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EARNINGS MANIPULATION AND PROFITABILITY

Abstract. *This paper uses 2005~2010 data from Standard & Poor's companies to establish a panel smooth transition regression model to determine variances in earnings management throughout business cycles. The purpose is to allow financial report users to understand the true information within the reports. The results indicate non-linear relations between profitability and earnings manipulation. When firm performance weakens, managers would want to convey a message of recovery and improvement by manipulating earnings. When firm performance strengthens, managers may cut back earnings management due to dividend plays or smooth earnings. Generally speaking, companies step up earnings manipulation in economic downturns.*

Key words: *Corporate performance, Earnings management, Earnings manipulation, Profitability*

JEL Classification: M21, M41, C22, C23

I. Introduction

The success or failure of a company is subject to many internal and external factors. External factors (such as economic fluctuations) are mostly beyond the company's control. Operational performance changes due to varying economic condition, and companies are therefore the most concerned with the impact of business cycles, economic cycles that fluctuate over time with changes to macroeconomic variables. Business cycles affect all players in the economy and

most companies view their operational performance as subject to the effects of business cycles, with profits that rise and fall accordingly. Managers can be motivated to manipulate earnings to stabilize share prices, establish expectations for future prospects, enhance investor confidence, reduce capital costs, comply with debt covenants, and secure their job positions and compensation by minimizing the impact of business cycles on operational performance. Alternatively, managers can write off inefficient operations or recognize significant allowances for losses during economic downturns, creating room for performance improvement upon economic recovery.

Modern corporations are large, complex organizations and it is difficult for investors to gain a complete understanding of their operations. Investors can only glimpse a company's current performance by reading its financial statements. However, frequent incidents of financial reporting manipulations and earnings management by companies since 2001 and scandals such as Enron, WorldCom, AOL–Time Warner, and Xerox have caused investors to question the information expressed in financial reports. Investors are increasingly concerned that financial reports are no longer relevant or reliable because of earnings management.

According to the Financial Accounting Standards Board (FASB), compared to cash-based information, accrual-based earnings present a better picture of operating results and improve the evaluation of current and future cash flows. Therefore, financial reports should be accrual based rather than cash based. Dechow [11] (1994) indicates that accrual-based information eliminates problems associated with the timing of earnings recognition and the mismatching of costs and incomes. To sum up, the accrual-based accounting allows financial statements to record information that is not contained in the current cash inflows or outflows and to convey expectations of future cash flows.

Accrual-based profits and losses contain more information than just cash flows: They contain implications about the expectations and planning of future operations, investments, and financing activities. In other words, they are a window to the past and the present. Using the accrual basis allows managers to select different financial reporting strategies according to industry characteristics and company specifics.

This approach provides better accounting information than cash-based reporting and enhances the economic and communications value of financial reporting. This is why management has a certain level of discretion over the choice of accounting methods and the control of accruals. Schipper [38] (1989) suggests that, driven by economic motives, companies seek to manage earnings by leveraging their discretion on profits and losses within a range acceptable to Generally Accepted Accounting Principles or via other means. Therefore, managers manipulate earnings by choosing the accounting methods that are favorable to themselves or the company to maximize their economic benefit. Earnings management can be achieved through the choice of accounting methods, the manipulation of discretionary accruals, and the adjustment of non-operating profits and losses.

Healy [20] (1985) finds that managers nudge company earnings upward or downward in accordance with dividend plans. Burns and Kedia [4] (2006), Bergstresser and Philippon [2] (2006), and Shuto [39] (2007) indicate that the stronger the correlation between managerial remuneration and share price, the more likely managers will manipulate earnings for personal gains. Hirshleifer, Hou, Teoh and Zhang [23] (2004) and Iatridis and Kadorinis [24] (2009) find that companies manage earnings to reduce the probability of breaking debt covenants. According to Roychowdhury [36] (2006), Charoenwong and Jiraporn [6] (2009), Cornett et al. [10] (2009), and Chen et al. [7] (2010), companies avoid reporting losses or reduced profits via a variety of methods.

Managers can manipulate earnings when they drop slightly or the company incurs minor losses. Managers can nudge up earnings somewhat or turn minor losses into paper profits. Cornett et al. [10] (2009) suggest that in a low-margin period, bank managers can smooth earnings by deferring the reporting of nonperforming losses or by increasing stock market gains. Charoenwong and Jiraporn [6] (2009) find that since the Asian financial crisis of 1997, Thai nonfinancial companies have become conservative in their earnings management. Hirshleifer et al. [22] (2009) note that in the bull market of the late 1990s, earnings management was more pronounced. To sum up, earnings management behavior changes according to the economic situation.

