals ($NADTA_{-1}$)	coef		22.12307[a]	62.93676[a]	44.65432[b]	47.32521[a]
	(t)		(2.4356)	(13.17)	(8.11)	(7.9)
$SIZE_{-1}$ (log market-value)	coef	0.0414[c]	-0.00103		0.04893[a]	0.04414[a]
	(t)	(-1.91)	(0.00561)		(6.1)	(4.86)

BM_{-1} (log book-to-market)	coef					0.13296
	(t)					(1.13)
R^2		0.1072	0.1801	0.4606	0.5028	0.504
adj R^2		0.0452	0.1753	0.4596	0.4958	0.4961
Panel C: two-year holding (0,23)						
Independent Variable		Model 1	Model 2	Model 3	Model 4	Model 5
Discretionary Current Accruals (DCA_{-1})	coef	1.36169		-11.7007[a]	-8.93845[a]	-19.6076[a]
	(t)	(0.19)		(-5.49)	(-4.28)	(-8.82)
Discretionary Total Accruals (DTA_{-1})	coef	-0.46082		2.00649[a]	1.08045	-2.07515[a]
	(t)	(-0.13)		(2.86)	(1.57)	(-2.91)
Nondiscretionary Current Accruals ($NDCA_{-1}$)	coef	-19.933		-32.2245[a]	-72.0347[a]	-129.161[a]
	(t)	(-0.77)		(-3.11)	(-6.19)	(-10.54)
Nondiscretionary Total Accruals ($NDTA_{-1}$)	coef	1.20732		-7.00679	23.11856[a]	-2.45461
	(t)	(0.07)		(-1.15)	(3.11)	(-0.33)
Performance-adjusted Discretionary Accruals ($ADTA_{-1}$)	coef		3.52314[a]	2.78156[a]	2.05928[a]	1.92969[a]
	(t)		(10.5)	(6.88)	(5.11)	(5.2)
Performance-adjusted Nondiscretionary Accruals ($NADTA_{-1}$)	coef		41.21447[a]	67.52039[a]	16.18046[a]	70.53557[a]
	(t)		(7.74)	(5.41)	(1.13)	(4.93)
$SIZE_{-1}$ (log market-value)	coef	0.07695	0.04767[a]		0.13741[a]	0.03994[a]
	(t)	(1.04)	(3.89)		(6.6)	(1.84)
BM_{-1} (log book-to-market)	coef					2.70577[c]
	(t)					(9.58)
R^2		0.0264	0.2115	0.2665	0.3249	0.4294
adj R^2		-0.0412	0.2068	0.2578	0.3155	0.4203

[a] significant at the 1% level based on a two-sided t test.
[b] significant at the 5% level based on a two-sided t test.
[c] significant at the 10% level based on a two-sided t test.

5. Conclusions

Publicly traded firms in Taiwan increasingly are implementing capital reduction. However, the previous literature on capital reduction only focuses on stock performance and ignores the fact that capital reduction combined with improved long-term performance may be a misleading phenomenon caused by managing earnings to match accounting standards. This study investigates earnings management surrounding the announcement of capital reduction. Following Teoh et al. (1998a, 1998b) and Kothari et al. (2005), this study uses pre and post capital reduction accruals as a proxy of earnings management. This study finds that earnings management exists following the announcement of capital reduction. Furthermore, the analytical results suggest that earnings management periods are longer for firms employing capital reduction under the Company Act than for those employing capital reduction under the Securities Exchange Act.

Generally, firm earnings per share are expected to improve with decreasing number of shares issued after capital reduction. To maximize executive compensation, managers might have an incentive to manipulate earnings. However, earnings management can trigger lawsuits against the firms involved. Eventually, investors will realize that capital reduction with earnings management was an attempt to boost stock prices without improving firm solvency. Thus in the long term the market will punish the stock. The results of this study show that earnings management occurs in firms undergoing capital reduction. Transparent financial statements without earnings management better serve shareholder interests and can also prevent capital reduction firms from experiencing significantly depressed stock prices over the long term.

