

## Industry Valuation Driven Earnings Management

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# **Industry Valuation Driven Earnings Management\***

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# Industry Valuation Driven Earnings Management

## Abstract

This paper investigates whether industry valuation impacts firms' earnings management decisions. Existing accounting literature assumes that industry valuation has a constant impact on this decision. We argue that a higher industry valuation increases the perceived benefits of earnings management at a time when the negative consequences associated with accrual reversal and the probability of detection are believed to be lower. Using a sample of quarterly data of U.S. firms from 1985 to 2005, we find that the four-quarter lagged industry valuation has a positive relationship with industry aggregate (current) discretionary accruals. More specific, one standard deviation increase in the aggregate industry valuation is associated with a significant increase of 2.4 cents in quarterly earnings per share. Our results are robust after controlling for several factors, including bubble years, size, leverage and performance.

**Keywords:** Industry valuation, Earnings management, Market to book ratio

## **1. Introduction**

The current earnings management literature has examined earnings management from either a transaction-specific or a firm-specific point of view. In their review of earnings management literature, Healy and Wahlen (1999) mention that firms manage their earnings when they are at the time to raise capital, such as initial public offerings (IPOs) or seasoned equity offers (SEOs), or when they need to meet analyst expectations or bonus plan targets related to executive compensation schemes. However, these studies disregard the fact that market conditions, like economic growth and industry valuation, are not constant over time. Focusing on the latter, we hypothesize that industry valuation will influence managers' decision to engage in earnings management. This can provide an explanation why earnings management occurs more frequent in some periods than in others. Our study contributes to two streams of literature.

First, we contribute to literature by providing evidence of industry effects on firms' earnings management decisions. Firms in the same industry face similar market conditions and (growth) prospects. Prior studies provide evidence that these industry prospects affect firms' financial decisions. Harford (2005) finds that merger waves occur in response to specific industry shocks that require large scale reallocation of assets. Mackay and Phillips (2005) find that industry and group factors are important to firms' capital structure decisions. Given the

importance of such industry effects, we investigate the impact of industry valuation on earnings management and aim to provide more empirical evidence on how industry effects can affect firms' decision making.

Second, our study provides new evidence on the relationship between stock market valuation and earnings management. Prior studies examine the association between valuation and earnings management. Jensen (2004) argues that over-valued firms have incentives to sustain their overvaluation. Kothari et al. (2006) empirically test Jensen (2004)'s argument and find evidence that the discretionary accruals of over-valued firms are much higher than firms with lower valuations. However, different from Kothari et al. (2006), we argue that the level of industry valuation can influence the earnings management decision of all firms in that industry, not only over valued ones. This is because the level of industry valuation can change the benefits and costs to manage earnings for all firms in that industry.

Our study shows how different cycles of booms and bursts in any industry changes managers' incentives to manage earnings. Rajgopal et al. (2007) focus on macro economic incentives that drive earnings management incentives, using macro economic variables (like GDP), that proxy for investor optimism in good times. Because economic cycles vary in time across industry, we argue that industry level provides a more accurate level of analysis to examine the impact of market conditions, i.e. the valuation levels of stocks on earnings management.

In this study, we employ a large sample of U.S. firms taken from COMPUSTAT. The sample period covers 20 years from 1985 to 2005. We test our hypothesis by examining the association between industry valuation and four-quarter ahead aggregate current discretionary accruals of individual firms in the industry. Following the behavioral finance literature (Baker et al., 2004), we use market to book ratio to proxy for the level of valuation. First, we find that after including the usual explanatory factors for earnings management, such as leverage, size, and performance, our measure for industry aggregate earnings management of each quarter remains is significantly positively associated with the lagged industry market to book ratio. This result holds for both current discretionary accruals and total discretionary accruals. In economic terms, this implies that one standard deviation increase in the industry valuation is associated with a significant increase of 2.4 cents in quarterly earnings per share. Second, to exclude alternative explanations, we run several robustness analyses, such as excluding high tech firms and excluding observations during bubble years. We continue to find a significantly positive association between aggregate current discretionary accruals and the industry market-to-book ratio.

The paper is organized as follows. In Section II we discuss related literature and develop our hypotheses. In Section III we describe our data and construct variables. In Section IV we present our main results, and analyze their robustness. In Section V, we discuss our findings.

## **2. Previous Literature and Hypotheses Development**

Firms make earnings management decisions after balancing the benefits and the costs associated with this decision. The underlying economic rationale for earnings management is that benefits outweigh the costs. Inversely, earnings management motives decrease if costs outweigh the benefits. Before analyzing the effects of industry valuation on earnings management, we start with a discussion of the benefits and costs related to earnings management.

### **Benefits of Earnings Management**

Since Ball and Brown (1968), numerous studies document a positive association between earnings surprises and stock returns. This offers managers the possibility to use earnings management in an attempt to influence stock price. Prior studies find evidence that support this argument. First, in their survey, Graham et al. (2005) report that CFOs' main motivation to engage in earnings management is to influence the firm's stock price. Second, managers' personal wealth is closely linked with stock price because of equity based compensation and human capital (Murphy, 1999). Third, stock price will decline in reaction to firms missing their analyst forecasts (Skinner and Sloan, 2002).

Although incentives to influence stock price by earnings management always exist, we argue that the extent to which stock prices react to earnings is positively



associated with the industry valuation. Veronesi (1999) investigates the effects of market fundamentals on investors' response to firms' earnings announcements. His analytical model demonstrates that investors will overreact to bad news when the market is performing well, but under react to good news when the stock market is performing poorly. This argument can also be applied to an industry level. It implies that there is more severe punishment of releasing disappointing earnings when the industry is expected to perform well than when it is expected to perform poorly. However the benefits of meeting earning expectations are higher in good times than in bad times. Therefore, earnings management has more appeal to managers when the industry valuation is higher. This argument is consistent with Dyck and Zingales (2002, p.85) who argue that "during a downturn, the valuation of a stock depends more on its liquidation value than on its future growth, making it less sensitive to news." In sum, we argue that the benefits of earnings management are higher when the industry has a higher valuation. Rational managers would time earnings management according to the level of the industry valuation.

