

國立交通大學

管理科學系

博士論文

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公司盈餘管理對其股票流動性之影響效果
The Effect of Earnings Management on Equity Liquidity

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摘要

本研究旨在探討公司盈餘管理行為對其股票流動性之影響。盈餘管理在許多情況下會使公司內部人與外部人之間產生利益衝突，本研究假設盈餘管理程度較高的公司將導致較嚴重的資訊不對稱，市場上的流動性供給者因為預期將面對較高的逆選擇風險，而會加大買賣價差，及致流動性較低。本研究使用 2001 年美國爆發一連串會計醜聞及 2002 年美國通過沙賓法案(the Sarbanes-Oxley Act)為樣本期間，實證結果顯示，盈餘管理程度高的公司，其股票確有較高的買賣價差及較低的流動性。

關鍵詞: 股票流動性、逆選擇成本、盈餘管理

The Effect of Earnings Management on Equity Liquidity

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ABSTRACT

This study sets out to investigate the relationship between earnings management and equity liquidity, positing that as incentives arise for the misrepresentation of firm performance through earnings management, a higher degree of earnings management may signal greater adverse selection costs. If the manipulation of earnings reveals aggressive accounting practices, liquidity providers may tend to widen the bid-ask spreads so as to protect themselves. The empirical results, based upon stocks listed on the NYSE and the NASDAQ, indicate that companies with a high degree of earnings management incur higher trading costs.

Key words: Liquidity; Adverse selection costs; Earnings management

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Chapter 1 Introduction

In order to allow the firm performance to be more properly expressed, accounting permits discretion in the application of the accounting methods used to report financial statements; however, when this discretion is intentionally used to manage a company's reported results, this is known as 'earnings management'. There are of course various motives behind earnings management; and indeed, there are many circumstances in which managers may conduct aggressive earnings management for their own private benefits. For example, recent studies have shown that stock-based compensation induces executives to engage in earnings management by which they may benefit at the expense of shareholders (Park and Park, 2004; Bartov and Mohanram, 2004; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Burns and Kedia, 2006), whereas Erickson, Hanlon, and Maydew (2006) find no consistent evidence to show that executive equity incentives are associated with fraud.

This paper sets out to investigate the effect of earnings management on equity liquidity, positing that there are several reasons why companies with higher levels of abnormal accruals will incur higher liquidity costs. First of all, aggressive earnings management indicates a lower quality and availability of corporate accounting information (Sloan, 1996; Dechow and Dichev, 2002), which may well lead to an increase in the proportion of informed traders in the firm's equity, along with a corresponding decline in the willingness of uninformed traders (liquidity

traders) to trade in such equities with abnormal accruals.

Secondly, since there is abundant evidence to show that there are many circumstances in which managers can conduct aggressive earnings management for their own private benefits, liquidity traders recognize that there are adverse selection costs involved in earnings management, with such costs having been clearly demonstrated by the recent corporate accounting scandals. In periods of corporate financial reporting crises, managerial agency costs are particularly severe for those firms with high discretionary accruals; as are the information asymmetry costs. Cohen, Dey, and Lys (2008) suggest that there is a significant increase in firms' management of their accounting earnings during the period prior to the SOX. Jain et al. (2008) also find that the reported financial scandals have led to a higher adverse selection component for spreads, and a decline in investor confidence.

Within the literature on market microstructure, one of the major components of the bid-ask spread is adverse selection costs, with the adverse-selection component compensating market-makers for losses incurred on trades against informed traders. With a rise in the incentives to manipulate firm performance through earnings management (due, in part, to a conflict of interest between firms' insiders and outsiders), earnings management increases the adverse selection costs for equity investors; hence, a higher degree of earnings management may signal greater asymmetric information costs. Although sophisticated market makers can sense earnings management performed by managers and calculate

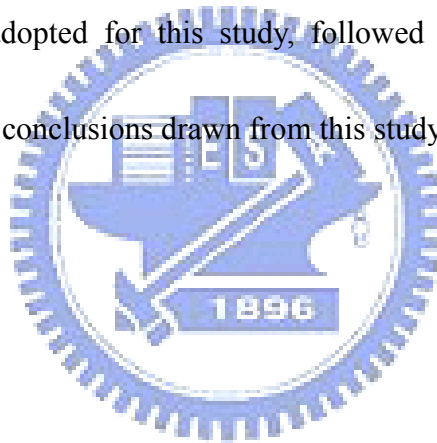
discretionary accruals based upon reported financial information, they are uncertain about how much private information the insiders have and how much the manipulated earnings is. Since those companies with high abnormal accruals will incur higher asymmetric information costs, thereby increasing the probability of trading against informed traders, the uninformed liquidity providers will incur relatively higher costs; they will therefore offer wider bid-ask spreads, whereupon the information asymmetry gets higher.