Standard & Poor's (S&P) 100 constituents have large market capitalization and receive significant attention from global investors. However, few academic discussions consider business cycles. Indeed, managers change their earnings management behavior for different reasons, but business cycles are the biggest factor in changing company operations. This paper intends to explore whether earnings management changes in different economic situations and to analyze the smooth transition effects of business cycles on earnings management. When the economy is below a threshold value, it is depressed. In such an economic climate, will managers step up earnings management? If the economy is above a threshold value, it is booming. At this juncture, will there be structural changes to earnings management? Because companies cannot predict the current business cycle, they can only infer the economic changes based on data from the previous period and decide whether they should engage in earnings management or manipulation.

This paper consists of five parts. The first part describes the motivations and purposes of the research. The second part examines the relevant literature. The third part outlines the research methodology. The fourth part presents the empirical analysis. Finally, the fifth part offers conclusions.

II. Literature Review

The main purpose of earnings management is to facilitate self-serving activities and convey particular signals. Managers engage in self-serving activities in the face of issues—such as their own remuneration, debt covenants, and political costs—by manipulating financial reports and sacrificing reporting reliability. Jiraporn, Miller, Yoon, and Kim [26] (2008) and Jiraporn, Kim, and Mathur [26] (2008) suggest that managers sometimes manage earnings to inflate company profits and share prices. In terms of signaling, managers intend to convey a message concerning the company's future and manage earnings to achieve predetermined targets. According to Conover et al. [9] (2008), the voluntary disclosure of accounting information can mitigate information asymmetry and improve communication between managers, shareholders, and creditors.

According to Healy [20] (1985), bonus plans are often accompanied by bonus ceilings and target earnings: If the target earnings are met or the bonus ceiling is reached, managers can suppress current earnings and transfer some earnings to the future. If earnings exceed the minimum requirement yet are below the desired target, the managers may raise earnings to hit the target. Burns and Kedia [4] (2006) indicate that if managers have a large sum in stock options, they are likely to manage earnings. According to Shuto [39] (2007), managers can exercise influence over financial reports to protect their own reputation and remuneration. Cornett et al. [10] (2009) argue that the stronger the correlation between manager compensation and the share price, the greater the value of discretionary accruals and the higher the likelihood of earnings management.

Creditors often assign debt covenants to protect their own benefits. Covenant clauses are usually associated with accounting earnings. Therefore, the higher the debt ratio, the more motivated a company is to manage earnings to reduce the likelihood of breaching debt covenants. According to Lambert [30] (2001), to avoid the negative results of breaching a debt covenant, managers take a proactive approach to financial reporting. Gaud et al. [16] (2007) find that companies can use discretionary accruals to manipulate earnings to address issues related to debt and equity. Hirshleifer et al. [23] (2004) suggest that companies engage in earnings management to protect their corporate image and avoid breaching debt covenants. Iatridis and Kadorinis [24] (2009) indicate that companies manage earnings to reduce the default probability when they are about to breach debt covenants.

According to Healy and Wahlen [21] (1999), the scale hypothesis holds that the larger a company, the more likely it will be accused of enjoying a monopoly due to antitrust laws or regulatory requirements. Governments also ask this type of company to assume more corporate social responsibilities. In such instances, a large company can opt to lower its profits to evade the control of competent authorities and reduce political costs. Therefore, the larger a company, the higher its political sensitivity and the higher the scale cost.

Steady growth provides financial report users the impression that the company is developing well. Therefore, companies will do what it takes to avoid reporting

losses or lower profits. Managers consider the relative performance of the current period against that of the following period when engaged in earnings management. If they expect poor results for the current period, they will borrow future profits to beef up the numbers. On the other hand, if the current period's performance is good, they will suppress its profits to allow for future earnings.

Fudenberg and Tirole [15] (1995) indicate that managers prefer to present a picture of steadily growing earnings; in other words, they smooth out earnings to enhance their sense of job security. According to Burgstahler and Dichev [3] (1997), companies with slightly above and slight below expected earnings are engaged in earnings management. Degeorge et al. [13] (1999) find that if affiliated parties expect positive earnings results to maintain their recent performance or to meet Wall Street forecasts, the managers will engage in earnings management to cater to these expectations. Roychowdhury [36] (2006) indicates that overproduction, loose credit terms, and a reduction in discretionary expenditures are means of boosting earnings to avoid reporting losses and to meet the expectations of Wall Street. Charoenwong and Jiraporn [6] (2009) suggest that the nonfinancial companies in Singapore and both financial and nonfinancial companies in Thailand manage earnings to avoid reporting losses or lower earnings. According to Cornett et al. [10] (2009), in a low-profit period, bank managers can smooth out earnings by deferring the reporting of bad loans and increasing the recognition of profits from stock market investments. Chen et al. [7] (2010) indicate that managers step up earnings management to avoid reporting reduced earnings.

