Real Earnings Management: Mergers and Acquisitions

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Abstract

Using a sample of completed mergers and acquisitions during a period of 1987 to 2015, we explore how Sarbanes-Oxley (SOX) and Dodd-Frank (DF) Acts associate with three types of real earnings management (Cash Flow from Operations, Discretionary Expenses and Total Production Cost). Our test results reveal that 1) acquirers tend to engage real earnings management during the period of Sarbanes-Oxley (SOX) Act. On the other hand, we do not notice a consistent pattern of real earnings management in targets. 2) Stock prices of targets, instead of acquirers, are found to relate to real earnings management, especially in Discretionary Expenses and Total Production Cost around Sarbanes-Oxley (SOX) Act and Dodd-Frank (DF) Act. These findings imply that the market may be more sensitive to targets' real earnings management than to acquirers' real earnings management.

Key word: Earnings management, Merger, Regulation, Sarbanes-Oxley, Dodd Frank

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1. Introduction

During the last two decades, we went through two financial crises which introduced Sarbanes-Oxley (2002) and Dodd-Frank Wall Street Reform (2010) Acts. Sarbanes-Oxley Act (SOX) was designed to protect investors from accounting manipulation or frauds. SOX requested information transparency and responsibility of financial managers. It might discourage managers' willingness to do some manipulations. On the other hand, Dodd-Frank (DF) was introduced after the financial crisis caused by risky investment of financial institutions in 2008. DF oversees financial institutions and stabilizes the financial market. DF regulates derivatives (credit swap), risky assets investment, corporate governance, performance compensation, etc. Especially, DF amends Bank Holding Company Act to limit certain activities of bank holding companies in their mergers and acquisitions, lending, etc. to stabilize the financial market. (https://www.law.cornell.edu/wex/dodd-frank_title_VI). Even though Dodd-Frank (DF) was rolled back in 2018, DF still influences financing environment for business.

A recent study by Bonaime, Gulen, Ion (2018) finds that political and regulatory uncertainty is strongly negatively associated with merger and acquisition activity at the macro and firm levels. The strongest effects are uncertainty regarding taxes, government spending, monetary and fiscal policies, and regulation. We believe that two major financial crises resulting in Sarbanes-Oxley (SOX) and Dodd-Frank (DF) might have worsened uncertainty of accounting regulation and monetary and fiscal policies, possibly increasing the chance of managers' engagement to manipulative activities in mergers and acquisitions.

In this paper, we explore how the changing business environment affected real earnings management of firms around mergers and acquisitions. As shown in the survey evidence by Graham et al (2005), managers are willing to manage earnings in order to build credibility with the market and to maintain or improve firms' stock prices. Managers tend to have taken either accrual based earnings management or real earnings management to inflate earnings. Accrual based earnings management alters financial reports by using the flexibility of accounting rules or principles. On the other hand, real earnings management changes operating, investing and financing activities, then eventually financial reports. It is well known that accrual based earnings management does not change actual cash flows whereas real earnings management changes actual cash flows but is not easily noticeable.

Roychowdhury (2006) introduces three ways of real earnings managements: Cash Flows from Operations, Discretionary Expenses, and Total Production Cost. He argues that if a firm intentionally inflates earnings, it may use price discount and lenient credit terms to improve sales, reducing its Cash Flows from Operations. The firm also may want to reduce Discretionary Expenses associated with R&D, advertising, and management. On top of these activities, the firm may also would like to increase volume of products and reduce its fixed cost per unit, purposely improving earnings. But it would increase Total Production Cost.

Cohen, Dey and Lys (2008) notice an increasing accrual-based earnings management during the pre-Sarbanes-Oxley period (1987 through 2001) and even larger increases in the scandal period (1987 through 1999). Following the passage of Sarbanes-Oxley (2002 through 2005), however, accrual based earnings management declines while real management based on Cash flow from Operations, Discretionary Expenses, and Total Production Cost increases. Here, they measure real earnings management, following Roychowdhury (2006). Zang (2012) shows a positive relationship between the level of real earnings management and costs associated with accrual based earnings management or between accrual based earnings management and costs of real earnings management. And the level of accrual based earnings management negatively associate with the amount of unexpected real earnings management. Focusing on merger and acquisition attempts, Yang, Son, Yoon and Navarrete (2018) explore accrual based earnings management of mergers and acquisitions around Sarbanes-Oxley and Dodd-Frank. They find that after the introduction of Sarbanes-Oxley and Dodd-Frank accrual based earnings management by acquirers tends to decline and to be negatively associated with their stock returns around the merger announcement. These patterns are prevalent in cash merger attempts, instead of stock merger attempts. In targets, however, they do not find a significant decrease in accrual based earnings management. Its impact on stock returns around the merger announcement has changed to be insignificant after the introduction of Sarbanes-Oxley (SOX).

Extending those findings, we explore patterns of real earnings management in mergers and

acquisitions around the periods of Sarbanes-Oxley (SOX) and Dodd-Frank (DF). At a merger attempt, a target naturally would like to improve its profitability or growth opportunity and then receive a good (high) offer price for its share. An acquirer may want to reduce overall financing cost on the merger attempt by inflating earnings and its stock price. Or it may want to show good financial soundness and to receive favorable terms in raising capitals or to signal its financial ability to execute the proposed merger attempt. Both managers of a target and an acquirer are willing to take advantage of any possibility of inflating earning or financial status. Uncertainty around SOX and DF might introduce business environment which may lead managers of either a target or a bidder to engage earnings management. Acquirers or targets' engagement to real earnings management would result in financial statements of decreasing cash flow from operations and discretionary expenses but increasing total production costs as Roychowdhury (2006) and Cohen, Deys and Lys (2008) point. Furthermore, if unnoticed, volume of real earnings management activities may increase even after the introduction of SOX and DF. On the other hand, SOX requires managers to be liable to errors in financial statements. DF affects decisions of financial institutions on risky or uncertain projects and possibly, financing ability of an acquirer involved in real earnings management. Thus after introduction of SOX and DF, it is expected real earnings management may decrease.