Although some of the prior studies have already dealt with the relationship between asymmetric information costs of capital and earnings management (Chan, Chan, Jegadeesh, and Lakonishok, 2004), few works have undertaken an examination of the effect of earnings management on equity liquidity. Given the recent period of crisis in the reporting of corporate accounts, it is believed that the analysis may be particularly informative in terms of providing a better understanding of the impact of earnings management. Using NYSE trade and quote (TAQ) data, this study aims to investigate the relationship between earnings management and equity liquidity during the recent crisis period in financial reporting. This period of crisis, sparked off by the revelations at Enron and WorldCom and the decline of investor confidence (Jain, Kim, and Rezaee, 2008), provides us with a valuable opportunity to examine the above hypothesis, and indeed, the results reveal that companies' absolute discretionary accruals do have a significant predictive role on the current percentage spreads of their equity.

The results suggest that aggressive earnings management increases information

asymmetry, and hence, reduces liquidity in the equity market; thus, the greater the information asymmetry between insiders and outsiders, the greater the likelihood of a firm manipulating its earnings. The results also show that the effects of earnings management on equity liquidity may appear to have been more severe after the promulgation of the Sarbanes-Oxley (SOX) Act.

The remainder of this paper is organized as follows. Chapter 2 discusses the background of the SOX Act and the extant literature. Chapter 3 provides a description of the data and the research methodology adopted for this study, followed by presentation of the empirical results in Chapter 4. The conclusions drawn from this study are provided in Chapter 5.



Chapter 2 Background and literature review

2.1 Background of SOX

To respond to an increasing number of financial restatements by eminent companies, and an erosion in market confidence, President Bush signed into law on July 30, 2002, the Public Company Accounting Reform and Investor Protection Act of 2002, better known as the Sarbanes-Oxley act of 2002 (SOX). SOX is one of the most far-reaching legislations stipulating the conduct of firms, corporate boards, executives, auditors, lawyers, and financial analysts, and imposes unprecedented requirement on them. The main purpose of SOX is to restore integrity to financial reports and reestablish investors' confidence in corporate mechanism, financial reports and related audit functions. SOX sets an independent regulatory structure for accountants who audit public companies, increases disclosure and reporting requirements to improve transparency of firms, increases criminal penalties for violations of related laws, changes accountants' relationship with their clients and audit committees, requires senior executives to certify reports filed with the SEC.

SOX immediately impacts CEOs and CFOs of publicly traded companies. The SEC adopted a rule that by August 14, 2002, the CEOs and CFOs of 947 firms with revenues of \$1.2 billion or more were required to sign concrete certification testifying the accuracy and completeness of financial filings with the commission. The act expanded this requirement to

all filing firms and charged a felony for erroneous certifications. It is required that each quarterly and annual financial report must be accompanied by a certification signed by the firms' principal executive officer and principal financial officer. The certification must affirm that (1) the signing officer has reviewed the report; (2) it contains no material misstatements; (3) the financial statements, and other financial information included in the report, fairly present in all material respects the financial condition and results of operations; (4) the signing officers are responsible for establishing and maintaining adequate and effective internal controls; and (5) any significant deficiencies in internal control have been disclosed to the company's independent auditors and the audit committee. Appendix A summarizes some of the important provisions of SOX. The main contents include establishment of Public accounting Oversight Board (PCAOB) and independence of auditor and audit committee, rotation of auditors, prohibition of non-audit services contemporaneously with audit services by accounting firms, certification requirement, disclosure of insider trading, assessment of internal controls, whistleblower protections, criminal penalties for violations of securities laws.

2.2 Related literature

Accounting firms undertake audits after clients close their accounts and provide after-closing trial balance. One CPA has to undertake audit and prepare reports within two or three months for many clients. Time pressure and audit effort will affect the probability that

the auditor detects an existing problem (Caramanis and Lennox, 2008). Furthermore, auditor independence also affects the likelihood of an auditor reporting a problem once it has been detected. Prior works have examined that earnings management is related to factors that could weaken auditor independence, including audit fees, non-audit service fees, client importance and audit firm tenure (Reynolds and Francis, 2000; Frankel et al., 2002; Myers et al., 2003). The findings of these studies suggest that audited financial reports are not guaranteed to be free of earnings manipulation.