The operating performance of most companies is subject to the effects of economic changes. Economic expansion boosts aggregate demand and increasing demand encourages production and sales. Producers are then optimistic about making make investments for the next cycle and the economy continues to expand. Machin and Van Reenen [32] (1993) develop a dynamic macroeconometric model to examine the effects of economic recession on the macroeconomy and businesses in the 1980s and find marginal profit ratios and business cycles to be highly correlated. Kane [25] (1997) also suggests that marginal profit ratios and business cycles are positively correlated. Lima and Resende [32] (2004) sample panel data

and find that the marginal profit ratios in companies in Brazil change with macroeconomic conditions. Sakakibara and Yamawaki [37] (2008) use panel data for companies in the UK and the US and suggest that the marginal profit ratios change consistently with economic demand fluctuations. Moren and Rodriguez [35] (2010) indicate that in the 1990s, the marginal profit ratios of European companies changed in tandem with the macroeconomy. To sum up, marginal profit ratios and business cycles are positively correlated.

III. Methodology

The panel threshold regression (PTR) model proposed by Hansen (1999) is given by the equation

$$Y_{i,t} = \alpha_i + \beta_0 X_{i,t} + \beta_1 X_{i,t} \Gamma(Q_{i,t};\ Q_c) + \varepsilon_{i,t} \quad (1)$$

where $Q_{i,t}$ is the threshold variable, Q_c is the threshold value, and $\Gamma(Q_{i,t};Q_c)$ is the transition function, which corresponds to the indicator function.

$$\Gamma(Q_{i,t};\ Q_c) = \begin{cases} 1 & if\ Q_{i,t} \geq \mathrm{Q}_c \\ 0 & otherwise \end{cases} \quad (2)$$

If the threshold variable is greater than Q_c ($Q_{i,t} \geq \mathrm{Q}_c$), then β_i is the parameter coefficient. If the inverse is true, then the parameter coefficient is $b_0 + b_1$. This model divides data into a small number of categories, reflecting reality. Thus, González et al. (2005) proposed the following panel smooth threshold regression (PSTR) that, in its simplest form, divides data into two regimes and a single transition function:

$$Y_{i,t} = \alpha_i + \beta_0 X_{i,t} + \beta_1 X_{i,t} \Gamma(Q_{i,t};\ \gamma, Q_c) + \varepsilon_{i,t} \quad (3)$$

where the transition function Γ is determined by the threshold variable Q_c; $c = (c_1,...,c_m)'$ is a vector of parameters and the parameter γ defines the slope of the transition function. González et al. (2005) extended the STAR time series model of Granger and Teräsvirta (1993) to obtain the logistic transition function:

$$\Gamma(Q_{i,t};\ \gamma, Q_c) = \left[1 + \exp\left(-\gamma \prod_{z=1}^{m} (Q_{i,t} - Q_c)\right)\right]^{-1}, \quad \gamma > 0, c_1 < ... < c_m \quad (4)$$

The higher γ, the steeper the slope of the transition function and the transition function $\Gamma(Q_{i,t};\ \gamma, Q_c)$ approaches the indicator function $\Gamma(Q_{i,t};\ Q_c)$. When $\gamma \to \infty$, the PSTR model converges to the PTR model; conversely, when $\gamma \to 0$, the transition function $\Gamma(Q_{i,t};\ \gamma, Q_c)$ becomes constant and the PSTR model will have fixed effects. The simplest logistic smooth transition function Γ is

$$\Gamma(Q_{i,t};\ \gamma, Q_c) = \frac{1}{1+\exp(-\gamma(Q_{i,t} - Q_c))} \tag{5}$$

where Q_c is the unknown threshold value and $\gamma > 0$. γ is the speed of adjustment. If $Q_{i.t} > Q_c$, γ will be very large and the smooth threshold parameter Γ will be a jump function. If $Q_{i,t} < Q_c$, then g will approach zero and the parameter Γ will have no regime; thus $0 \le \Gamma(Q_{i,t};\gamma, Q_c) \le 1$.