Secondly, we explore an impact of real earning management on stock prices around a merger announcement. In literature, it is well known that the stock return depends on the post-merger synergy or performance that a buyer or acquirer expects to achieve through a merger or acquisition. We believe financial statement frauds around Sarbanes-Oxley (SOX) and financing environment around Dodd-Frank (DF) may lead investors or financial analysts to be more cautious about real earnings management and its manipulative characteristics than before. Real earnings management may discount the prospective post-merger synergy and performance and negatively affect stock price around the merger announcement. Thus, we expect the results of real earnings management such as decreasing cash flow from operations and discretionary expenses would reduce stock prices around the merger announcement, generating positive coefficients in tests. Increase in total production costs are expected to reduce stock prices, generating a negative coefficient. These relations between real earnings management and stock price may be prevalent around the passage of SOX and DF. On the other hand, if Sarbanes-Oxley (SOX) and Dodd-Frank (DF) do not help or affect investors or financial analysts to understand manipulative characteristics of real earnings management, the stock price may increase with real earnings management. Negative coefficients on decreasing Cash Flow from Operations and Discretionary Expenses. A positive coefficient on increasing Total Production Costs.

Using a sample of 9,600 of acquirers and 4,306 targets during a period of 1987 to 2015, we explore our testable arguments on real earnings management in Cash Flow from Operations, Discretionary Expenses and Total Production Cost. To deal with our tests, we divide our sample period into several time periods: a period of 1987 to 1989, in which world stock markets crashed and many savings and loan institutions started to close (BASE), a post financial crisis period of 1990 to 1999 (POSTCR), pre Sarbanes-Oxley period of 2000 to 2001 (PRESOX), Sarbanes-Oxley period of 2002 to 2003 (SOX), post SOX period of 2004 to 2007, pre Dodd-Frank period of 2008 to 2009 (PREDF), Dodd-Frank period of 2010 to 2011 (DF), and post Dodd-Frank period of 2012 to 2015 (POSTDF).

Our test results reveal that acquirers tend to continue real earnings management around SOX but not around DF. Targets does not show significant changes of real earnings management around SOX and DF.

Real earnings management of acquirers does not relate to stock prices around the merger announcement. This insignificance is also found during the periods of SOX and POSTSOX and of DF and POSTDF. But in an acquirers' subsample with only negative Discretionary Expense, we notice a significantly positive relationship of real earnings management (Discretionary Expenses) with stock prices during the period of POSTSOX.

In targets, we notice a significantly positive impact of real earnings management (Discretionary Expenses) on stock prices during the period of SOX and a negative impact of real earnings management (Total Production) on stock prices during POSTSOX. In a targets' subsample with only negative

Discretionary Expenses or positive Total Production Cost, we find that real earnings management in Discretionary Expense positively associate with stock prices during the periods of SOX and POSTSOX. Real earnings management in Total Production Cost is negatively related to stock prices during the periods of POSTSOX and POSTDF.

Overall, these test results suggest SOX may not significantly change activities of real earnings management in mergers and acquisitions. Acquirers tend to engage in real earnings management more than targets. But, SOX and DF seem to lead investors and analysts to be cautious about manipulative characteristics of real earnings management and affect the relationship between real earnings management (Discretionary Expenses and/or Total Production Costs) and stock price around a merger announcement in acquirers and targets. Interestingly targets' real earnings management (Discretionary Expense and Total Production Costs) tend to draw more analysts' and investors' attention, compared to acquirers' real earnings management. This paper is composed of several sections. Section 2 introduces literature review and testable hypotheses. Section 3 explains data and measurements. Section 4 show our test results. Section 5 concludes our paper.

2. Literature Review and Hypotheses

Graham et al (2005) survey 401 financial executives and report that managers tend to focus on earnings rather than cash flow. The two most important earnings benchmarks are quarterly earnings for the same quarter last year and the analyst consensus estimate. Meeting and exceeding earnings benchmarks is very important in order to build credibility with the market and to maintain or improve firms' stock prices. Managers are willing to trade off between the short-term need to deliver earnings and the long-term objective of making value maximization investment decisions.

In the existing literature, two types of earnings management are explored. One is accrual based earnings management. The other is real earnings management. Erickson and Wang (1999) explore 55 stock merger cases during a period of 1985 to 1990. They find that acquirers in stock for stock mergers tend to engage accrual based earnings management which inflates earnings and stock price prior to the merger agreement, eventually reducing the cost of the merger attempt. Louis (2004) explores how accrual based earnings management relates to post-merger underperformance of acquirers in stock for stock mergers. Using 373 cash and stock mergers during the period of 1992 and 2000, he argues that acquirers in stock mergers tend to inflate earnings in the quarter preceding a merger announcement. The post-merger long term (3 year) performance of acquirers in stock mergers also negatively associates with accrual based earnings management. Gong, Louis, and Sun (2008) state that there is a positive association between stock-for-stock acquirers' pre-merger abnormal accruals and post-merger announcement lawsuits.

On the other hand, Roychowdhury (2006) tests three types of possible real (earnings) management: sales manipulation through price discount, reduction of discretionary expenditure of R&D, advertising costs, and SG& A expenses, and reduction of COGS production costs. Real earnings management or real manipulation is known to change actual cash flows and differ from accrual based earnings management associated with changes of financial statements. He explores annual financial information of 4,252 firms (in non-financial and regulated industries) during 1987 to 2001 and focus on suspect firms just meeting zero earnings target. He finds suspect firms tend to show low Cash Flow from Operations resulting from price discount, low Discretionary Expenses and overproduction (low unit cost but high Total Operating Cost) resulting in earnings improvement. These patterns generally happen in a period of zero or low earnings. This real earnings management are somehow associated with debt amount, growth opportunities, industry member (manufacturing) of a firm.

Cohen, Dey and Lys (2008) explore annual financial information of non-financial firms during the period of 1987 to 2005. They divide the period into pre-Sarbanes-Oxley (1987 through 2001) and post-Sarbanes-Oxley (2002 through 2005). Furthermore, they subdivide the pre-Sarbanes-Oxley into two periods: the period of prior major corporate scandals (1987 through 1999) and the period immediately preceding the passage of Sarbanes-Oxley (2000 and 2001). They notice an increasing accrual-based

earnings management during the pre-Sarbanes-Oxley period (1987 through 2001) and even larger increases in the scandal period (1987 through 1999). Following the passage of Sarbanes-Oxley (2002 through 2005), however accrual based earnings management declines while real earnings management based on Cash Flow from Operations, Discretionary Expenses, and Total Production Cost (Roychowdhury 2006) increases. They find these patterns of accrual based and real management are more prevalent in suspect firms which have very low earnings close to forecasted earnings by analysts. And the increase of accrual based earnings management relates to the contemporaneous increase of option-based compensation.