Accrual-based accounting, the most commonly adopted accounting practice, reports income and expenses as they take place, as opposed to cash-based accounting which reports income as it is received and expenses when they are paid. One role of accruals is to shift, or adjust, the recognition of cash flows over time so that the adjusted numbers (earnings) better measure of firm profitability. Under the accrual method, firms do have some discretion with regard to when income and expenses are recognized. However, accruals require assumptions and estimations. When this discretion is intentionally used to manage a company's reported results, this is known as 'earnings management'.

Firm executives may record receivables to accelerate the recognition of revenue, or delay the recognition of expenses, so as to overstate their earnings. Insiders (such as company executives) can use their control for personal benefit at the expense of other stockholders. For instance, Bartov and Mohanram (2004) suggest that managers may inflate

earnings through accruals management in the period leading up to the abnormally large stock option exercise. Whilst the use of ‘discretionary accruals’ is not the only earnings management tool, this is the most controllable tool for executives and is the most widely used measure of earnings management in the prior studies (see, for example, Teoh et al., 1998a, 1998b; Leuz et al., 2003).

Although some of the prior studies demonstrate that earnings smoothing enhances the information value of reported earnings (Wang and Williams, 1994; Subramanyam, 1996), Jensen (2005) nevertheless argues that the smoothing of earnings to meet market projections actually leads to poor decisions that can ultimately undermine the value of a firm. Leuz, Nanda, and Wysocki (2003) also argue that insiders attempt to use earnings management to conceal the actual firm performance, and thereby protect their private control benefits.

Aggressive earnings management and poor disclosure deteriorate the information asymmetry problem. When market makers face with higher asymmetric information costs, they would widen the bid-ask spreads to afford themselves some measure of price protection. Accordingly, keeping other factors constant, information asymmetry will result in a wider bid ask spread and lower stock liquidity (Glosten and Milgrom, 1985). Prior studies have suggested that aggressive earnings management increases information asymmetry between insiders and outsiders, has the potential of reducing shareholders’ wealth, and demonstrates lower accounting quality. For example, Teoh et al. (1998a, 1998b) report that initial public

offering (IPO) and subsequent equity offerings (SEO) issuers who manage earnings aggressively and show how outside shareholders can be harmed by the practice of earnings management. The evidence provided by Sloan (1996) and Dechow and Dichev (2002) also shows that high accrual levels signified lower quality and less persistent earnings.

It has been suggested that executive compensation provides incentives for earnings management, an observation first proposed by Healy (1985) who demonstrates that earnings management is related to earnings-based compensation. More recently, a number of other studies have provided further support for the argument that stock-based compensation motivates greater earnings management (Bergstresser and Philippon, 2006; Burns and Kedia 2006; Cheng and Warfield, 2005). Thus, earnings management could provide a clear and important signal indicating that managers are pursuing their own private benefits at the expense of shareholders' wealth.

A good investor protection environment will minimize the costs of information asymmetry and reduce the probability of expropriation by managers (Chung, 2006). It is suggested that whilst insiders would be likely to engage in earnings management so as to divert the firm's resources to themselves, an effective set of laws and strong enforcement may, nevertheless, reduce such insiders' incentives and mitigate their diversionary activities (Leuz et al., 2003; Burgstahler and Phillippon, 2006). It is also shown that earnings management was negatively associated with investor protection and highlighted the important roles to be played

by laws and legal protections as determinants of earnings management.

The purpose of the SOX Act was to improve the accuracy and reliability of corporate disclosures and to reduce the likelihood of financial reporting misstatements. The Act stipulates the requisite conduct of firms, and also requires corporate boards, executives and auditors to take specific measures to bring about greater corporate accountability and transparency. Cohen et al. (2008) suggest that the management of earnings by firms had increased to its highest peak at the time of the passage of the SOX Act, followed by a significant decline.



Chapter 3 Data source and methodology

3.1 Data source

This study analyses data on stocks traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX) and the NASDAQ to examine the cross-sectional relationship between earnings management and liquidity (i.e., the percentage bid-ask spread). The trading characteristic variables, such as trading volume, price and firm size, are obtained from CRSP and COMPUSTAT. In similar fashion to Huang and Stoll (1996), this paper selects those stocks which had an average price in excess of \$1.00 and which had an average total of four or more daily trades.