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Appendix A：Calculation of Discretionary Accruals

A.1. TWW (Teoh, Welch and Wong, 1998a, 1998b) Model

To evaluate earnings management, Teoh, Welch and Wong (1998a, 1998b) constructed a proxy for the amount of accounting adjustments undertaken by management.

$$\text{Net Income} = \text{Cash Flow from Operation} + \text{Total Accruals} \tag{1}$$

Therefore, accruals are the proxy for earnings management,

$$\text{Total Accruals} = \text{Net Income} - \text{Cash Flow from Operation} \tag{2}$$

Following Jones (1991) Model, we scale the model by beginning total assets to reduce heteroskedasticity:

$$\frac{\text{Total Accruals}_{j,t}}{\text{Total Assets}_{j,t-1}} = a_0 \frac{1}{\text{Total Assets}_{j,t-1}} + a_1 \frac{\Delta\text{Sales}_{j,t}}{\text{Total Assets}_{j,t-1}} + a_2 \frac{\text{PPE}_{j,t}}{\text{Total Assets}_{j,t-1}} + \varepsilon_{j,t} \tag{3}$$

where, j represents the matching firm, which is the same industry as the sampling firm (exclude sample). PPEj,t represents gross property, plant, and equipment for firm j at quarter t.

Nondiscretionary total accruals (NDTA) are calculated as:

$$\text{NDTA}_{i,t} = \hat{a}_0 \frac{1}{\text{TotalAssets}_{i,t-1}} + \hat{a}_1 \frac{\Delta\text{Sales}_{i,t} - \Delta\text{AR}_{i,t}}{\text{Total Assets}_{i,t-1}} + \hat{a}_2 \frac{\text{PPE}_{i,t}}{\text{Total Assets}_{i,t-1}} \tag{4}$$

where i represents the sample firm. As modified Jones Model, we subtract the change of the account receivables（ΔAR) from change in sales to allow for the possibility for allowing generous credit policies to obtain high sales prior to the offering.[13]

Discretionary total accruals (DTA) represents by the residual:

$$\text{DTA}_{i,t} = \frac{\text{Total Accruals}_{i,t}}{\text{Total Assets}_{i,t}} - \text{NDTA}_{i,t} \tag{5}$$

However, total accruals are classified into four categories jointly by time period and manager control. Therefore, this study measures the earnings management based on the discretionary current accruals (DCA), nondiscretionary current accruals (NDCA), discretionary long-term accruals (DLA), and nondiscretionary long-term accruals (NDLA).

Current accruals are defined as a change in non-cash current assets minus the change in

[13] See Dechow, Sloan and Sweeney (1995).

operating current liabilities:

$$\text{CDA} = (\Delta\text{Current Assets}-\Delta\text{Cash})-(\Delta\text{Current Liabilities}-\Delta\text{Current Maturity of Long-term Debt}) \quad (6)$$

Because of the difference in industries, firms' accounting items differ. Therefore, this study calculates current accruals as:

$$\begin{aligned}\text{CDA} = &(\Delta\text{Account Receivables} + \Delta\text{Inventory} + \Delta\text{Other Current Assets}) \\ &- (\Delta\text{Account payable} + \Delta\text{Tax Payable} + \Delta\text{Other Current Liabilities})\end{aligned} \quad (7)$$

Following Jones (1991) Model, this study scales the model by beginning total assets to reduce heteroskedasticity:

$$\frac{\text{CDA}_{j,t}}{\text{Total Assets}_{j,t-1}} = b_0 \frac{1}{\text{Total Assets}_{j,t-1}} + b_1 \frac{\Delta\text{Sales}_{j.t}}{\text{Total Assets}_{j,t-1}} + \varepsilon_{j,t} \quad (8)$$

where j represents the matching firm, which is the same industry as the sampling firm (exclude sample).

Nondiscretionary current accruals (NDCA) are calculated as:

$$\text{NDCA}_{i,t} = \hat{b}_0 \frac{1}{\text{TotalAssets}_{i,t-1}} + \hat{b}_1 \frac{\Delta\text{Sales}_{i,t} - \Delta\text{AR}_{i,t}}{\text{Total Assets}_{i,t-1}} \quad (9)$$

where i represents sample firm. As modified Jones Model, this study subtracts the increase in accounting receivables (ΔAR) from change in sales to allow for the possibility for allowing generous credit policies to obtain high sales prior to the offering.