Zang (2012) examine how managers trade off real earnings management (over production and cutting discretionary expenditures) and accrual based earnings management. Using more than 6,500 earnings management suspect firm years over the period of 1987-2008, she shows that real earnings management is constrained by firms' competitive status in the industry, financial health, scrutiny from institutional investors, and tax consequence of manipulation. Accrual based earnings management is constrained by the presence of high quality auditors, heightened scrutiny of accounting practice after Sarbanes-Oxley (SOX), accounting flexibility - choice of accounting practice and the length of operating cycles. There is a positive relationship between the level of real earnings management and costs associated with accrual based earnings management or between accrual based earnings management and costs associated with real earnings management. And the level of accrual based earnings management negatively associate with the amount of unexpected real earnings management. The decision of real earnings management precedes the decision of accrual based earnings management.

Zhao, Chen, Zhang and Davis (2012) examine how takeover protection associates with real earnings management measured by abnormal production costs (Total Production Cost), abnormal Discretionary Expenditure, and abnormal Cash Flow from Operations. Using all firm years (meeting near-term earnings target of either zero earnings or the prior year's earnings) during 1995 to 2008 and stagger board as a proxy for takeover-protection, they show that firms with takeover protection tend to show lower levels of real earnings management used just to meet near-term earnings targets. Real earnings management tend to reduce industry-adjusted cash flow from operating activities over the subsequent three years. However, if real earnings management is to just meet near-term earnings targets, it positively associates with industry-adjusted cash flow from operating activities.

Using mergers and acquisitions during the period of 1987 to 2015, Yang, Son, Yoon and Navarrete (2018) test accrual based earnings management of mergers and acquisitions around Sarbanes-Oxley and Dodd-Frank. They also find after the introduction of Sarbanes-Oxley and Dodd-Frank, accrual based earnings management by acquirers tends to decline and to be negatively associated with their stock returns around the merger announcement. These findings are prevalent in cash merger attempts. In targets, however, they do not find a significant decrease in accrual based earnings management. Its impact on stock returns around the merger announcement has changed to be insignificant after the introduction of Sarbanes-Oxley.

Extending these findings, we further explore how real earnings management in Cash Flows from Operations, Discretional Expenses and Total Production Costs associates with mergers and acquisitions over the time period, especially around Sarbanes-Oxley (SOX) and Dodd-Frank (DF). In the past twenty years, we had two major crises and were introduced Sarbanes-Oxley (SOX) and Dodd-Frank (DF). One of purposes embedded in SOX is to protect investors from accounting manipulation or frauds. SOX requests information transparency and responsibility of financial managers. Thus it would discourage managers' willingness to do earnings management and possibly, reduce a degree of information asymmetry between a buyer and a seller in merger attempts. On the other hand, Dodd-Frank (DF) is introduced after the financial crisis caused by risky investment of financial institutions in 2008. DF oversees financial institutions and market risk to stabilize the financial market. DF regulates derivatives (credit swap), risky assets investment, corporate governance, performance compensation, etc. Especially, DF amends Bank Holding Company Act to limit certain activities of bank holding companies in their mergers and acquisitions, lending, etc to stabilize the financial market (https://www.law.cornell.edu/wex/dodd-

frank_title_VI). We believe these regulations may generate business environment improving quality of earnings and limiting the usage of manipulative real earnings management (Cash Flow from Operations, Discretional Expenses and Total Production Cost) in mergers and acquisitions. Thus, it is expected real earnings management may reduce after introduction of SOX or DF. But as Cohen, Deys and Lys (2008) point out, real earning management is not easily noticed, compared to accrual based earnings management. If acquirers and targets comply with Accounting rules and principles and continuously proceed real earnings management for an advantageous bargaining position, regardless of SOX and DF, real earnings management activities would increase. These arguments introduce our first testable null hypothesis:

H_0: Sarbanes-Oxley (SOX) and Dodd-Frank (DF) do not affect real earnings management (Cash Flow from Operations, Discretionary Expenses and Total Production Cost) of acquirers and targets.

Secondly, we test an impact of real earning management (Cash Flow from Operations, Discretionary Expenses and Total Production Cost) on stock price returns around the period of Sarbanes-Oxley and Dodd-Frank. In literature, it is known that the stock return depends on the post-merger synergy or performance that the buyer or bidder expects to achieve. We believe financial statement fraud and financing environment resulting in Sarbanes-Oxley (SOX) and Dodd-Frank (DF) may improve investors' perception about real earnings management and its manipulative characters. Thus, if noticed, real earnings management in Cash Flows from Operations, Discretionary Expenses and Total Production Cost may discount the prospective post-merger synergy and performance. It may negatively affect a stock price. Thus we expect decreasing Cash Flow from Operations and Discretionary Expenses would reduce stock prices around the merger announcement, generating positive coefficients. On the other hand, increasing Total Production Cost is expected to reduce stock prices, generating a negative coefficient. The influence of real earnings management on stock price around the merger announcement may be prevalent around Sarbanes-Oxley (SOX) and Dodd-Frank (DF). But, if investors or financial analysts do not notice real earnings management and its manipulative characteristics, regardless of Sarbanes-Oxley (SOX) and Dodd-Frank (DF), the stock price may not relate to real earnings management. These arguments introduce the second testable null hypothesis:

H_0: Real earnings management (Cash Flows from Operations, Discretionary Expenses and Total Production Cost) around Sarbanes-Oxley and Dodd-Frank does not affect a stock price around a merger announcement.

3. Data and Measurement

3.1. Data

Using SDC, we collect merger and acquisition information during the period of 1987 to 2015. For our research purpose, we explore acquirers and targets, separately. As shown in Table 1, the availability of accounting data and stock prices leaves us 13,905 company information involving mergers and acquisitions (9,600 acquirers and 4,305 targets). A sample of acquirers (targets) shows an average transaction size of $275.91 ($734.95) million. Around 33.95 percent of acquirers use a stock payment, whereas 28.41 percent of targets receive stocks. Not many of acquirers or targets use tender offers to complete mergers. Regarding a merger attitude, about 98.15 percent of acquirers involve friendly merger attempts. 60.64% of targets show a friendly attitude. Table 1 also displays a distribution of sample sizes over the periods and of two digit SICs.