This study focuses on the relationship between EM and equity liquidity during the recent period of financial reporting crises and the period after the promulgation of the Sarbanes-Oxley (SOX) Act. On 16 October 2001, Enron announced that it was reducing both its post-tax net income (by US\$544 million) and its shareholder equity (by US\$1.2 billion), and subsequently declared bankruptcy on 2 December 2001. President George W. Bush signed the bill into law on July 30, 2002. One after another, NYSE and NASDAQ announced the governance proposal recommended by board committee and submitted the proposals to SEC from August to October 2002. This timeline suggests that the most severe period of corporate accounting scandal was the fourth quarter of 2001 and also reveals that new

governance rule took months to develop and pass. We therefore choose October-December 2001 and October-December 2002 as our sample period, corresponding with the Enron crisis period and promulgating the SOX Act.

This paper obtains the intraday transaction and quote prices from the NYSE TAQ database and deletes all trades and quotes that are out of time sequence, as well as those involving any errors. This paper also omits any quotes falling within the following three conditions: (i) where either the bid or the ask price is equal to, or less than, zero; (ii) where either the bid or the ask depth is equal to, or less than, zero; and (iii) where either the price or volume is equal to, or less than, zero.

Following Huang and Stoll (1996), this paper attempts to further minimize data errors by eliminating any data with the following characteristics: (i) all quotes with a negative bid-ask spread, or a bid-ask spread of greater than US\$4; (ii) all trades and quotes which took place either 'before-the-open' or 'after-the-close'; (iii) all P_t trade prices, where: $|(P_t - P_{t-1})/P_{t-1}| > 0.1$; (iv) all a_t ask quotes, where $|(a_t - a_{t-1})/a_{t-1}| > 0.1$; and (v) all b_t bid quotes, where $|(b_t - b_{t-1})/b_{t-1}| > 0.1$.

This paper identifies an initial sample of firms included in the Russell 3000 index; however, base upon their different accrual procedures, all banks and financial institutions (comprising of 676 firms with SIC codes 6000-6999) are excluded from the sample. Furthermore, firm numbers must be higher than six in any given industry for the

cross-sectional estimation of the modified-Jones model, and the necessary related financial data on COMPUSTAT must also be available to estimate the measures of earnings management and the financial control variables. For inclusion in the final sample, firms must have available stock return and price data on CRSP and trade and quote data on the TAQ database. To control for the possible influence of extreme observations, we winsorize all observations below the 1 and above the 99 percentile of observations. The total numbers of quotes in the October to December 2001 sample data was 14,322,366, whilst the total number of trades was 12,140,496. The final sample comprised of a total of 999 firms in 44 industries (see Appendix B).

Since liquidity is a multifaceted concept, and since turnover has been widely used as a proxy for liquidity in previous studies (Brockman et al., 2008), this study also uses turnover as an additional measure of liquidity. This work defines *TURNOVER* as the log value of the average daily trading volume divided by total shares outstanding. Since firms with aggressive EM incur higher asymmetric information costs, decreasing the trading intention of uninformed investors, this study expects that *TURNOVER* will be deduced. Furthermore, since firms with higher turnover are actively followed by outside capital markets, such firms may be less able to hide EM behavior, thus reducing the level of discretionary accruals. This study thus expects a simultaneous and negative relationship between *EM* and *TURNOVER*.

3.2 Earnings management measures

Although there is no perfect method of measuring earnings management behavior, a widely accepted proxy is the modified-Jones model; indeed, evidence is presented by Dechow, Sloan, and Sweeney (1995) to show that this model is extremely powerful in detecting sales-based manipulations. This paper uses the quantity of such manipulations, referred to as ‘discretionary current accruals’, to measure abnormal accruals, following the standard methodology to measure such discretionary current accruals (Jones, 1991; Dechow et al., 1995; Sloan, 1996; Teoh, Welch, and Wong, 1998a).

In order to estimate ‘non-discretionary accruals’, this paper regresses the accruals on the change in sales. In particular, this paper estimate the parameters of the following modified-Jones model, a cross-sectional ordinary least squared (OLS) regression model¹:

$$\frac{Accruals_{i,t}}{TA_{i,t-1}} = \omega_0 \frac{1}{TA_{i,t-1}} + \omega_1 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

where $Accruals_{i,t}$ refers to the current accruals for firm i in year t , measured as the change in non-cash current assets minus the change in non-debt current liabilities and depreciation expenses; $\Delta SALES_{i,t}$ is the change in sales for firm i in year t ; and $TA_{i,t-1}$ is the book value of total assets for firm i from the previous year. The regression equation is deflated by lagged total assets in order to reduce heteroskedasticity. Estimation of the regression coefficients is

¹ The average adjusted R^2 for all industries in Eq. (2) is 36.53% for 2001, and 34.15% for 2002.

carried out for each industry, with those industries with fewer than six observations being excluded from the analysis.