The PSTR model allows for variation in the coefficients of the dependent variable *Y* for different companies and times, while parameterizing company heterogeneity and time instability, and defines smooth changes in these parameters as a function of the threshold variable. At time *t*, the sensitivity of *Y* for company *i* is defined as

$$e_{i,t} = \frac{\partial Y_{i,t}}{\partial X_{i,t}} = \beta_0 + \beta_1 \Gamma(Q_{i.t};\gamma, Q_c) \tag{6}$$

Depending upon the characteristics of the transition function $0 \le \Gamma(Q_{i,t};\ \gamma, Q_c) \le 1$; if $\beta_1 > 0$, then $\beta_0 \le e_{i,t} \le \beta_0 + \beta_1$. If $\beta_1 < 0$, then $\beta_0 + \beta_1 \le e_{i,t} \le \beta_0$. The coefficient for the dependent variable *Y* is defined as the weighted average of β_0 and β_1. The PSTR model can be used to estimate the coefficients (β_0 and β_1) for different extreme regimes, as in equation (6), but these coefficients do not correspond directly to effects on *Y*.

When the transition function $\Gamma(Q_{i,t};\ \gamma, Q_c) \to 0$, the coefficient β_0 corresponds to a direct effect on *Y*. Conversely, when $\Gamma(Q_{i,t};\ \gamma, Q_c) \to 1$, the coefficient of *Y* is the sum of β_0 and β_1.

For both regimes, the coefficient of *Y* approaches infinity and is given by the weighted average of β_0 and β_1. Thus, it is a difficult to directly explain the coefficients obtained with probit and logit models. It is customary to interpret the

value of the threshold variable as the increase or decrease in the coefficients of *Y* and those given by equation (6) for different times and individual levels.

The PSTR model can be extended to $r + 1$ regimes with the equation

$$Y_{i,t} = \alpha_i + \beta_0 X_{i,t} + \sum_{j=1}^{r} \beta_j X_{i,t} \Gamma(Q_{i,t};\ \gamma_j, Q_{c_j}) + \delta z_{i,t} + \varepsilon_{i,t} \tag{7}$$

where the transition functions $\Gamma(Q_{i,t};\ \gamma_j, Q_{c_j})$ are determined by the slope of the parameter γ_j and the logistic parameter Q_{c_j}. When the threshold variable $Q_{i,t}$ is different from the independent variable $X_{i,t}$, at time *t* the coefficient of *Y* for company *i* is the weighted average of the $(r + 1)$th coefficient β_j and the $r + 1$ extreme regimes:

$$e_{i,t} = \frac{\partial Y_{i,t}}{\partial X_{i,t}} = \beta_0 + \sum_{j=1}^{r} \beta_j \Gamma_j(Q_{i,t}; \gamma, Q_c),\ \forall i, \forall t \tag{8}$$

When the transition function equals the exogenous variable, the representation of elasticity changes. When $Q_{i,t} = X_{i,t-1}$, the coefficient of the dependent variable *Y* is represented by

$$e_{i,t} = \frac{\partial Y_{i,t}}{\partial X_{i,t-1}} = \beta_0 + \sum_{j=1}^{r} \beta_j \Gamma_j(Q_{i,t-1}; \gamma, Q_{c_j}) + \sum_{j=1}^{r} \beta_j \frac{\Gamma_j(Q_{i,t-1}; \gamma, Q_{c_j})}{\partial X_{i,t-1}} X_{i,t-1},\ \forall i, \forall t \tag{9}$$

By removing individual fixed effects and using the nonlinear least squares method, the PSTR model estimates the individual fixed effects of the transition model. González et al. (2005) proposed the following test procedure. First, test whether the PSTR model is linear; then test for the number of regimes the transition function has. The linearity of the PSTR model (see equation (3)) can be tested with $H_0 : \gamma = 0$ or $H_0 : \beta_1 = 0$. However, under these null hypotheses, both tests are flawed, since the PSTR model contains unknown, unnecessary parameters. The way to avoid this issue is to carry out a first-order Taylor expansion of $\Gamma(Q_{i,t}; \gamma_j, Q_{c_j})$ with $\gamma = 0$ to obtain the auxiliary regression equation

$$Y_{i,t} = \alpha_i + \theta_0 X_{i,t} + \theta_1 X_{i,t} + \delta Z_{i,t} + \varepsilon_{i,t} \tag{10}$$