### **Costs of Earnings Management**

Marquardt and Wiedman (2004) argue that accruals reversal is one of the important costs associated with earnings management. It impacts the future earnings and thus constraints the future reporting flexibility of firms. For example,

an early recognition of income can potentially increase earnings in the current period. However this early recognition decreases the growth of future earnings, and limits the room of earnings management in the future. In the following part, we will discuss the influence of industry valuation on the costs associated with accrual reversal when firms engage into earnings management.

### **Accruals Reversal**

Accrual reversal is one of the most important costs associated with earnings management (Marquardt and Wiedman, 2004). The decrease in future earnings as a result of accrual reversal is not only associated with negative stock price reactions (e.g. Teoh et al., 1998a and 1998b), it also constrains the flexibility of future earnings. However, we argue that the costs of accrual reversal is positively associated with industry valuation, i.e. the costs decrease in case of higher or increasing industry valuation and increase if industry valuation is lower or decreasing. Assuming that stock markets can predict future economic performance (Fischer and Merton, 1985, Lee, 1992), we propose the following relationship. When the average stock price of firms in an industry increases, managers of in that industry are more likely to have an optimistic outlook of the economic prospects and expect increasing future cash flows. As a consequence, they are more likely to believe that earnings management brings less constraint on future reporting flexibility, because the reversal of accruals will be covered, at

least partially, by increasing cash flows. In this case, the negative influence from accrual reversal will be mitigated. In the case of lower or decreasing average industry stock prices, the problem with reporting flexibility will be more severe if managers engage in earnings management. Large amount of accruals applied in the current period will bring much more difficulty in avoiding the negative consequences of an accrual reversal (i.e. a decrease of future earnings), since cash flow will decrease during an economic downturn or recession. Therefore, we conclude that the costs with reporting flexibility change with industry valuation. High industry valuation offers more reporting flexibility to managers.

### **The Probability of Detecting Earnings Management**

One obvious challenge to our argument on accrual reversal might be that the participants of stock market can see through the components of earnings and thus detect accounting discretion. However, prior studies find that the probability of detecting earnings management by outsiders is not high (Sloan, 1996). In line with this, our claim is that it is lower when industry valuation is higher.

First, it is less likely for investors to detect earnings management. Investors, especially individual investors, lack the ability to distinguish cash flow and accruals. Sloan (1996) examines the information content of both accruals and cash flow. He finds that investors react to earnings rather than either of its components. This result provides an indication that it is difficult for investors to see through

earnings and identify the source of earnings changes. Managers can use this to inflate or deflate accruals depending on the stock market valuation levels. Graham et al. (2005) show that CFOs believe that for investors, earnings are a more important metric than cash flows. Hence, we argue that the industry valuation can mislead investors and influence their sentiment. A high industry valuation predicts growing future cash flow and thus leads investors to be (more) optimistic about the firms' performance. In this case, it is easier for management to engage in earnings management, because scrutiny of investors is lower under these circumstances. Conversely, a low industry valuation increases investor skepticism and make them more suspect of firms' performance.

Second, several studies find that the probability for journalists to see through firms' discretion is low when an industry performs well. The financial press plays a key role in communicating information about corporate performance between firms and investors. Dyck and Zingales (2002) argue that journalists are less motivated to discover negative news when stock market valuation is high because (1) firms have more intention to release good news and are very selective to journalists during stock market booms; (2) in exchange for the access to information from firms, journalists have incentive to report more positive news. This result is also consistent with that of Solt and Statman (1988). They find that news writer's sentiment in the current period is positively related to the stock market return in the prior period. Given these findings, we argue that the industry

valuation impacts effectiveness of media in communicating information and monitoring firms. It is less likely for them to alert investors about bad information, such as earnings management, during periods of high industry valuation. Hence, we propose that the probability of detecting earnings management by investors is lower, especially when stock market valuation is high.

Combining the above arguments about the influence of the industry valuation on the costs and the benefits of earnings management, as well as the likelihood of earnings management being detected, we predict that the incentives to engage in earnings management vary across time and are associated with aggregate levels of industry valuations: earnings management is expected to occur more frequently when industry valuation is high. Therefore, our main hypothesis is that industry valuation has a positive impact on the degree of earnings management in that industry.

### **3. Data and Variables**

#### **Sample Selection**

To construct our sample, we start with quarterly financial data of all COMPUSTAT firms appearing between 1950 and 2005. To control the effects of equity offers on earnings management, we also retrieve the data of IPOs and seasoned equity offers from SDC, which covers the period between 1970 and 2005. After merging these two samples, our initial sample contains data covering

a period from 1970 to 2005. Next, we screen our initial sample by deleting 4858 financial companies (SIC code starting with 6). Third, we delete the observations which do not have enough data to estimate discretionary accruals using the cross sectional modified Jones model. Fourth, we drop observations if there are less than 10 observations to estimate the coefficients of total accruals. Fifth, we exclude observations which have either missing market values and missing or negative book values, or missing control variables. Finally, we delete the outliers by excluding the bottom and top 1% of every variable. From the first to the final step, we obtain 164320 observations containing 9065 companies from the third quarter of 1985 to the fourth quarter of 2004. The steps of sample screening are shown in Table 1.

-----Please insert Table 1 here-----

### **Earnings Management Variables**

We use current discretionary accruals as the proxy for earnings management, because current discretionary accruals are ‘the component most easily subject to successful managerial manipulation (Teoh et al., 1998, page 195). Prior audit quality research also argues that firms have most of their discretion over current accruals (Becker et al., 1998). In addition, the main difference between discretionary accruals and current discretionary accruals is the accruals associated with depreciation. Manzon (1992) and Hunt et al. (1996) find little evidence that

firms manage depreciation to meet short term earnings targets. Since our analysis focuses on the quarterly earnings management decisions, the quarterly frequency will be too short to use depreciation account for earnings management. Therefore, we expect that when firms face pressure from aggregate stock market valuation, they probably first choose to manage accounts such as tax and current liabilities rather than depreciation. Current discretionary accruals will thus be a more proper measurement for the degree of earnings management in this study.