Following Dechow et al. (1995), this paper estimates the non-discretionary accruals (*NDA*) for each sample firm as follows:

$$NDA_{i,t} = \hat{\omega}_0 \frac{I}{TA_{i,t-1}} + \hat{\omega}_1 \frac{(\Delta SALES_{i,t} - \Delta TR_{i,t})}{TA_{i,t-1}} \quad (2)$$

where $\hat{\omega}_0$ and $\hat{\omega}_1$ are OLS estimates for the regression parameters in Equation (1) and $\Delta TR_{i,t}$ is the change in trade receivables, subtracted to allow for the possibility of credit sales management by the company (Teoh, Welch, and Wong, 1998b). The results of the paper are robust to omitting this adjustment, ΔTR (see the Appendix D). The discretionary accrual (*DA*) is then the remaining portion of the accruals:

$$DA_{i,t} = \frac{Accruals_{i,t}}{TA_{i,t-1}} - NDA_{i,t} \quad (3)$$

In an attempt to avoid dampening fluctuations in their performance, managers may use reporting discretion to misrepresent the economic performance of their firms. For example, managers may overstate their reported earnings to achieve certain targets in specific instances, such as an equity issues (Teoh et al., 1998a). On the other hand, managers may also choose to manipulate their reported earnings downwards when pre-managed earnings exceed threshold earnings by a substantial amount (Degeorge, Patel, and Zeckhauser, 1999), or when managers' account-based bonuses are at their maximum (Healy, 1985; Holthausen, Larcker,

and Sloan, 1995). Accordingly, following Richardson (2000) and Leuz et al. (2003), the hypothesis of this work does not rely on the direction of the discretionary accruals but rather on the magnitude; thus, the measure of earnings management (*EM*) is based on the absolute value of *DA*.²

3.3 Measures of liquidity

3.3.1 Bid-ask spread

This research uses the percentage spread as the measure of liquidity, which is then averaged for each security over each period within the overall sample period. The nominal spread of security *i* at time *t*, *Traded Spread*_{*it*}, is calculated as $a_{it} - b_{it}$, where a_{it} and b_{it} are the respective intraday ask and bid prices at time *t* for security *i*. The percentage spread of security *i* (*PSP*_{*i*}) is calculated as:

$$PSP_i = \text{mean of } \frac{a_{it} - b_{it}}{(a_{it} + b_{it}) / 2} \quad (4)$$

3.3.2 Information asymmetry component

In the literature on market microstructure, the bid-ask spread is modeled as arising from three sources, order-processing, asymmetric information, and inventory holding costs due to risk aversion (McInish and Van Ness, 2002). The asymmetric information component compensates the market maker for losses incurred on trades against informed traders. In a

² For the robustness, I also perform the tests with *DA* as the proxy of earnings management. The empirical results are similar. The firms with the bigger magnitude of *DA* (whether positive or negative) have less stock liquidity.

market with asymmetric information, the uninformed must always bear the cost of trading against those who are more informed, essentially because informed traders will sell at the bid price if they have information confirming that the actual price is lower, and will buy at the ask price if they have information which justifies a higher price. If high absolute discretionary accruals signals higher agency problems, and thus higher asymmetric information costs, these costs may be positively related to the extent of earnings management.

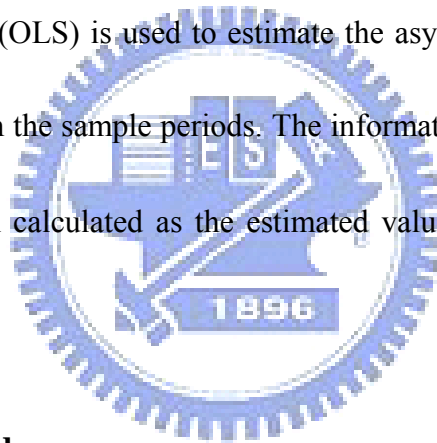
This paper goes on to investigate the impact of earnings management on the asymmetric information component of the equity bid-ask spread. This issue is examined by testing the relationship that exists between the measures of earnings management and the asymmetric information costs of the equities. After comparing several structural models, Van Ness, Van Ness, and Warr (2001) concluded that no single model appeared to perform better than any other. This study uses the method adopted by George, Kaul and Nimalendran (1991) (hereafter GKN approach) since McNish and Van Ness (2002) document that GKN approach strongly supports the hypotheses that asymmetric information component is positively related to risk and information. GKN approach shows that the difference between transaction returns and bid returns can filter out the serial dependence in returns. The resulting estimate of the adverse selection component is expressed as:

$$2RD_t = \pi s_q \Delta Q_t + u_t, \quad (5)$$

where RD_t is the difference between transaction return and bid-to-bid return immediately following the transaction return at time t , π is the order-processing component, $1-\pi$ is the adverse selection component, s_q is the percentage quoted bid-ask spread, Q_t is the trade indicator defined by the Lee and Ready (1991) algorithm, and u_t is the disturbance term. By adding an intercept to the above equation and relaxing the assumption that s_q is constant, this paper has:

$$2RD_t = \pi_0 + \pi_1 s_{qt} \Delta Q_t + u_t \quad (6)$$

Ordinary Least Squares (OLS) is used to estimate the asymmetric information components, $(1-\pi_1)$, for each stock in the sample periods. The information asymmetry components of the bid-ask spreads are then calculated as the estimated value of $(1-\pi_1)$ times the percentage spread.



3.4 Econometric methods

As noted in McNish and Wood (1992), Madhavan (2000) and Stoll (2003), it is established in some of the prior studies that cross-sectional variations in spreads can be explained by economic variables, and that the relationship between the spread of a security and the trading characteristics of that security is one of the strongest and most robust relationships in finance. Demsetz (1968), for example, find that spreads are positively related to price and volume, whilst Stoll (1978) documents that spreads are positively related to volatility. These studies have also

suggested that firm size can be used as a control variable (Stoll, 2000; 2003).

Following Stoll (2000), the average of each of the underlying variables is taken across all of the days in the overall sample period in order to reduce the errors associated with a single day. This paper investigates the following regression model in order to control for the factors that might be important in determining the spreads:

$$PSP_i = \alpha_0 + \alpha_1 EM_i + \alpha_2 SDRET_i + \alpha_3 LNTV_i + \alpha_4 LNCLP_i + \alpha_5 LNTR_i + \alpha_6 LNMV_i + \alpha_7 DEXCH_i + \varepsilon_i \quad (7)$$

where PSP_i is the average of the percentage spread for equity i ; EM_i is the measure of earnings management calculated using the method referred to in the previous subsection; $SDRET_i$ is the standard deviation of daily stock returns without dividends. $LNTV_i$ is the natural log of average daily trading dollar volume; $LNCLP_i$ is the natural log of the mean daily closing stock price; $LNMV_i$ is the natural log of the market value of firm i (i.e. the closing price at the end of sample period multiplied by the company's common shares outstanding), and $LNTR_i$ is the natural log of the average daily total number of trades.

The accounting accruals are adjustments to cash flows, and should sum to zero over the life of a corporation. If managers manipulate the earnings of a firm, the effects of the manipulation will ultimately unwind and such corrections will subsequently be reversed, or realized, as the same account; as such, upwardly managed accruals are expected to be followed by downwardly managed accruals. Chan, Jegadeesh, and Sougiannis, (2004)

demonstrate that earnings management causes a negative relationship between current accruals and future earnings; hence, the absolute value of discretionary accruals will be positively autocorrelated.

When information asymmetry is high, shareholders do not have sufficient resources to monitor managers' actions; thus, earnings management can occur. Richardson (2000) shows that the proxy variable for information asymmetric costs (the bid-ask spread) could affect earnings management; hence, in the model, earnings management is endogenous³, which demonstrates that an instrumental variable estimation procedure is more appropriate for the model structure. Following the prior studies, this paper adopt 'debt to asset ratio', 'quarterly operating cash flow volatility', 'firm size', 'market-to-book ratio', 'net revenue growth' and 'return on assets' as the instrumental variables used to estimate Equation (7).

The empirical research design of the relationship between earnings management and equity liquidity comprises of two parts. Firstly, since the main research interest of this research focuses on the effects of earnings management on equity liquidity especially in the periods of corporate financial crises, this paper considers the estimation of Equation (7) for the period from October to December 2001. In order to ensure the timely disclosure of operating results and financial position, firms must announce interim financial report and any unscheduled material events or corporate changes that are deemed to be of importance to

³ To test for endogenous relationship, this study performs the Hausman-Test. The test results reject the null hypothesis and instrument variable is suitable for Equation (7).

shareholders or the SEC during the accounting year. For example, listed firms must announce quarterly financial reports and monthly sales. Firms may also hold investor conference and earnings conference calls which provide a setting to study the implications of public information's complementary role. The sample periods of our study are last quarters of 2001 and 2002 which are close to the end of the two fiscal years. Much accounting information of the accounting year (for example: the 3rd quarterly accounting report and earnings conference calls) have been released by firms and been interpreted by market participant.