$H_0 : \theta_1 = 0$ versus $H_0 : \theta_1 \neq 0$ is used to test the linearity of the PSTR model. González et al. (2005) and Colletaz and Hurlin (2006) assumed that each transition function has *m* thresholds, as shown by the equation

$$Y_{i,t} = \alpha_i + \theta_0 X_{i,t} + \theta_1 Q_{i,t} X_{i,t} + \theta_2 Q_{i,t}^2 X_{i,t} + \cdots + \theta_m Q_{i,t}^m X_{i,t} + \delta Z_{i,t} + \varepsilon_{i,t}^* \quad (11)$$

Then $H_0 : \theta_1 = \cdots = \theta_m = 0$ versus $H_1 : \theta_1 \neq 0$ can be $g(q_{it}; \gamma, c)$ used for the test. SSR_0 is the total sum of the squared residuals under H_0 and SSR_1 is the number of regimes in the PSTR model. The corresponding F-statistic is given by

$$LM_F = \frac{(SSR_0 - SSR_1)}{SSR_0 / (TN - N - mK)} \sim F(mK, TN - N - mK) \quad (12)$$

where T is the number of periods, N is the number of companies, and K is the exogenous variable. After nonlinearity is ascertained, the number of transition functions is considered. First, test for the existence of only one transition function ($H_0 : r = 1$) or for the existence of at least two transition functions ($H_1 : r = 2$). If the model has two transition functions, with

$$Y_{i,t} = \alpha_i + \beta_0 X_{i,t} + \beta_1 X_{i,t} \Gamma_1 (Q_{i,t}; \gamma_1, Q_{c_1}) + \theta_2 X_{i,t} \Gamma_2 (Q_{i,t}; \gamma_2, Q_{c_2}) + \delta Z_{i,t} + \varepsilon_{i,t}^* \quad (13)$$

where $\Gamma_1 (Q_{i,t}; \gamma_1, Q_{c_1})$ and $\Gamma_2 (Q_{i,t}; \gamma_2, Q_{c_2})$ are two different transition functions. With a logistic test, the second transition function is transformed through a first-order Taylor expansion with $\gamma_2 = 0$; the condition for linearity in the test parameters is also changed. The model is defined as

$$Y_{i,t} = \alpha_i + \beta_0 X_{i,t} + \beta_1 X_{i,t} \Gamma_1 (Q_{i,t}; \gamma_1, Q_{c_1}) + \theta_2 Q_{i,t} X_{i,t} + \delta Z_{i,t} + \varepsilon_{i,t}^* \quad (14)$$

This nonlinearity test is simply defined as $H_0 : \theta_1 = 0$. When the PSTR model has only one transition function, let SSR_0 be the total sum of the squared residuals under H_0 and let SSR_1 be the sum of the squared residuals of the transition model (as in equation (14)). When the PSTR model has r* transitions functions, the null hypotheses are $H_0 : r = r^*$ and $H_1 : r = r^* + 1$. If H_0 cannot be rejected, then there is only one transition function and the test is terminated; if H_0 is rejected, the test continues with $H_0 : r = r^* + 1$ versus $H_1 : r = r^* + 2$. The test continues in this manner until the null hypothesis cannot be rejected. Since this is a continuous test process, for every subsequent test the significance level ($0 < \tau < 1$) decreases by a constant factor τ to avoid an uncontrollable increase in the model. González et al. (2005) suggested a value of $\tau = 0.5$.

This paper uses a smooth transition model because it has an economic as well as statistical advantage. At the economic level, company earnings management is a

dynamic process and the smooth transition model can reflect excessive regimes. At the statistical level, the model allows for radical changes in the data or can be of the smooth threshold type. Such flexibility removes any data limitations data. The threshold value is given by $(\hat{Q}_c, \hat{\gamma}) = \arg\min_{Q_c,\gamma} S_1(\hat{Q}_c, \hat{\gamma})$. To guarantee sufficient degrees of freedom, at least five are required.

This paper assumes that $H_0 : \beta^{(1)} = \beta^{(2)}$ when there are no threshold effects and S_0 is set as the sum of squared residuals under the null hypothesis. The likelihood ratio of H_0 is based on $\Gamma_1 = (S_0 - S_1(\hat{Q}_c, \hat{\gamma}))/\hat{\sigma}^2$, where $\hat{\sigma}^2 = S_1(\hat{Q}_c, \hat{\gamma})/N(T-1)$. Because the threshold and adjustment coefficient under H_0 are uncertain, the basic test is that of a non-standard distribution.