Table 1. Data Description

	Acquirer	Target
Numbers	9,600	4,305
Transaction Value	$275.91	$734.95
(Unit: $ million)		
Max	$89,167.72	$164,746.90
Min	$0.01	$0.013
Stock Payment (%)	33.95%	28.41%
Tender offer (%)	2.33%	4.49%
Attitude (Friendly, %)	98.15%	60.64%

Year	Acquirer (Number of Firms)	Target (Number of Firms)
1987	155	224
1988	146	239
1989	190	293
1990	190	204
1991	199	161
1992	310	143
1993	358	191
1994	493	299
1995	582	397
1996	715	423
1997	889	338
1998	881	278
1999	509	247
2000	420	163
2001	305	107
2002	283	50
2003	307	73
2004	341	57
2005	320	53
2006	295	56
2007	282	70
2008	184	56
2009	133	48
2010	174	24
2011	201	23
2012	205	19
2013	163	14
2014	215	26
2015	155	29

2 Digit SIC	Acquirer (Number of Firms)	Target (Number of Firms)
01 (Agricultural Product – Corp)	7	8
02 (Agricultural Product –Livestock)	1	3
07 (Agricultural Service)	8	1
08 (Forestry)	12	6
10 (Metal, Mining)	10	26
12 (Coal, Mining)	7	3
13 (Oil &Gas Extraction)	142	124
14 (Mining & Quarrying of Nonmetallic Minerals)	31	9
15 (Building Construction - General Contractors & Operative Builders)	22	14
16 (Heavy Construction – Contractors)	20	3
17 (Construction- Special Trade Contractors)	35	6
20 (Food & Kindred Products)	204	83
21 (Tobacco Products)	1	1
22 (Textile Mill Products)	43	26
23 (Apparel & Other Textile Products)	50	25
24 (Lumber & Wood Products,except Furniture)	67	13
25 (Furniture & Fixtures)	26	16
26 (Paper & Allied Products)	82	47
27 (Printing & Publishing)	110	49
28 (Chemical & Allied Products)	467	283
29 (Petroleum Refining & Related Industries)	46	21
30 (Rubber & Miscellaneous Plastics Products)	57	36
31 (Leather & Leather Products)	19	14
32 (Stone, Clay, Glass, & Concrete Products)	31	24
33 (Primary Metal Industries)	150	75
34 (Fabricated Metal Products)	143	63
35 (Industrial Machinery & Equipment)	660	272
36 (Electronic & Other Electric Equipment)	645	297
37 (Transportation Equipment)	183	94
38 (Instruments & Related Products)	637	221
39 (Miscellaneous Manufacturing Industries)	68	51
40 (Railroad Transportation)	13	17
41 (Local, Suburban Transit & Interurban Highway Passenger Transportation)	2	1
42 (Motor Freight Transportation)	10	25
44 (Water Transportation)	19	13
45 (Transportation by Air)	18	31
46 (Pipelines, Except Natural Gas)	8	2
47 (Transportation Services)	6	3
48 (Communications)	287	180
49 (Electric, Gas & Sanitary Services)	115	118
50 (Wholesale Trade – Durable Goods)	181	67
51 (Wholesale Trade – Nondurable Goods)	104	34
52 (Building Materials, Hardware, Garden Supply & Mobile Home Dealers)	13	20
53 (General Merchandise Stores)	41	32
54 (Food Stores)	55	48
55 (Automotive Dealers & Gasoline Service Stations)	16	12
56 (Apparel & Accessory Stores)	31	22
57 (Home Furniture, Furnishings & Equipment Stores)	24	24
58 (Eating & Drinking Places)	86	66

59 (Miscellaneous Retail)	150	61
60 (Depository Institutions)	1,473	562
61 (Non-depository Credit Institutions)	7	44
62 (Security & Commodity Brokers, Dealers, Exchanges & Services)	6	34
63 (Insurance Carriers)	70	154
64 (Insurance Agents, Brokers & Service)	7	14
65 (Real Estate)	23	38
67 (Holding & Other Investment Offices)	1,051	149
70 (Hotels, Rooming Houses, Camps, & Other Lodging Places)	57	36
72 (Personal Services)	23	6
73 (Business Service)	1,000	308
75 (Automotive Repair, Services & Parking)	10	6
76 (Miscellaneous Repair Services)	12	4
78 (Motion Pictures)	43	45
79 (Amusement & Recreation Services)	49	11
80 (Health Services)	238	119
81 (Legal Services)	0	1
82 (Educational Services)	15	6
83 (Social Services)	1	1
87 (Engineering & Management Services)	122	76
99 (Non-Classifiable Establishments)	3	1

3.2. Periods

To test the trend of real earnings management over the sample period of 1987 to 2015, we discretionally divide our sample period into several time periods: the period of 1987 to 1989, in which world stock markets crashed and many savings and loan institutions started to close (BASE), post financial crisis period of 1990 to 1999 (POSTCR), pre Sarbanes-Oxley period of 2000 to 2001 (PRESOX), Sarbanes-Oxley period of 2002 to 2003 (SOX), period of post SOX of 2004 to 2007, period of pre Dodd-Frank of 2008 to 2009 (PREDF), Dodd-Frank period of 2010 to 2011 (DF), and post Dodd-Frank period of 2012 to 2015 (POSTDF), during which the global crisis associated with European debts occurred.

3.3. Real Earnings Management Measurement

To measure quarterly real earnings management, we use cross-sectional models (Roychowdhury, 2006 and Cohen, Dey and Lys, 2008). For each quarter, we estimate a model for every industry classified by its two digit SIC code. Thus, the model partially controls for industry wide changes in economic conditions while allowing the coefficients to vary across time.

$$\frac{CFO_{it}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{it}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (1)$$

$$\frac{DISEXP_{it}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (2)$$

$$\frac{PROD_{it}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{it}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{it-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (3)$$

Here, CFO is Cash Flow from Operations. DISEXP is Discretionary Expenses. PROD is Total Production Cost combining COGS (Costs of Goods Sold) and ΔINV (Inventory). Then we estimate real earnings management by subtracting normal earnings management (estimated CFO/Assets, DISEXP/Assets or PROD/Assets) from actual CFO/Assets, DISEXP/Assets, or PROD/Assets of each sample (firm i). t is quarter.