Discretionary current accruals (DCA) represents by the residual:

$$\text{DCA}_{i,t} = \frac{\text{C}DA_{i,t}}{\text{Total Assets}_{i,t}} - NDCA_{i,t} \quad (10)$$

Therefore, Nondiscretionary long-term accruals (NDLA) and Discretionary long-term accruals (DLA) are:

$$\text{NDLA}_{i,t} = \text{NDTA}_{i,t} - \text{NDCA}_{i,t} \quad (11)$$

and

$$\text{DLA}_{i,t} = \text{DTA}_{i,t} - \text{DCA}_{i.t} \quad (12)$$

A.2. KLW (Kothari, Leone and Wasley, 2005) Model

Kothari, Leone and Wasley (2005) indicated that existing methods for estimating discretionary accruals are biased toward rejecting the null hypothesis of no earnings management. Kothari, Leone and Wasley (2005) recommended performance-adjusted discretionary current accruals (ADTA) when test earnings management.

Therefore, this study uses adjusted discretionary accruals by subtracting discretionary accruals of control firms matched on prior-quarter ROA about ±20% and industry.

$$\frac{\text{Total Accruals}_{j,t}}{\text{Total Assets}_{j,t-1}} = a_0 \frac{1}{\text{Total Assets}_{j,t-1}} + a_1 \frac{\Delta\text{Sales}_{j,t}}{\text{Total Assets}_{j,t-1}} + a_2 \frac{\text{PPE}_{j,t}}{\text{Total Assets}_{j,t-1}} + \varepsilon_{j,t} \quad (13)$$

where j represents the closest matching firm, which is the same industry and similar ROA as the sampling firm (exclude sample). $\text{PPE}_{j,t}$ represents gross property, plant, and equipment for firm j at quarter t.

Nonperformance-adjusted discretionary accruals (NADTA) are calculated as:

$$\text{NADTA}_{i,t} = \hat{a}_0 \frac{1}{TotalAssets_{i,t-1}} + \hat{a}_1 \frac{\Delta\text{Sales}_{i,t}}{\text{Total Assets}_{i,t-1}} + \hat{a}_2 \frac{\text{PPE}_{i,t}}{\text{Total Assets}_{i,t-1}} \quad (14)$$

where i represents the sampling firm.

Performance-adjusted discretionary current accruals (ADTA) represents by the residual:

$$\text{ADTA}_{i,t} = \frac{\text{Total Accruals}_{i,t}}{\text{Total Assets}_{i,t}} - NADTA_{i,t} \quad (15)$$

Appendix B：Long-term Performance- Buy and Hold Model

Conrad and Kaul (1992) documented that cumulative returns are biased upward. Buy-and-hold abnormal returns (BHARs) mitigate the bias in abnormal performance measures and are often used in long-horizon studies. The model is:

$$\mathrm{BHAR}_{i,\tau} = \prod_{t=1}^{\tau}\left[1+\mathrm{R}_{i,t}\right] - \prod_{t=1}^{\tau}\left[1+\mathrm{E}\left(\mathrm{R}_{i,t}\right)\right] \tag{16}$$

where $R_{i,t}$ represents the raw return of firm i at quarter t, $E(R_{i,t})$ represents the expected return of firm i at quarter t.

$$\mathrm{HPR}_{(i;a,b)} = \prod_{t=a}^{b}\left[1+\mathrm{R}_{i,t}\right] - 1 \tag{17}$$

where $R_{i,t}$ represents the raw return of firm i at quarter t, and a and b define the quarters over which the holding-period return is calculated.

Barber and Lyon (1997) found that BHAR and matching sample firms to control firms of similar size and book-to-market ratios yield well-specified test statistics in virtually all sampling situations. Furthermore, Teoh, Welch and Wong (1998a, 1998b）also used the same model to calculate long-term performance in earnings management firms.

$$\overline{BHAR} = \frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=m1}^{me}\left(1+r_{i,t}\right) - \prod_{t=m1}^{me}\left(1+a_{i,t}\right)\right] \tag{18}$$

where N represents the number of firms, $r_{i,t}$ represents the quarterly return on firm i at quarter t, $a_{i,t}$ represents quarterly return of the matching firm, which is the same industry and similar market value as the sampling firm i (exclude sample) at quarter t. m_1 is the starting quarter, and m_e is the ending quarter. This study matches the sample by identifying all firms with a market value of equity between 70% and 130% of the market value of the sample firms. Forming this set of firms, this study selects the firm with the closest book-to-market ratio to the sampling firm as the matching firm.