Earnings management is a widely discussed issue in financial accounting. This paper seeks to capture the degree of earnings management with the amount of discretionary accruals. Jones [28] (1991) develops a model that can efficiently generate discretionary accruals; however, it estimates discretionary accruals based on time-series data. A small sample will lead to too small a degree of freedom. While the Jones model is efficient, the modified Jones model boasts stronger testing power. Therefore, this paper uses the modified Jones model to estimate discretionary accruals.

This paper expects earnings management to show a structural change due to economic expansion and contraction. The change should be in the form of a smooth transition. Therefore, this paper runs the panel smooth threshold regression (PSTR) developed by González et al. [18] (2005) to explore the effect of business cycles on earnings management.

The model is defined as

$$DA_{i,t} = \mu_i + \beta_0 MPR_{i,t} + \beta_1 MPR_{i,t} g(MPR_{i,t-1}, \gamma, c) + \varepsilon_{i,t} \quad (15)$$

where DA is the dependent variable, that is, earnings management, represented as discretionary accruals; $MPR_{i,t}$ is the marginal profit ratio as the proxy variable for business cycles; $MPR_{i,t-1}$ is the transition variable, representing the marginal profit ratio lagged by one period; $g(MPR_{i,t-1}, \gamma, c)$ is the transition function; γ is the transition speed; and c is the transition threshold value.

The PSTR model can estimate the coefficients of the dependent variable DA for different extreme zones (β_0 and β_1), as shown in equation (1). These parameters do not have direct effects on their corresponding dependent variable DA. When $MPR_{i,t}$, parameter β_0 will have direct effects on the corresponding dependent variable DA. If $g(MPR_{i,t-1},\gamma,c)\to 1$, the coefficient of the dependent variable DA will equal the sum of the parameters β_0 and β_1. Between the two zones, the coefficient of the dependent variable DA will reach infinity. The coefficient of DA is defined as the weighted average of the parameters β_0 and β_1.

A smooth transition model has advantages in statistics and economics. Economically speaking, earnings management is a dynamic process and a smooth transition model can reflect such a transition. Statistically speaking, this model allows data to suddenly change or shift into a smooth threshold pattern, without restrictions on the research data.

IV. Data and Empirical Results

This paper does not focus on the earnings management of specific events and therefore cannot predict the direction of discretionary accruals. According to Dechow et al. [12] (1995), companies may manipulate earnings by playing with the timing of recognizing receivables. This is why nondiscretionary accruals are defined as changes in sales minus changes in receivables in the Jones [28] (1991) model. In addition, the modified Jones model boasts better explanatory power than other models in terms of earnings management assessments for random samples. Guay et al. [19] (1996) are also convinced that the modified Jones model can derive more accurate discretionary accruals. Therefore, this paper uses the modified Jones model to calculate discretionary accruals.

Discretionary accruals are the difference between total accruals and nondiscretionary accruals:

$$DA_{i,t} = TAC_{i,t} / A_{i,t-1} - NDA_{i,t} / A_{i,t-1} \qquad (16)$$

where for period *t*, total accruals TAC_t is the net operating income minus operating cash flows, NDA_t denotes nondiscretionary accruals, and DA_t is discretionary accruals and A_{t-1} is total assets for the period *t* - 1.

Dechow, Sloan, and Sweeney [12] (1995) believe that managers can manipulate earnings by determining the timing of recognizing receivables. This can cause measurement bias in the evaluation of discretionary accruals. Hence, modifications were made to the Jones [28] (1991) model, resulting in the modified Jones model. The authors suggest that the variation in revenue should be deducted with the portion that can be manipulated in the calculation of non-discretionary accruals. In other words, the estimates of non-discretionary accruals should subtract the change in receivables.

To estimate nondiscretionary accruals, this paper estimates the coefficients of individual companies in the sampled period by using

$$TAC_{i,t}/A_{i,t-1} = \alpha_0(1/A_{i,t-1}) + \alpha_1(\Delta REV_{i,t}/A_{i,t-1}) + \alpha_2(PPE_{i,t}/A_{i,t-1}) + \varepsilon_{i,t} \quad (17)$$

where ΔREV_t denotes changes to net income in the period *t* and ε_t is the residual of the period t, to derive the parameter and plugging it into

$$NDA_{i,t}/A_{i,t-1} = a_0(1/A_{i,t-1}) + a_1(\Delta REV_{i,t} - \Delta AR_{i,t})/A_{i,t-1} + a_2(PPE_{i,t}/A_{i,t-1}) \quad (18)$$

where AR_t denotes changes to receivables in period *t* and PPE_t is the gross number of properties, plants, and equipment in period *t*. a_0, a_1, a_2, α_0, α_1, and α_2 above are all estimates. To avoid the effects of different company sizes, all variables are the deflected assets at the beginning of the period.