We compute the quarterly current discretionary accruals based on the method of discretionary accruals in Matsumoto (2002). The total current accruals ( $TCA_{ijtq}$ ) of firm  $i$  in two-digit SIC code  $j$  in quarter  $q$  of year  $t$  are computed as follows (Equation 1):

$$TCA_{ijtq} = (\Delta CA_{ijtq} - \Delta Cash_{ijtq}) - (\Delta CL_{ijtq} - \Delta STDebt_{ijtq}) \quad (1)$$

Where  $\Delta CA_{ijtq}$  = change in current assets (Compustat item # 40)

$\Delta Cash_{ijtq}$  = change in cash and cash equivalent (Compustat item # 36)

$\Delta CL_{ijtq}$  = change in current liabilities (Compustat item # 49)

$\Delta STDebt_{ijtq}$  = change in debt included in current liabilities (Compustat item # 45)

Furthermore, we use a second model to estimate current discretionary accruals ( $DCA_{ijtq}$ ) and current nondiscretionary accruals ( $NDCA_{ijtq}$ ). This model is similar to the modified Jones Model. However, we exclude accruals associated with the

growth of long term assets since we are measuring the current part of discretionary accruals. In addition, we add a dummy for the fourth quarter of every year because it is well established that the accruals in the fourth quarter are different (Matsumoto, 2002).

$$\frac{TCA_{ijtq}}{A_{ijtq-1}} = \alpha_{jt} \frac{1}{A_{ijtq-1}} + \beta_{1jt} \frac{\Delta REV_{ijtq} - \Delta AR_{ijtq}}{A_{ijtq-1}} + \beta_{2jt} Qtr4 + \varepsilon_{jt} \quad (2)$$

Where  $\Delta REV_{ijtq}$  = change in revenue (Compustat item # 2)

$\Delta AR_{ijtq}$  = change in account receivable (Compustat item # 37)

$Qtr4$  = the fourth quarter dummy

$A_{ijtq-1}$  = lagged total assets (Compustat item # 44)

We estimate Equation 2 for each firm-year using all firm quarters in that year in the same industry (two-digit SIC code). To get sufficient data for parameter estimations, those firm years with less than ten observations are excluded. After estimating the parameters in Equation 2, we apply them into the same model and then get the estimation of  $NDCA_{ijtq}$ . The difference between  $TCA_{ijtq}$  and  $NDCA_{ijtq}$  is the estimation of current discretionary accruals ( $DCA_{ijtq}$ ) (Equation 3).

$$DCA_{ijtq} = TCA_{ijtq} - NDCA_{ijtq} \quad (3)$$

Industry current discretionary accruals are measured as the lag asset weighted average of discretionary accruals of all firms in an industry. Equation 4 presents the way to calculate industry current discretionary accruals.



$$DCA_{jtq} = \frac{\sum_i DCA_{ijtq} \times A_{ijtq-1}}{\sum_i A_{ijtq-1}} \quad (4)$$

Where  $DCA_{jtq}$  = industry current discretionary accruals

### **Stock Valuation Variable**

In their review of behavioral corporate finance, Baker et al. (2004) suggest that market-to-book ratio is the most often used proxy for stock valuation. Following the main stream studies, we also use this as our proxy for stock valuation.

We adopt the definition of market-to-book ratio by Kaplan and Zingales (1997) and Gompers et al. (2003). According to this definition, the market value of a firm is calculated as the book value of assets (Compustat item #44) plus the market value of common stocks, less the sum of book value of common equity (Compustat item #59) and balance sheet deferred taxes (Compustat item #79). The market value of common stocks is the product of outstanding shares (Compustat item #61) and the stock price at the end of fiscal quarter (Compustat item #14). The book value of assets is defined as total assets (Compustat item #44). Market to book ratio is a ratio of market value of a firm to the book value of assets of that firm.

The industry market-to-book ratio ( $MB_{jtq}$ ) is used as our proxy for stock market valuation at industry level. It is calculated as the ratio of the sum of the market

capitalization of all stocks in quarter  $q$  of year  $t$  in industry  $j$  to the sum of the book value of these stocks in the same period and same industry.

$$MB_{jtq} = \frac{\sum_i M_{ijtq}}{\sum_i B_{ijtq}} \quad (5)$$

Where  $M_{ijtq}$  = the market value of firm  $i$  in quarter  $q$  of year  $t$  in industry  $j$

$B_{ijtq}$  = the book value of firm  $i$  in quarter  $q$  of year  $t$  in industry  $j$

$MB_{jtq}$  = the industry market-to-book ratio

### Control Variables

Because prior studies on earnings management have identified several factors that affect the degree of earnings management (e.g., Dechow et al. 1996; Bowen et al., 2004), it is important to control for these variables in our study as well.

*Firm valuation* ( $VAL_{ijtq-4}$ ): several studies (e.g. DeGeorge et al., 1999, Burgstahler and Eames, 1998) argue that firms manage their earnings to meet the stock market expectation and hence to sustain or increase their stock price. Jensen (2005) argues that overvalued equities count on their earnings to keep up the already high valuation. Kothari et al. (2006) find empirical evidence showing Jensen's overvaluation theory is consistent with empirical findings of return behavior, analyst optimism and insider trading. However, Hirshleifer et al. (2004) find that undervalued equities also have incentive to manipulate earnings upwards

in order to show a performance comparable to industry peers. Therefore the impact of the firm's stock market valuation on earnings management could be either positive or negative. We employ a market to book ratio at individual firm level to proxy for the stock market valuation at the firm level.