Furthermore, to some extent, earnings management is an overall accounting arrangement, and some time is required for the discretionary accruals to be adjusted. For example, if managers manipulate their earnings, the effects of such manipulation will ultimately unwind and eventually be reversed at the same amount, albeit coming into play during subsequent periods. Consequently, those firms with higher earnings management in the previous period may still have relatively higher earnings management in the near future.

Accordingly, although market makers and liquidity suppliers do not have any access to explicit financial reports of firms and any public information on abnormal discretionary accruals during the sample period, they can use interim financial information to conclude the degree of earnings management. Since simultaneity may well exist between earnings management and the liquidity of a firm, this study conducts a simultaneous equation model and estimate Equation (7) by the three stage least squared (3SLS), which uses 'debt to assets

ratio', 'quarterly operating cash flow volatility', 'firm size', 'market-to-book ratio', 'growth opportunity' and 'return on assets' as the instrumental variables.

Finally, in order to investigate the impact of earnings management on the adverse selection components of the equity bid-ask spread, this paper also tests the relationship between earnings management and the information asymmetry component using the GKN approach.

3.5 Instrumental variables

3.5.1 Leverage

Firms facing financial constraints or debt covenants may have incentives to manage earnings in order to avoid financial problems and potential penalties. DeAngelo, DeAngelo, and Skinner (1994) report evidence of abnormal accruals when firms are faced with debt covenants, whilst Dechow, Sloan, and Sweeney (1996) also demonstrate the need for the avoidance of debt covenants as a motivation for earnings manipulation.

Although this debt-covenant scenario will predict a positive relationship between earnings management and financial distress, if lenders are to closely monitor the earnings of highly indebted firms, the degree of earnings management may decline with financial leverage. This paper therefore adopts financial leverage, determined by the ratio of total debt to total assets, as a proxy for the proximity to covenants and the association with the

existence and rigidity of such covenants.

3.5.2 Operating cash flow volatility

When firms are faced with operating risk or economic shocks, there may be a tendency amongst managers to conceal the underlying performance of such firms by using their accounting discretion to buffer cash flow shocks and to smooth the reported operating earnings; i.e., to effectively reduce the volatility of the firm's reported earnings (Leuz et al., 2003). Managers may decide to accelerate future revenues or to delay current costs in order to hide poor pre-management earnings. Conversely, they may underreport current revenues or accelerate current costs when pre-management earnings are high. Accordingly, high volatility in pre-management earnings is accompanied by high abnormal accruals. Following Peasnell, Pope, and Young (2005), this paper uses operating cash flow as the instrument for pre-management earnings in order to capture the economic performance of the firms, and then use the volatility of operating cash flow as a proxy for the firms' risk (Richardson, 2000).

3.5.3 Firm size

Zmijewski and Hagerman (1981) provide evidence to show that political costs increase with firm size. Managers of large firms may have greater incentives to manipulate earnings in order to reduce costs; on the other hand, since they are actively followed by outside capital

markets, such firms may be less able to hide earnings management behavior, since the level of information transparency and disclosure increases with firm size. This study therefore uses the logarithm of total assets as a proxy to capture the size of the firm and its information environment.

3.5.4 Growth opportunity

Given that it is much more difficult to scrutinize the activities of rapidly-growing firms, it is much easier for such firms to manage their earnings than slower-growing firms. Dechow et al. (1996) demonstrate that those firms which are alleged to have violated GAAP by overstating their reported earnings have higher market-to-book ratios vis-à-vis a control group, and suggest that investors expect these firms to have higher growth opportunities. Park and Shin (2004) also find that earnings management has a positive correlation with the growth opportunities for a firm, whilst Richardson (2000) posits that earnings management has a positive correlation with sales growth. Accordingly, this study measures the current and future growth opportunities for a firm by net revenue growth and market-to-book ratio, respectively.

3.5.5 Operating performance

Given that, in many companies, the stock price and managers' compensation are tied to earnings performance (Holthausen et al., 1995; Lee, Li, and Yue, 2006), this may motivate managers to

engage in earnings manipulation; a positive relationship between discretionary accruals and the profitability of firms is also found by McNichols (2000) and Lee et al. (2006). Following that, this study adopts ROA as a proxy to capture the performance of firms.