This paper refers to discretionary accruals as the proxy variable for earnings management (Dechow et al., [12] 1995; Giroud and Mueller, [17] 2010; Leuz et al., [31] 2010; Kima et al., [29] 2011) and the marginal profit ratio as the proxy variable for business cycles (Lima and Resende, [32] 2004; Sakakibara and Yamawaki, [37] 2008; Moren and Rodriguez, [33] 2010). The calculation of discretionary accruals is based on the modified Jones model developed by Dechow et al. [12] (1995). In a gloomy economy, operating performance often falls short of expectations and companies can reveal declining profits or simply sink into losses. Managers can then window-dress earnings reports with active earnings management. In a booming economy, operating performance is usually strong. To

maintain steady earnings, managers can be less engaged in earnings management. However, companies cannot predict the period's economic fluctuations and can only infer the current period's economic changes from the economic situation of the previous period before deciding whether to manage earnings and in which direction to nudge the numbers. Therefore, this paper defines the threshold variable as the marginal profit ratio lagged by one period.

According to the National Bureau of Economic Research, the US has experienced 11 business cycles from 1945 (the end of World War II) to 2009. The average expansion lasts 59 months (from the previous trough to the current peak) and the average contraction lasts 11 months (from peak to trough). A complete cycle is an average of 69 months (i.e., 23 quarters; see http://www.nber.org). To cover a complete business cycle, this paper therefore samples data from 23 quarters before the third quarter of 2010, that is, from the first quarter of 2005 through the third quarter of 2010.

According to the ranking of global economies (based on the nominal gross domestic product) by the International Monetary Fund (IMF), the US was the world's largest economy through the end of 2010. Any economic changes in the US therefore have a profound impact on global prosperity. Standard & Poor's constructs the S&P 500 Index from the top 500 companies with the largest market capitalization on the New York Stock Exchange (NYSE) and the National Association of Securities Dealers Automated Quotations System (NASDAQ). This index is highly representative and can thus serve as a window into the US economy. Therefore, this paper samples the top 100 companies from the S&P 500 to examine how business cycles affect earnings management. The samples must be S&P 100 companies that adopt the calendar year system and have complete data, with no gaps. In the end, this paper's sample comprises 37 companies.

Callen et al. [5] (1996) suggest that window dressing is more noticeable in the fourth quarter of each year, since the absolute value (or percentage) of accruals then is higher than in the previous three quarters. Bartov [1] (1993) samples nonfinancial companies and finds that asset disposals and profit and loss offsetting are mostly concentrated in the fourth quarter. To avoid the effects of different

financial years, this paper samples companies that adopt the calendar year system. Following Chang et al. [8] (2010), this paper classifies the S&P 100 into five industry segments: consumption (Cnsmr.), health (Hlth.), high technology (HiTec.), manufacturing (Manuf.) and other, containing 11, five, four, 16, and one company, respectively.

Table 1 summarizes the descriptive statistics for discretionary accruals in different industries. The standard deviations of discretionary accruals are 28% for consumption, 32% for health, 19% for high technology, 42% for manufacturing, and 3% for other. The variance in the use of discretionary accruals for individual companies is greatest in the manufacturing industry. The maximum and minimum values also suggest that discretionary accruals have a significant influence on annual financial reporting in the manufacturing industry. The mean of discretionary accruals in the healthcare industry is 0.0972, indicating an upward adjustment of reported earnings by using discretionary accruals. All the other industries have negative mean values.

Table 1 Summary statistics of discretionary accruals in different industry

Industry	Variables	Mean	Std.	Max.	Min.
Consumption	DA_t	-0.1116	0.2846	0.6464	-0.8314
	MPR_t	0.1338	0.0988	0.7884	-0.1972
Health	DA_t	0.0972	0.3205	0.8927	-0.4863
	MPR_t	0.1899	0.1712	1.5861	-0.2612
High Technology	DA_t	-0.0760	0.1916	0.2939	-0.4545
	MPR_t	0.0549	0.3392	0.6563	-2.9910
Manufacture	DA_t	-0.0818	0.4160	1.2634	-0.9027
	MPR_t	0.1015	0.2102	0.8882	-2.5151
Other	DA_t	-0.0199	0.0308	0.0376	-0.1076
	MPR_t	0.1171	0.0344	0.1626	0.0329

According to Table 2, the Wald, Fisher, and likelihood ratio (LR) tests show that the exponential function rejects the null hypothesis at a 99% confidence level.