To explore real earnings management before a merger announcement, we measure quarterly real earnings management over five quarters (t-4 to t, t is a Quarter of a merger announcement). Table 2 presents that on average, acquirers have real earnings management (in Cash Flow from Operations) of 0.0492 (t-4), 0.0484 (t-3), 0.0482 (t-2), 0.0477 (t-1) and 0.0475 (t) over each quarter. Acquirers tend to show real earnings management (in Discretional Expenses) of -0.0038 (t-4), -0.0110 (t-3), -0.0123 (t-2), -0.0106 (t-1) and -0.0074 (t) over each quarter. Real earnings management (in Total Production Cost) is -0.0031 (t-4), -0.0110 (t-3), -0.0135 (t-2), -0.0115 (t-1), and -0.0160 (t).

Table 3 shows that in targets, real earnings management (in Cash Flow from Operations) of 0.0089 (t-4), 0.0065 (t-3), 0.0063 (t-2), 0.0083 (t-1) and 0.0046 (t) over each quarter. Real earnings management (in Discretional Expenses) is -0.0039 (t-4), -0.0049 (t-3), -0.0071 (t-2), -0.0031 (t-1), and -0.0030 (t). Real earnings management (in Total Production Cost) is -0.0032 (t-4), -0.0046 (t-3), -0.0037 (t-2), -0.0042 (t-1) and -0.0011 (t).

Table 2. Real Earnings Management of Acquirers

1) Cash Flow from Operations

Acquirer	Q-4	Q-3	Q-2	Q-1	Q
Mean	0.0492	0.0484	0.0482	0.0477	0.0475
Max	1.9879	1.1261	0.8237	0.8127	0.9519
Min	-3.5026	-2.4921	-2.1592	-2.1592	-1.1134
Standard Deviation	0.1258	0.1211	0.1158	0.1169	0.1138

2) Discretionary Expenses

	Q-4	Q-3	Q-2	Q-1	Q
Mean	-0.0038	-0.0110	-0.0123	-0.0106	-0.0074
Max	7.4663	7.3706	7.5737	7.4861	7.4949
Min	-2.4971	-3.8947	-2.1758	-6.8577	-2.0051
Standard Deviation	0.3253	0.2914	0.2579	0.3009	0.2888

3) Total Production Cost

	Q-4	Q-3	Q-2	Q-1	Q
Mean	-0.0031	-0.0110	-0.0135	-0.0115	-0.0160
Max	68.0909	8.8659	5.7519	3.7438	5.3442
Min	-7.4113	-13.1259	-2.5201	-2.7869	-39.7229
Standard Deviation	1.0207	0.3103	0.1837	0.1491	0.6140

Table 3. Real Earnings Management of Targets

1) Cash Flow from Operations

Target	Q-4	Q-3	Q-2	Q-1	Q
Mean	0.0089	0.0065	0.0063	0.0083	0.0046
Max	0.7571	1.1581	1.7805	0.7460	1.1990
Min	-1.2507	-1.0775	-1.7738	-1.3484	-1.7949
Standard Deviation	0.1218	0.1247	0.1430	0.1288	0.1421

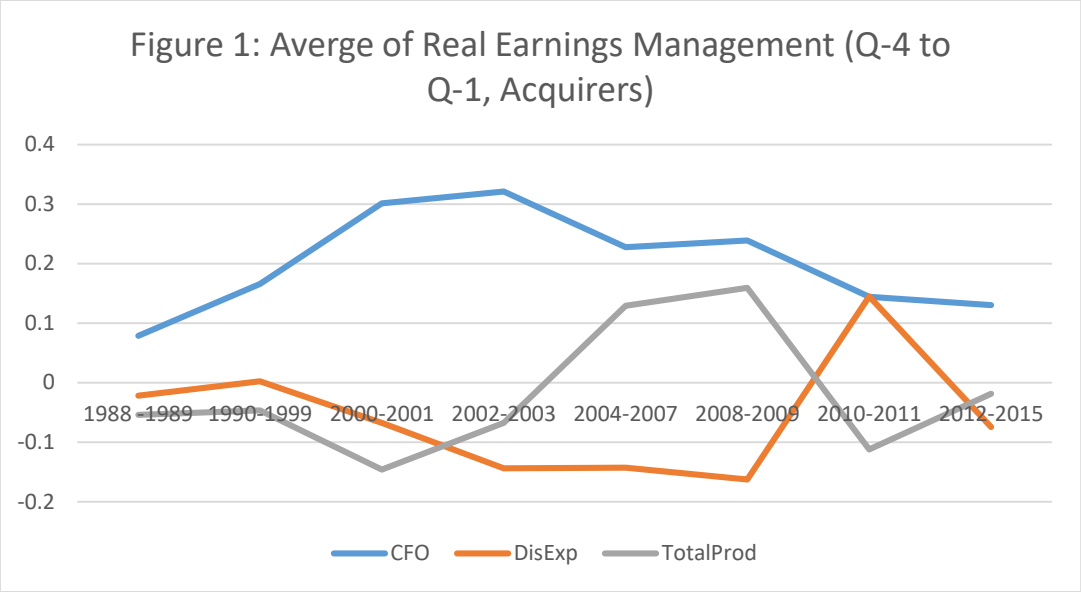
2) Discretionary Expenses

	Q-4	Q-3	Q-2	Q-1	Q
Mean	-0.0039	-0.0049	-0.0071	-0.0031	-0.0030
Max	2.8947	2.8232	2.5791	2.8545	2.5494
Min	-1.1736	-1.0635	-1.3763	-1.6079	-0.9119
Standard Deviation	0.1615	0.1439	0.1557	0.1777	0.1584