*Demand from external financing (FreeC<sub>ijtq-4</sub>):* An *ex-ante* measure of the demand for external financing (*FreeC<sub>ijtq-4</sub>*) is developed by Dechow et al. (1996) as in Equation 6. They argue that the demand for external finance depends not only on how much cash is generated from operating and investment activities, but also on the 'stock' of funds already available within the firm. Since current assets are convertible to cash, they represent the firm's 'stock' of funds. When firms have fewer 'stock' of funds, there is a higher demand for external financing, hence, more incentives to manage earnings. We calculate the absolute value of the ratio of current asset to cash from operations except average capital expenditure. The inverse of this ratio indicates the number of years during which firms can fund their operations and investments by internal funds. Following Dechow et al. (1996), we use this variable as an indicator variable. It is coded as 1 if the *FreeC<sub>ijtq</sub>* is less than -0.5 and 0 otherwise. The expected relationship between earnings management and *FreeC<sub>ijtq-4</sub>* is positive.

$$FreeC_{ijtq-4} = \frac{CashFromOperations_{ijtq-4} - AverageCapitalExpenditures_{(ijtq-4)-3TO(ijtq-4)-1}}{CurrentAssets_{(ijtq-4)-1}} \quad (6)$$

*Leverage ( $LEV_{ijtq-4}$ ):* Prior studies (such as Bowen et al. 1981, Dechow et al. 1996) use leverage to measure the debt covenant motivation for earnings management. Assuming that firms with more leverage are closer to debt covenant violation, these firms are more inclined to engage in earnings management. We use leverage to measure the closeness of firms to their potential debt covenant violation. Leverage is defined as total long term debt (Compustat item #51) scaled by total total assets (Compustat item #44).

*Size ( $SIZE_{ijtq-4}$ ):* Several studies find that larger firms have more potential for earnings management. Bartov (1993) argues that larger firms have more room for earnings manipulation through asset sales. Watts and Zimmerman (1990) argue that larger firms face higher political costs and hence have stronger incentives to manage earnings in order to reduce the potential political risk. Francis et al. (1996) have similar results for asset write-offs. So, the expected sign of the influence from size on earnings management is not clear from the literature. We use the natural logarithm of sales (Compustat Item #2) as the proxy of firm size. The sign of the relationship between discretionary accruals and firms size is not predicted.

*Performance ( $ROA_{ijtq-4}$ ):* Dechow et al. (1995, p. 193) show that accruals are correlated with not only the current performance but also with the past performance. However the (modified) Jones model only control for the current performance. Kothari et al. (2005) show that the models to estimate discretionary accruals are often mis-specified if the firms' performance is not controlled for.

Bowen et al. (2004) include ROA as a control variable when analyzing the relationship between earnings management and corporate governance variables. We use return on assets ( $ROA_{ijtq}$ ) to proxy for firms' performance and use  $ROA_{ijtq}$  as a control variable, where  $ROA_{ijtq}$  is defined as income before extraordinary items (Compustat Item #8) scaled by lagged total assets (Compustat Item #44).

*Equity Issue ( $IPO_{ijtq+m}, SEO_{ijtq+m}$ ):* Several studies (e.g., Friedlan, 1994, Teoh et al. 1998) find that firms manage earnings upward before going public to attract investors. Similar income increasing earnings management is also found before seasoned equity offerings (Teoh et al. 1998b, Shivakumar, 2000). Lamont and Stein (2006) find that the scale and numbers of financial activities of firms are positively associated with the aggregate stock market valuation. Therefore, our study faces the challenge that results might partially driven by equity offerings. To control for this alternative explanation, dummies for both IPOs ( $IPO_{ijtq+m}$ ) and seasoned equity offers ( $SEO_{ijtq+m}$ ) will be introduced into the analysis.  $IPO_{ijtq+m}$  and  $SEO_{ijtq+m}$  stand for the IPO dummies and SEO dummies of company  $i$  in the quarter  $q+m$  of year  $t$  in the industry  $j$ , where  $m$  varies from -4 to 4. These dummies are equal to one if in the four quarters before ( $m=[-4,0]$ ) and after the quarter ( $m=(0, 4]$ ) either IPOs or seasoned equity offers are implemented.

*Industry and Quarter dummies ( $D_{in}, D_{qtr}$ ):* to control for other unobservable factors that might influence firms' earnings management decisions we introduce industry (two-digit SIC code) and quarter dummies.

## **Descriptive Statistics**

Descriptive statistics of the final sample appear in Table 2. To avoid that our results are influenced by outliers, we trim each variable at the first and 99th percentile. The mean of current discretionary accruals is 0.58%, and its median is 0.46%. The individual market-to-book ratio has a mean of 1.9875 and a median of 1.4189. The mean of the industry market to book ratio is 1.8712, and the median is 1.637. Comparing the mean of other control variables with those reported in Bowen et al. (2004), it appears that our sample has firms with a larger degree of earnings management, higher leverage and smaller size. This result is not surprising since they only include firms in the S&P 500, S&P 400 mid cap and S&P 600 small cap. The correlation matrix is reported in Table 3. Consistent with prior studies, total discretionary accruals have a positive relationship with free cash flows, firm size, and firm performance.

-----**Please insert Table 2 and Table 3 here**-----

## **4. Empirical Tests and Results**

In this section, we present the results of our empirical tests. To distinguish the effect of industry valuation from that of the factors documented by prior studies, we develop a two stage analysis. In the first stage, we explain earnings management by regressing it on the control variables including leverage, size,

performance, demand for external funds, equity issue dummies, time dummies and industry dummies. Control variables excluding dummy variables (equity issue dummies, time dummies and industry dummies) have a one-year lag behind the period of earnings management. As a result of this, the error terms from the first step regression contain the component of earnings management not explained by the variables in the first stage regression. We then aggregate the error terms for each industry quarter. The aggregation is a proxy for the unexplained part of earnings management at industry level and thus the dependent variable in our second stage regression. In the second stage, we use a univariate regression to examine the association between unexplained earnings management in industry quarters and the four-quarter lagged industry market to book ratio. The coefficient estimated from this regression provides us with an estimate of the effect of industry valuation on the degree of earnings management in that industry. In comparison with a single stage analysis approach, the advantage of a two stage analysis is to avoid collinearity problems between the industry market to book ratio and the quarter dummies.