Given the Akaike information criteria and Bayesian information criteria, the PSTR (as an exponential function) is a better choice. The PSTR shows that the model is non-linear with a structural change. As Table 3 shows, the Wald, Fisher, and LR tests all reject the null hypothesis, demonstratingthe model is non-linear with one structural change.

Table 2 Linearity test

Testing Statistics	LM	LMF	LR
Exponential	20.643***	10.091***	20.899***
Transition Function	(0.000)	(0.000)	(0.000)

Notes: 1. H_0: linear model against H_1: PSTR model with at least one threshold variable;
2. *** indicate significance at the 1% level.The digits in paretheses are the *p*-values.
3. LM, LMF, and LR denote the statistics of the Wald test, Fisher test, and likelihood ratio test, respectively.

Table 3 Test of remaining non-linearity

Number of Location Parameters	Testing	Statistics	*p*-value
$H_0 : r = 1 vs H_1 : r = 2$	LM	0.827	0.661
	LMF	0.394	0.675
	LR	0.827	0.661

Note: LM, LMF, and LR denote the statistics of the Wald test, Fisher test, and likelihood ratio test, respectively.

According to the estimated coefficients shown in Table 4, the threshold value is 0.72, with a transition speed of 1.39. When the economy is above this threshold, the economy is expanding; if it increases by 1%, earnings management decreases by 0.6030%. If the economy falls below the threshold value, the economy is contracting; if it declines by 1%, earnings management increases by 0.0839%. To sum up, economic recessions prompt earnings management.

Table 4 Parameter estimates for the PSTR models

	β_0	β_1
MPR_t	0.6030***	-0.6869***
	(8.85)	(-8.01)
Threshold value	0.72	
Transition speed	1.39	

Notes: The corresponding t-values are reported in parentheses.
*** indicate significance at the 1% level.

V. Conclusion

This paper finds a non-linear relationship between business cycles and earnings management. When the business cycle is above a threshold value, the economy is expanding and if it continues to do so, discretionary accruals will increase. When the business cycle is below a threshold value, the economy is contracting and if it continues to deteriorate, discretionary accruals will decline. These findings suggest that managers seek to blame inefficient operations on the poor economy. In contrast, when the economy is in an upswing, they nudge up reported earnings to signal that business is improving.

Managers refrain from earnings management in a booming economy because of dividend plans or earnings smoothing. Generally speaking, earnings management is more pronounced in a recession. It is suggested that the competent authorities tighten up the audits of financial reports during a gloomy economy. External users of financial reports should also adopt a conservative attitude when interpreting reported earnings during an economic depression.

This paper examines the management or manipulation of financial numbers in finance. The results suggest that managers manipulate and manage earnings to protect jobs, prevent losses or earnings decline, support share prices, and avoid compensation cuts or unemployment. They seek to ensure that financial results are in line with the expectations of management or stakeholders and hence influence the perception of external investors regarding company performance. Under generally accepted accounting principles, managers have certain discretion

concerning the selection of accounting methods and reporting procedures. According to agency theory, managers have the incentives and capabilities to manage earnings under information asymmetry. They manipulate financial results and sacrifice the interest of external parties. Under certain contracts or events, managers can achieve predetermined earnings target by using discretionary accruals. Although discretionary accruals eventually reverse, managers still have the motivation to transfer profits from one year to another. Due to the conflicts of interest between shareholders and managers, earnings management clouds real performance and prevents investors from making correct decisions. The result is an increase of potential agency costs to shareholders.

This paper believes that the constituents of S&P 100 are large firms with high transparency. Earnings management can be spotted easily and affects share prices and personal reputations. Hence, managers are less motivated or less willing to manage earnings. The findings of this paper can serve as a reference to investors, creditors, and other users of accounting information in decisions over investments, lending, and other issues so they can approach financial reports with caution and discern potential earnings management. The competent authorities should also demand more information from companies and set up relevant requirements and policies to mitigate certain management behaviors and motivations. The research findings can serve as a reference to the authorities concerning the formation of corporate governance policies.

This paper applies the modified Jones model to calculate discretionary accruals as a proxy for earnings management. The literature provides other methods to calculate discretionary accruals. In practice, managers have multiple options for earnings manipulate. It is suggested that follow-up studies use other proxies for earnings management for further examination.

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