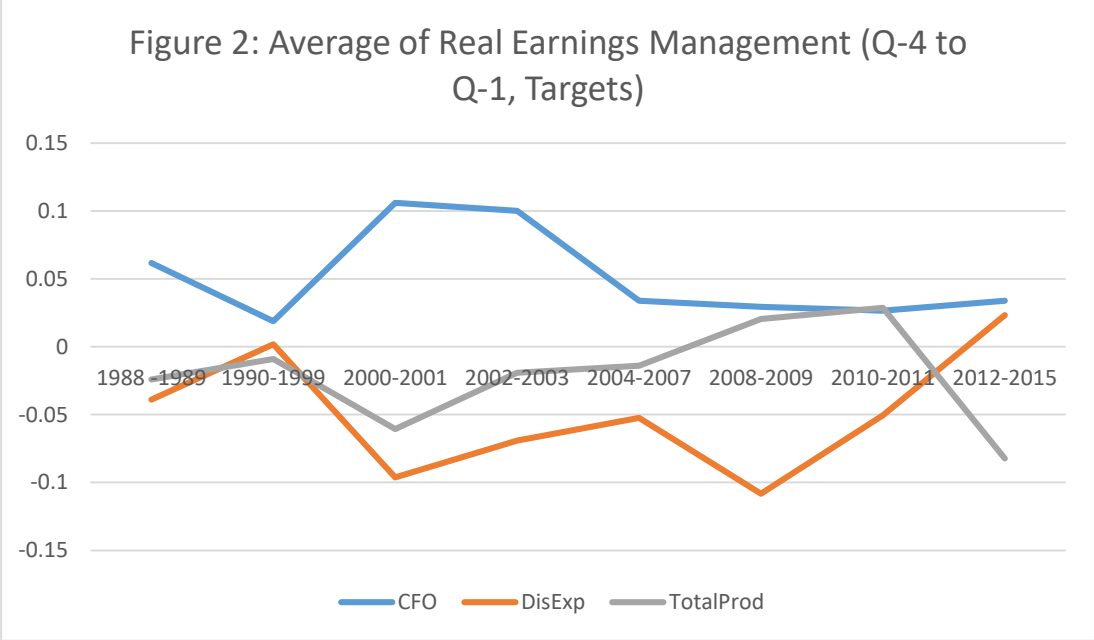
3) Total Production Cost

	Q-4	Q-3	Q-2	Q-1	Q
Mean	-0.0032	-0.0046	-0.0037	-0.0042	-0.0011
Max	1.8464	0.6802	1.9905	1.4644	2.3950
Min	-0.4970	-1.9736	-0.7739	-1.3625	-0.6879
Standard Deviation	0.0826	0.0828	0.0858	0.0864	0.1008

To understand patterns of real earnings management around SOX and DF, we calculate averages of quarterly real earnings management (in Cash Flow from Operations, Discretionary Expenses and Total Production Cost) during four quarters (t-4 to t-1) before a merger announcement. And then, we show averages over time. As Figure 1 shows, from PRESOX to SOX, acquirers tend to show decreasing real earnings management in Discretional Expenses (DisExp) and increasing real earnings management in Total Production Cost (TotalProd). From PREDF to DF, acquirers show decreasing real earnings management in Cash Flow from Operations. Overall, acquirers seem to show symptom of real earnings management around SOX and DF.



We also estimate averages of quarterly real earnings management of targets during t-4 to t-1. As Figure 2 shows, targets show decreasing real earnings management in Cash Flow from Operations (CFO) but increasing real earnings management in Total Production Cost from PRESOX to SOX and from PREDF to DF. These patterns may imply targets continuosly engage real earnings management around SOX and DF.



4. Test result

4.1. Real Earnings Management of Acquirers

As discussed, we expect some patterns in real earnings management: negative or decreasing Cash Flow from Operations (CFO) and Discretionary Expenses but positive or increasing Total Production costs if acquirers or targets involve real earnings management. In addition, if SOX or/and DF affect patterns of real earnings management, there may be changes of real earnings management around SOX or DF.

To test these arguments, as shown in Equation (4), we use dummy variables of each period (POSTCR, PRESOX, SOX, POSTSOX, PREDF, DF, POSTDF) as independent variables. Dependent variable is real earnings management (REM) in Cash Flow from Operations, Discretional Expenses, or Total Production Cost. A base period is 1987 to 1989 in which the financial crisis happened. A coefficient and its significance of a dummy variable of one period indicate an increase or decrease over real earnings management of a base period. Under our null hypothesis, in cases of Cash Flow from Operations and Discretionary Expenses, we expect coefficients tend to reduce from PRESOX to SOX or POSTSOX and from PREDF to DF or POSTDF. In a case of Total Production Cost, we expect coefficients increase from PRESOX to SOX or POSTSOX and from PREDF to DF or POSTDF.

$$REM = \alpha_0 + \alpha_1 POSTCR + \alpha_2 PRESOX + \alpha_3 SOX + \alpha_4 POSTSOX + \alpha_5 PREDF + \varepsilon_{it} \qquad (4)$$

As shown in Table 4, acquirers' real earnings management in Cash Flow from Operations indicates that from PRESOX to SOX or POSTSOX, coefficients of dummies of periods tend to be positive and reduce.

Table 4. Changes of Real Earnings Management in Acquirers

	Cash Flow from Operations	Discretionary Expenses	Total Production
Intercept	0.0785*	-0.0218	-0.0544
	(1.6772)	(-0.8263)	(-0.9428)
1990 to 1999	0.0880*	0.0242	0.0078
(POSTCR)	(1.8687)	(0.8782)	(0.1277)
2000 to 2001	0.2216**	-0.0458	-0.0920
(PRESOX)	(4.5196)	(-1.3441)	(-1.1011)
2002 to 2003	0.2425**	-0.1221**	-0.0132
(SOX)	(4.9200)	(-3.4248)	(-0.1259)
2004-2007	0.1490**	-0.1210**	0.1833**
(POSTSOX)	(3.1102)	(-3.8872)	(2.1593)
2008 to 2009	0.1602**	-0.1409**	0.2133*
(PREDF)	(3.1516)	(-3.3502)	(1.6016)
2010 to 2011	0.0656	0.0400**	-0.0586
(DF)	(1.3062)	(4.1562)	(-0.4161)
2012 to 2015	0.0515	-0.0527	0.0357
(POSTDF)	(1.0590)	(-1.5519)	(0.3913)
R-square	2.3668%	1.4407%	0.2984%
Sample	8,137	9,600	4,650

*significant at 10%, **significant at 5%, and *** significant at 1%.

In real earnings management of Discretionary Expenses, coefficients are significantly negative and reduce. Coefficients in a case of Total Production Cost significantly increases. These seem to show continued activities of real earnings management.

During the periods of PREDF to DF or POSTDF, in real earnings management of Cash Flow from Operation, coefficients and their significance of dummies of periods reduce. But, coefficients in cases of Discretionary Expenses and Total Production Cost are not aligned with expected activities of real earnings management. Thus, we believe SOX does not significantly change acquirers' real earnings management policy. But, DF may somehow affect acquirers' real earnings management.

4.2. Real Earnings Management of Targets

As shown in the test results in Table 5, coefficients do not provide supporting evidence of targets' real earnings management in Cash Flow from Operations and Discretionary Expenses. But in a case of Total Production Cost, an increasing coefficient during the period of PRESOX to SOX or POSTSOX is noticed.