Equation 7 (see below) is the model we used in the first step of the regression with current discretionary accruals as the dependent variable. Panel A of Table 4 shows the results of this model. The coefficients of firm valuation, demand of external finance, and performance are consistent with prior studies. The signs of these coefficients are positive, while all are significant at 0.0001 level. Also the

coefficient of firm size is positive and significant at 0.1 level. This result is consistent with the idea that larger firms have more resources to manage earnings. We do not report the coefficients of quarter and industry dummies for reasons of brevity. The overall R square of Model 7 is 1.40%, suggesting that much of the variation in discretionary accruals remains unexplained. However, we should bear in mind that this low R square is not surprising because our sample is not constructed conditional on special events, like for example in the case of equity offerings. Moreover, prior studies on earnings management, such as Kasznik (1999) and Xie et al. (2002), report similar levels of explanatory power in their models.

$$\begin{aligned}
 DCA_{ijtq} = & \alpha_0 + \alpha_1 VAL_{ijtq-4} + \alpha_2 LEV_{ijtq-4} + \alpha_3 FreeC_{ijtq-4} + \alpha_4 SIZE_{ijtq-4} + \alpha_5 ROA_{ijtq-4} \\
 & + \sum_{\substack{n=14, m=4 \\ n=6, m=-4}} \alpha_n IPO_{ijtq+m} + \sum_{\substack{n=23, m=4 \\ n=15, m=-4}} \alpha_n SEO_{ijtq+m} + D_{qtr} + D_{in} + \varepsilon_{ijtq}
 \end{aligned} \tag{7}$$

Where  $DCA_{ijtq}$  = Current discretionary accruals estimated by modified Jones model

$VAL_{ijtq-4}$  = Market to book ratio of individual firms

$LEV_{ijtq-4}$  = Leverage, the ratio of long term debt to total assets

$FreeC_{ijtq-4}$  = Demand for external fund

$SIZE_{ijtq-4}$  = Firm size measured as ln(sales)

$ROA_{ijtq-4}$  = Firm performance



- $IPO_{ijtq+m}$  = IPO dummies  
 $SEO_{ijtq+m}$  = Seasoned equity offer dummies  
 $D_{qtr}$  = Quarter Dummies  
 $D_{in.}$  = Industry dummies

After the first stage analysis we aggregate the error term of each industry by quarter and regress the aggregated error terms on the industry market to book ratio (see equation 8).

$$\sum_i \varepsilon_{ijtq} = \lambda_0 + \lambda_1 MB_{jtq-4} + v_{jtq} \quad (8)$$

where  $\sum_i \varepsilon_{ijtq}$  = Aggregated error terms from the first stage analysis per industry

$MB_{jtq-4}$  = Lagged aggregate industry market to book ratio

-----Please insert Table 4 and 5 here-----

Descriptive statistics of the variables used in the second stage are presented in Table 5. Panel B of Table 4 presents the result of the second stage analysis. The coefficient of the industry valuation from the second step is significantly positive, which is consistent with our hypothesis. This result shows that the industry average valuation has a positive relationship with the earnings management, after controlling for the usual suspects. The coefficient of the industry valuation is

0.0014, which is significant at 0.0001 level. This result implies that one standard deviation increase in industry valuation leads to an increase of 0.08 percentage point in aggregated error terms, which is about 11% of its average value. To translate this result into earnings per share, we first calculate the quarterly industry wide assets per share, which is a ratio of the sum of total assets to the sum outstanding shares in each quarter. The mean of the industry asset per share in our sample is 30.06 dollars per share. One standard deviation increase in industry market to book ratio will lead to an increase of about 2.4 cents ( $0.08\% * 30.06 = 2.4$ ) in quarterly aggregate earnings per share. In sum, our result suggests that industry valuation influences the degree of earnings management, especially the current component of earnings management.

### **Discretionary accruals**

Most earnings management studies use total discretionary accruals to proxy for earnings management. Although total discretionary accruals are not the best proxy in the context of our analysis, we also examine the relationship between the industry valuation and discretionary accruals. Equation 9 shows the first stage of the analysis with discretionary accruals as the dependent variable. In this stage, we still regress the firm level discretionary accruals on the control variables, which have been examined by prior studies. The error terms from this analysis are assumed to represent the part not explained by the control variables. After the

first stage analysis, we aggregate the error terms of firms in same industry of each quarter and regress the aggregated error terms on industry valuation in the second stage (Equation 10).

$$\begin{aligned}
 DA_{ijtq} = & \alpha_0 + \alpha_1 VAL_{ijtq-4} + \alpha_2 LEV_{ijtq-4} + \alpha_3 FreeC_{ijtq-4} + \alpha_4 SIZE_{ijtq-4} + \alpha_5 ROA_{ijtq-4} \\
 & + \sum_{\substack{n=14, m=4 \\ n=6, m=-4}} \alpha_n IPO_{ijtq+m} + \sum_{\substack{n=23, m=4 \\ n=15, m=-4}} \alpha_n SEO_{ijtq+m} + D_{qtr} + D_{in} + \varepsilon_{ijtq}
 \end{aligned} \tag{9}$$

Where  $DA_{ijtq}$  = Discretionary accruals estimated by modified Jones model

$$\sum_i \varepsilon_{ijtq} = \lambda_0 + \lambda_1 MB_{jtq-4} + \nu_{jtq} \tag{10}$$

Table 6 presents the result of the analysis based on Equation 9. In the Panel A of Table 6, except for the coefficient of firm valuation ( $VAL_{ijtq-4}$ ), the coefficients of other independent variables are similar with those in prior studies. The signs of these coefficients are in line with expectations. Panel B of Table 6 shows the result of equation 10. Table 7 presents the statistics of the variables in the second stage analysis. The positive coefficient of industry average market to book ratio indicates a positive relationship between industry valuation and the earnings management, beyond the control variables. The coefficient of the industry valuation is 0.0027 and significant at 0.0001 level. One standard deviation increase in the industry valuation leads to an increase of 0.14 percentage points in aggregated error terms, which is about 16% of its average value.