During the periods of PREDF to DF or POSTDF, we observe that changes of coefficients are not well aligned with expected activities of real earnings management.

Overall, these test results reveal that acquirers tend to continue real earnings management around SOX. But, real earnings management reduces around DF. Targets do not consistently engage real earnings management around SOX and DF.

Table 5. Changes of Real Earnings Management in Targets

	Cash Flow from Operations	Discretionary Expenses	Total Production
Intercept	0.0616*	-0.0390**	-0.0241**
	(1.6770)	(-2.8075)	(-2.7439)
1990 to 1999	-0.0428	0.0409**	0.0152
(POSTCR)	(-1.1333)	(2.6139)	(1.5268)
2000 to 2001	0.0444	-0.0573**	-0.0366**
(PRESOX)	(0.9523)	(-2.0992)	(-2.1365)
2002 to 2003	0.0384	-0.0302	0.0048
(SOX)	(0.6394)	(-0.8183)	(0.2053)
2004-2007	-0.0278	-0.0134	0.0101
(POSTSOX)	(-0.6018)	(-0.4743)	(0.5616)
2008 to 2009	-0.0321	-0.0693*	0.0445*
(PREDF)	(-0.5984)	(-1.8284)	(1.7643)
2010 to 2011	-0.0350	-0.0114	0.0529
(DF)	(-0.5183)	(-0.1960)	(1.4588)
2012 to 2015	-0.0277	0.0624	-0.0582**
(POSTDF)	(-0.4838)	(1.4054)	(-2.1438)
R-square	0.3840%	0.7879%	0.3716%
Sample	3,030	4,172	4,306

*significant at 10%, **significant at 5%, and *** significant at 1%.

4.3. Cumulative Abnormal Return (-1 to 1) of Acquirers

In this section, we explore impacts of real earnings management on Cumulative Abnormal Return (CAR, -1 to +1) around SOX and DF. As shown in Equation (5), a dependent variable is CAR (-1 to 1) measured by the market model. Independent variables are period dummy variables and interaction variables between the period dummy variable and average real earnings management during t-4 to t-1 for the period. Here, the interaction variables measure how real earnings management in each period affects Cumulative Abnormal Return (stock price) around a merger announcement. Dummy variables of periods is considered to handle a fixed year effect of each period. t is quarter of a merger announcement. An intercept represents influence of Financial Crisis during 1987 to 1989.

$$CAR\ (-1\ to 1) = \alpha_0 + \alpha_1 POSTCR + \alpha_2 PRESOX + \alpha_3 SOX + \alpha_4 POSTSOX + \alpha_5 PREDF + \alpha_6 DF + \alpha_7 POSTDF + \beta_1 POSTCR \times REM + \beta_2 PRESOX \times REM + \beta_3 SOX \times REM + \beta_4 POSTSOX \times REM + +\beta_5 PREDF \times REM + \beta_6 DF \times REM + \beta_7 POSTDF \times REM + \varepsilon_{it} \quad (5)$$

Under our null hypothesis, coefficients of interaction variables may be insignificant, indicating no influence from SOX and DF. But if the market understands manipulative characteristics of real earnings management, CAR may differently respond to real earnings management. For example, negative or decreasing Cash Flow from Operations or Discretionary Expenses is expected to signal real earnings management to the market and negatively affect stock price around the merger announcement. Thus, the coefficient of an interaction variable between a period dummy and real earnings management in Cash Flow from Operations or Discretional Expense would be positive. On the other hand, we expect real earnings management would increase Total Operating Cost. A positive or increasing Total Operating Cost are believed to negatively relate to stock prices around the merger announcement. The coefficient of an interaction variable between a period dummy and real earnings management in Total Operating Cost would be negative.

And if SOX or DF leads investors or analysts to be cautious about real earnings management, we expect significantly positive coefficients of interaction variables with real earnings management in Cash Flow from Operations or Discretionary Expense and significantly negative coefficient of an interaction variable with real earnings management in Total Operating Cost during SOX, POSTSOX, DF and POSTDF.

But, in this test, we are not sure whether a sign of a coefficient really results from manipulative characteristics. For example, increasing Cash Flow from Operations may positively relate to stock prices, generating a positive coefficient. Either increasing or decreasing Cash Flow from Operations ends up with a positive coefficient. By the same token, increasing Total Production Cost may cause a concern about weak profitability and negatively affect stock prices, generating a negative coefficient. Either increasing or decreasing Total Production Cost also produces a negative coefficient. Thus we consider subsamples which may reflect manipulative characteristic of real earnings management – only negative Cash Flow from Operations, only negative Discretionary Expense, and only positive Total Production Cost.

Table 6 shows test results with only interaction variables for simplicity. We notice overall real earnings management of an acquirer does not affect stock prices around the merger announcement. This insignificance of coefficients is still noticed during the periods of SOX and POSTSOX and of DF and POSTDF. But, in a subsample of negative Total Discretional Expense, a positive and significant coefficient of POSTSOX indicates a significant impact of real earnings management (Directional Expenses) on stock prices. This finding implies that intentional financial misstatements and resultant SOX may lead investors or analysts to be more sensitive to real earnings management in Discretional Expenses in acquirers.

Table 6. Real Earnings Managements and CAR (-1 to 1) of Acquirers

	Cash Flow from Operations (all samples)	Cash Flow from Operations (only negative samples)	Discretionary Expenses (all samples)	Discretionary Expenses (only negative samples)	Total Production (all samples)	Total Production (only positive samples)
Intercept	-0.1018*	-0.1875**	0.0008	0.0027	0.0091**	0.0072
	(-1.9793)	(-2.1051)	(0.3160)	(0.8133)	(2.6988)	(1.3470)
1990 to 1999	0.0015	-0.0632	-0.0009	-0.0200**	-0.0082**	-0.0106
(POSTCR)	(0.0867)	(-1.4809)	(-0.4905)	(-3.3960)	(-2.0298)	(-1.4481)
×Real Earnings						
2000 to 2001	-0.0296	0.0362	-0.0003	0.0222**	-0.0045	-0.0282
(PRESOX)	(-0.7881)	(0.4759)	(-0.0826)	(2.7021)	(-0.4002)	(-1.2209)
×Real Earnings						
2002 to 2003	-0.0074	0.1052	-0.0096**	-0.0093	0.0260	-0.0076
(SOX)	(-0.1791)	(0.7368)	(-1.8894)	(-1.1220)	(1.0785)	(-0.1443)
×Real Earnings						
2004-2007	-0.0075	0.1163	0.0009	0.0075**	0.0002	-0.0001
(POSTSOX)	(-0.2642)	(1.3993)	(0.3174)	(1.7888)	(0.1936)	(-0.1254)
×Real Earnings						
2008 to 2009	-0.0763	-0.0027	0.0008	0.0038	-0.0018	-0.0099
(PREDF)	(-1.3590)	(-0.0117)	(0.2106)	(0.5638)	(-0.3584)	(-1.5209)
×Real Earnings						
2010 to 2011	0.0056	0.0208	-0.0005	0.0103	0.0065	0.0069
(DF)	(0.0697)	(0.651)	(-0.2111)	(1.6360)	(1.1483)	(0.9155)
×Real Earnings						
2012 to 2015	-0.1029**	-0.1055	-0.0004	-0.0005	-0.0016	-0.0054
(POSTDF)	(-2.4188)	(-1.3552)	(-0.2099)	(-0.1099)	(-0.2642)	(-0.7616)
×Real Earnings						
Adj. R-square	0.2357%	0.6901%	0.0194%	0.3408%	0.0451%	0.4726%
Sample	8,137	1,937	9,600	5,849	4,650	1,742

*significant at 10%, **significant at 5%, and *** significant at 1%.

4.4. Cumulative Abnormal Return (-1 to 1) of Targets

With the previous model, we explore impact of real earnings management on stock price of targets around SOX and DF. As shown in Table 7, we find no significant influence of real earnings management in Cash Flow from Operation. But in subsamples, significant and positive coefficients of SOX and POSTSOX indicate real earnings management in Discretionary Expense positively associate with stock prices. Significant and negative coefficients of POSTSOX and POSTDF also indicate real earnings management in Total Production Cost is also negatively related to stock prices. These findings imply that analysts and investors become sensitive to targets' real earnings management in Discretional Expenses and Total Production Cost after SOX and DF.

Overall these test results reveal SOX and DF affect the relationship between real earnings management and stock price around a merger announcement in acquirers and targets. However, targets' real earnings management in Discretional Expense and Total Production Cost tend to draw more attention, compared to acquirers' real earnings management.

Table 7. Real Earnings Management and CAR (-1 to 1) of Targets

	Cash Flow from Operations (all samples)	Cash Flow from Operations (only negative samples)	Discretionary Expenses (all samples)	Discretionary Expenses (only negative samples)	Total Production (all samples)	Total Production (only positive samples)
Intercept	0.0211	0.0503*	0.0415**	0.0394**	0.0455**	0.0451**
	(1.4665)	(1.8750)	(7.9282)	(6.3146)	(8.4200)	(5.5104)
1990 to 1999 (POSTCR) ×Real Earnings	0.0081	0.0206	0.0012	-0.0122	0.0012	-0.0040
	(0.9838)	(1.4090)	(0.1586)	(-0.5221)	(0.1007)	(-0.1838)
2000 to 2001 (PRESOX) ×Real Earnings	0.0363	0.0623	-0.0406	-0.0842*	0.0198	-0.0088
	(1.3949)	(1.1770)	(-1.4764)	(-1.7228)	(0.6198)	(-0.1389)
2002 to 2003 (SOX) ×Real Earnings	-0.0768*	-0.0810	0.1726**	0.2339**	-0.0659	-0.1093
	(-1.7311)	(-0.6706)	(3.5761)	(3.5930)	(-1.1984)	(-1.2718)
2004-2007 (POSTSOX) ×Real Earnings	-0.0064	00328	0.0356	0.0839**	-0.0909**	-0.1039**
	(-0.2338)	(0.6472)	(1.5119)	(2.9383)	(-2.7928)	(-1.9654)
2008 to 2009 (PREDF) ×Real Earnings	0.0052	-0.0600	-0.0490	-1.094*	0.0047	0.0157
	(0.1457)	(-1.0912)	(-1.1334)	(-1.7459)	(0.0961)	(0.2472)
2010 to 2011 (DF)× Real Earnings	-0.1226	-0.0344	0.0290	0.0024	0.2469**	0.1781
	(-1.6212)	(-0.2376)	(0.3660)	(0.0179)	(2.4659)	(1.2980)
2012 to 2015 (POSTDF) ×Real Earnings	-0.0603	-0.0526	-0.0225	-0.3492**	-0.0138	-0.5673**
	(-0.9166)	(-0.3959)	(-0.7767)	(-3.2614)	(-0.2334)	(-2.3966)
Adj. R-square	1.8924%	2.0639%	2.5149%	4.5385%	1.7451%	1.8216%
Sample	3,032	1,265	2,943	1,896	4,306	1,959

*significant at 10%, **significant at 5%, and *** significant at 1%.

5. **Conclusion**

In this paper, we explore real earnings management of acquirers and targets in Cash Flow from Operations, Discretionary Expenses and Total Production Costs. Especially, around SOX and DF Acts, we test how three types of real earnings management has changed and how they associate with stock prices around the merger announcement.

These test results reveal that acquirers tend to continue real earnings management around SOX. But, they do not show significant real earnings management around DF. Targets do not consistently engage real earnings management around or after SOX and DF. We also explore how the market responds to real earnings management of acquirers and targets around SOX and DF. To test this argument, we evaluate interaction variables in subsamples with characteristics of real earnings management. We find that a subsample of negative Total Discretionary Expense shows a significant impact of acquirers' real earnings management in Directional Expenses on stock prices during the period of POSTSOX. Targets' real

earnings management in Discretional Expense positively associate with stock prices during the periods of SOX and POSTSOX. Real earnings management in Total Production Cost is also negatively related to stock prices during the periods of POSTSOX and POSTDF. These findings imply that analysts and investors become sensitive to acquirers' and targets' real earnings management in Discretional Expenses and Total Production Cost after SOX and DF. Instead of acquirers' real earnings management, targets' real earnings management looks like drawing additional attention from analysts and investors.

Overall, these findings suggest several interesting points. Acquirers tend to involve more real earnings management in Cash Flow from Operations, Discretionary Expenses and Total Production Cost than targets do around SOX. Around DF, both acquirers and targets do not show active engagement to real earnings management. But the market tends to respond to targets' real earnings management in Discretionary Expenses and Total Production Costs stronger than to acquirers' real earnings management.

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