-----Please insert Table 6 and 7 here-----

### **Robustness checks**

To exclude alternative explanations for the previous results, we conduct several sensitivity analyses. First, it is possible that our results are driven by high tech firms because high tech firms use more stock based compensations than other firms. A higher level stock based compensation can create more incentives for firms to manage earnings. To control for these effects, we follow the definition of high tech firms by Loughran and Ritter (2004) and exclude these high tech firms from our sample. We find that the relationship between industry valuation and earnings management is still significantly positive. This result shows that the positive association between industry valuation and earnings management is not driven by the high tech sector.

Second, during the booming of the stock market in the late 1990s, the likelihood to detect earnings management may be higher than other periods. Accounting fraud cases may have increased investors scrutiny. Therefore, our results may be driven by the stock market bubble, such as in the years 1999 and 2000. To mitigate this effect, we exclude observations in 1999 and 2000 from our sample and re-run the analyses. The results remain significant positive, indicating an association between industry valuation and earnings management. Hence, our results are not driven by bubble years.

Third, we test our hypothesis using four quarter lagged industry valuation because we assume that managers take the action of managing earnings by evaluating industry valuation level of the same quarter in the past year. To examine the sensitivity of this to our results, we also test the relationship between earnings management and industry valuation of three quarter, two quarter and one quarter ago. The results show that earnings management also has a positive relationship with the industry valuation with three quarter lag, two quarter lag, and one quarter lag.

## **5. Summary and Conclusion**

This study investigates the relationship between industry valuation and earnings management behavior. Previous academic research has investigated several capital market motivations of earnings management. However, most of these studies take the industry environment as constant and focus on earnings management around firm specific and transaction specific transactions. We argue that the industry valuation will affect the expected payoff and the cost of earnings management, and thus has an impact on earnings management. Our main hypothesis is that industry valuation has a positive impact on the degree of earnings management in an industry.

We apply a two stage empirical model to explore the association between industry aggregate earnings management and industry valuation. We use current

discretionary accruals as our proxy for earnings management because it is “the component most easily subject to successful managerial manipulation (Teoh et al., 1998, page 195)”. Besides using current discretionary accruals as the proxy of earnings management, we also follow other earnings management studies and use discretionary accruals as another proxy for earnings management. After controlling for the effects of other factors on earnings management, such as leverage, firm size and firm performance, we find a significant positive relationship both between industry valuation and aggregate discretionary current accruals, and between industry valuation and aggregate discretionary accruals. Therefore, we conclude that industry valuation is another motivation of earnings management.

In sum, the empirical findings reported in this study show that earnings management decisions are not only subjective to firm-specific or transaction-specific factors, but also influenced by levels of industry valuation. Our claim is that industry valuation provides an accurate measure to examine the impact of market conditions, i.e. the valuation levels of stocks on earnings management, since economic cycles vary in time across industry. Industry valuation therefore constitutes an important factor that enables us to explain earnings management motives. In addition, different from existing studies (Jensen, 2005) on overvalued firms and earnings management, we show that the level of industry valuation can impact the earnings management decisions of all firms in that industry.



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**Table 1****Sample criteria**

Table 1 presents the steps to screen our initial sample. Firstly, we screen this initial sample by non-US stocks and financial companies (SIC code starting with 6). Secondly, we delete the observations which do not have enough data to estimate discretionary accruals by cross sectional Modified Jones model. Thirdly, we drop observations if there are less than 10 observations to estimate the coefficients of total accruals. Fourthly, we exclude observations which have the missing market value and book value, and other missing control variables. Finally, we delete the outliers by excluding the bottom and top 1% of every variable.

Screening Steps	No. of Obs. in Sample	No. of Firms	Sample Period
Initial sample	1871232	22382	1970.1~2005.4
Less: financial firms	1475632	17524	1970.1~2005.4
Less: observations with less than necessary data for Modified Jones model	498315	15601	1972.3~2005.4
Less: less than 10 observations for Modified Jones model estimation	382012	15267	1975.1~2005.4
Less: Missing control variables	178683	9354	1985.3~2004.4
Less: top and bottom 1% outliers	164320	9065	1985.3~2004.4

**Table 2**  
**Descriptive statistics**

Table 2 presents the descriptive statistics of the sample with current discretionary accruals as the dependent variable.  $DCA_{ijtq}$  is quarterly current discretionary accruals estimated from modified Jones model.  $MB_{ijtq-4}$  is industry market to book ratio with a four quarter lag behind the quarter of  $DCA_{ijtq}$ .  $VAL_{ijtq-4}$ ,  $LEV_{ijtq-4}$ ,  $FreeC_{ijtq-4}$ ,  $SIZE_{ijtq-4}$ ,  $ROA_{ijtq-4}$ , represent market to book ratio of individual firms, leverage, demand of external capital, firm size, firm performance and firm risk respectively. They all have a four quarter lag behind the quarter when  $DCA$  is estimated.  $VAL_{ijtq-4}$  is defined as the book value of assets (Compustat item #44) plus the market value of common stocks, less the sum of book value of common equity (Compustat item #59) and balance sheet deferred taxes (Compustat item #79). The market value of common stocks is the product of outstanding shares (Compustat item #61) and the stock price at the end of fiscal quarter (Compustat item #14). The book value of assets is defined as total assets (Compustat item #44). Market to book ratio is a ratio of market value of a firm to the book value of assets of that firm.  $LEV_{ijtq-4}$  is a ratio of total long term debt (Compustat item #51) to total total assets (Compustat item #44).  $FreeC_{ijtq-4}$  is the absolute value of the ratio of current asset to cash from operations except average capital expenditure.  $SIZE_{ijtq-4}$  is defined as the natural logarithm of sales (Compustat Item #2) as the proxy of firm size.  $ROA_{ijtq-4}$  is the income before

extraordinary items (Compustat Item #8) scaled by lagged total assets (Compustat Item #44).

Variable	Firm-quarters	Mean	Median	Std. Dev	Min	Max
$DCA_{ijtq}$	164320	0.0058	0.0046	0.0879	-0.5254	0.6222
$MB_{ijtq-4}$	164320	1.8712	1.637	0.7479	0.752	6.0992
$VAL_{ijtq-4}$	164320	1.9875	1.4189	1.6869	0.5518	15.3904
$LEV_{ijtq-4}$	164320	0.1745	0.1228	0.1856	0	0.9055
$FreeC_{ijtq-4}$	164320	0.0753	0	0.2707	0	1
$SIZE_{ijtq-4}$	164320	3.1286	3.1361	2.1979	-3.2968	8.3825
$ROA_{ijtq-4}$	164320	-0.0088	0.0078	0.0638	-0.4764	0.1065

**Table 3**  
**Correlation matrix**

Table 3 presents the correlation matrix of variables of the final sample.

	$DCA_{ijtq}$	$MB_{ijtq-4}$	$VAL_{ijtq-4}$	$LEV_{ijtq-4}$	$FreeC_{ijtq-4}$	$SIZE_{ijtq-4}$	$ROA_{ijtq-4}$
$DCA_{ijtq}$	1						
$MB_{ijtq-4}$	-0.0101	1					
$VAL_{ijtq-4}$	0.0124	0.2661	1				
$LEV_{ijtq-4}$	-0.0083	-0.1624	-0.2085	1			
$FreeC_{ijtq-4}$	0.0059	-0.0515	0.0247	0.1653	1		
$SIZE_{ijtq-4}$	0.0173	-0.0917	-0.2131	0.2433	-0.1285	1	
$ROA_{ijtq-4}$	0.0478	-0.1397	-0.2191	0.0305	-0.2267	0.4042	1

#### Table 4

Panel A of Table 4 presents the results of regression based on Equation 7, where the dependent variable is current discretionary accruals ( $DCA_{ijtq}$ ) of firm  $i$  in industry  $j$  at the quarter  $q$  of year  $t$ .  $VAL_{ijtq-4}$ ,  $LEV_{ijtq-4}$ ,  $FreeC_{ijtq-4}$ ,  $SIZE_{ijtq-4}$ ,  $ROA_{ijtq-4}$ ,  $RISK_{ijtq-4}$  represent market to book ratio of individual firms, leverage, demand of external capital, firm size, firm performance respectively. They all have a four quarter lag behind the quarter in which  $DCA_{ijtq}$  is estimated.  $IPO_{ijtq+m}$  and  $SEO_{ijtq+m}$  are dummies variables for IPOs and Seasoned Equity offers from the four quarters before when  $DCA$  is estimated to the four quarters after that. The coefficients for quarter and industry dummies are also included in the regression but not reported here. Panel B of Table 4 presents of the results of the second stage regression based on Equation 8, where the dependent variable  $\sum_i \varepsilon_{jtq}$  is the quarterly aggregated error terms of each industry from the first step. The independent variable is the industry market to book ratio, which is the measurement of industry valuation.

**Panel A: Results of First Stage Analysis**

$$DCA_{ijtq} = \alpha_0 + \alpha_1 VAL_{ijtq-4} + \alpha_2 LEV_{ijtq-4} + \alpha_3 FreeC_{ijtq-4} + \alpha_4 SIZE_{ijtq-4} + \sum_{n=5, m=-4}^{n=13, m=4} \alpha_n IPO_{ijtq+m} + \sum_{n=14, m=-4}^{n=22, m=4} \alpha_n SEO_{ijtq+m} + D_i + D_t + \varepsilon_{ijtq}$$

Variable	Coefficient	P-Value	Variable	Coefficient	P-Value
<i>VAL<sub>ijtq-4</sub></i>	0.0010	0.000	<i>IPO<sub>ijtq+3</sub></i>	0.0039	-0.039
<i>LEV<sub>ijtq-4</sub></i>	-0.0052	0.000	<i>IPO<sub>ijtq+4</sub></i>	0.0264	-0.018
<i>FreeC<sub>ijtq-4</sub></i>	0.0061	0.000	<i>SEO<sub>ijtq-4</sub></i>	0.0039	0.000
<i>SIZE<sub>ijtq-4</sub></i>	0.0002	0.092	<i>SEO<sub>ijtq-3</sub></i>	0.0043	0.001
<i>ROA<sub>ijtq-4</sub></i>	0.0725	0.000	<i>SEO<sub>ijtq-2</sub></i>	0.0085	0.005
<i>IPO<sub>ijtq-4</sub></i>	0.0002	0.979	<i>SEO<sub>ijtq-1</sub></i>	0.0118	0.008
<i>IPO<sub>ijtq-3</sub></i>	-0.0075	-0.042	<i>SEO<sub>ijtq</sub></i>	0.0126	0.009
<i>IPO<sub>ijtq-2</sub></i>	0.0199	-0.015	<i>SEO<sub>ijtq+1</sub></i>	0.0091	0.005
<i>IPO<sub>ijtq-1</sub></i>	0.0035	-0.032	<i>SEO<sub>ijtq+2</sub></i>	0.0042	0.000
<i>IPO<sub>ijtq</sub></i>	-0.0017	-0.043	<i>SEO<sub>ijtq+3</sub></i>	0.0015	-0.003
<i>IPO<sub>ijtq+1</sub></i>	-0.0242	-0.065	<i>SEO<sub>ijtq+4</sub></i>	0.0052	0.001
<i>IPO<sub>ijtq+2</sub></i>	0.0178	-0.023	<i>Intercept</i>	0.0433	0.390
Overall R-sqrt	0.014				
No. of Observations	164320				

**Panel B: Result of Second Stage Analysis**

$$\sum_i \varepsilon_{ijtq} = \lambda_0 + \lambda_1 MB_{jtq-4} + v_{jtq}$$

Variable	Predicted Sign	Coefficient	p-value
<i>MB<sub>jtq-4</sub></i>	+	0.0014	0.000
<i>Intercept</i>		0.0053	0.000
Adjusted R-sqrt	0.007		
No of observations	4549		

**Table 5**  
**The Statistics of Variables in the Second Stage Analysis**

Variable	Industry Quarters	Mean	Std. Deviation	Minimum	Maximum
<i>MB<sub>jtq-4</sub></i>	4549	1.5957	0.5361	0.7520	6.0992
$\sum_i \varepsilon_{ijtq-4}$	4549	0.0075	0.0086	-0.0335	0.0608



### Table 6

Panel A of Table 6 presents the results of regression based on Equation 9, where the dependent variable is discretionary accruals ( $DA_{ijtq}$ ) of firm  $i$  in industry  $j$  at the quarter  $q$  of year  $t$ .  $VAL_{ijtq-4}$ ,  $LEV_{ijtq-4}$ ,  $FreeC_{ijtq-4}$ ,  $SIZE_{ijtq-4}$ ,  $ROA_{ijtq-4}$ , represent market to book ratio of individual firms, leverage, demand of external capital, firm size, firm performance respectively. They all have a four quarter lag behind the quarter in which  $DA_{ijtq}$  is estimated.  $IPO_{ijtq+m}$  and  $SEO_{ijtq+m}$  are dummies variables for IPOs and Seasoned Equity offers from the four quarters before when  $DA$  is estimated to the four quarters after that. The coefficients for quarter and industry dummies are also included in the regression but not reported here. Panel B of Table 6 presents of the results of the second stage regression based on Equation 10, where the dependent variable  $\sum_i \varepsilon_{jtq}$  is the quarterly aggregated error terms of each industry from the first step. The independent variable is the industry market to book ratio, which is the measurement of industry valuation.

**Panel A: Results of First Stage Analysis**

$$DA_{ijtq} = \alpha_0 + \alpha_1 VAL_{ijtq-4} + \alpha_2 LEV_{ijtq-4} + \alpha_3 FreeC_{ijtq-4} + \alpha_4 SIZE_{ijtq-4} + \sum_{n=5, m=-4}^{n=13, m=4} \alpha_n IPO_{ijtq+m} + \sum_{n=14, m=-4}^{n=22, m=4} \alpha_n SEO_{ijtq+m} + D_t + D_i + \varepsilon_{ijtq}$$

Variable	Coefficient	P-Value	Variable	Coefficient	P-Value
<i>VAL</i> <sub>ijtq-4</sub>	-0.0005	0.044	<i>IPO</i> <sub>ijtq+3</sub>	-0.0051	0.864
<i>LEV</i> <sub>ijtq-4</sub>	0.0077	0.001	<i>IPO</i> <sub>ijtq+4</sub>	0.0191	0.527
<i>FreeC</i> <sub>ijtq-4</sub>	0.0078	0.000	<i>SEO</i> <sub>ijtq-4</sub>	-0.0038	0.237
<i>SIZE</i> <sub>ijtq-4</sub>	-0.0006	0.000	<i>SEO</i> <sub>ijtq-3</sub>	0.0010	0.763
<i>ROA</i> <sub>ijtq-4</sub>	0.1136	0.000	<i>SEO</i> <sub>ijtq-2</sub>	0.0055	0.085
<i>IPO</i> <sub>ijtq-4</sub>	0.0000	0.999	<i>SEO</i> <sub>ijtq-1</sub>	0.0063	0.060
<i>IPO</i> <sub>ijtq-3</sub>	0.0010	0.976	<i>SEO</i> <sub>ijtq</sub>	0.0111	0.001
<i>IPO</i> <sub>ijtq-2</sub>	0.0303	0.343	<i>SEO</i> <sub>ijtq+1</sub>	0.0067	0.052
<i>IPO</i> <sub>ijtq-1</sub>	-0.0087	0.780	<i>SEO</i> <sub>ijtq+2</sub>	0.0008	0.822
<i>IPO</i> <sub>ijtq</sub>	-0.0307	0.401	<i>SEO</i> <sub>ijtq+3</sub>	0.0038	0.279
<i>IPO</i> <sub>ijtq+1</sub>	-0.0335	0.360	<i>SEO</i> <sub>ijtq+4</sub>	0.0087	0.015
<i>IPO</i> <sub>ijtq+2</sub>	0.0142	0.658	<i>Intercept</i>	0.0677	0.468
Overall R-sqrt	0.029				
No. of Observations	127257				

**Panel B: Result of Second Stage Analysis of the DA Sample**

$$\sum_i \varepsilon_{ijtq} = \lambda_0 + \lambda_1 MB_{jtq-4} + v_{jtq}$$

Variable	Predicted Sign	Coefficient	p-value
<i>MB</i> <sub>jtq-4</sub>	+	0.0027	0.000
<i>Intercept</i>		0.0043	0.000
Adjusted R-sqrt	0.004		
No of observations	4391		

**Table 7**  
**The Statistics of Variables in the Second Stage Analysis**

Variable	Industry quarters	Mean	Std. Deviation	Minimum	Maximum
<i>MB</i> <sub>jtq-4</sub>	4391	1.5909	0.5325	0.752	6.0992
$\sum_i \varepsilon_{jtq-4}$	4391	0.0086	0.0237	-0.0501	0.0847

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