Chapter 4 Empirical results

4.1 Descriptive statistics

Table 1 reports the average values and other summary statistics for percentage spread (*PSP*), the measure of earnings management (*EM*) and other firm-specific trading and financial variables. The final sample in pre-SOX period comprised of a total of 999 firms in 44 industries. Among the sample firms, 537 corporations are listed on the NASDAQ and 457 (5) corporations are listed on the NYSE (AMEX). *EM* is approximately 6.72 per cent of total assets, ranging between 61.53 per cent and 0.01 per cent. The highest average percentage spread value is 4.27 per cent, while the lowest percentage spread is 0.04 per cent.

Table 2 presents the correlation coefficient matrix of the variables, thereby providing some basic analysis of the correlation between variables. A preliminary analysis of the details provided in Table 2 indicates that percentage spread (*PSP*) has a positive correlation with *EM*. Furthermore, this study finds that percentage spread (*PSP*) has a negative correlation with trading characteristic variables, such as trading dollar volume (*LNTV*), number of trades (*LNTR*), closing price (*LNCLP*) and market value (*LNMV*), but that it has a positive correlation with standard deviation of returns (*SDRET*). *EM* has a negative correlation with firm leverage (*LEV*) and profitability (*ROA*), but that it has a positive correlation with cash flow volatility (*CFVAR*) and market-to-book ratio (*MB*).

Table 1 Descriptive statistics of the variables

Variables ^a	Descriptive Statistics			
	Mean	Max.	Min.	Std. Dev.
EM	0.0675	0.6153	0.0001	0.0571
PSP	0.0047	0.0427	0.0004	0.0056
SDRET	0.0328	0.1154	0.0090	0.0146
LNTV	8.6573	14.5068	3.2033	1.9892
LNCLP	2.9525	6.2477	0.1670	0.7040
LNTR	3.7542	8.7139	1.1221	1.3400
LNMV	7.2600	13.4813	2.5254	1.6385
LEV	0.2077	0.7941	0	0.1768
LTA	6.8537	12.6884	2.2569	1.5835
MB	3.3117	25.5750	0.1390	2.8696
CFVAR	1.5904	13.7251	0.1435	1.8258
ROA (%)	1.8932	24.2570	-75.8810	12.0446
GROWTH	0.0567	3.3853	-0.9688	0.3006

Notes:

^a *EM* is the absolute value of the discretionary accruals for the year 2001; *PSP* is the average percentage spread for the sample period, 1 October to 31 December 2001; *SDRET* is the standard deviation of daily stock returns; *LNTV* is the natural log of average daily trading dollar volume; *LNCLP* represents the natural log of the average closing stock price; *LNTR* is the natural log of the average daily total number of trades; *LNMV* is the natural log of the market value of the firm at the end of 2001; *LEV* is the debt to total asset ratio; *LTA* represents the natural log of total assets at the end of 2001; *MB* is the market to book ratio (i.e., the closing price at the end of 2001 multiplied by the company's common shares outstanding, divided by common equity as reported); *CFVAR* represents the standard deviation of quarterly operating cash flows over the past three years divided by the average quarterly operating cash flows over the period; *ROA* is the return on assets for 2001; and *GROWTH* is the net revenue for 2001 less the net revenue for 2000, divided by the net revenue for 2000. Total number of sample = 999.

Table 2 Variable correlations

Variables ^a	Correlation Coefficients ^b											
	PSP	SDRET	LNTV	LNCLP	LNTR	LNMV	LEV	LTA	MB	CFVAR	ROA	GROWTH
EM	0.054*	0.201***	0.045	-0.114***	0.093***	-0.016	-0.063**	-0.028	0.102***	0.091***	-0.278***	-0.015
PSP		0.419***	-0.696***	-0.679***	-0.531***	-0.668***	-0.044	-0.556***	-0.200***	0.132***	-0.279***	-0.008
SDRET			-0.096***	-0.540***	0.159***	-0.387***	-0.146***	-0.394***	-0.029	0.191***	-0.443***	0.023
LNTV				0.592***	0.909***	0.8759***	-0.019	0.678***	0.403***	-0.133***	0.144***	0.063**
LNCLP					0.374***	0.643***	0.018	0.465***	0.303***	-0.183***	0.356***	0.088***
LNTR						0.693***	-0.128***	0.469***	0.401***	-0.086***	-0.009	0.055*
LNMV							0.042	0.803***	0.356***	-0.215***	0.285***	0.015
LEV								0.376***	-0.077**	-0.070***	-0.02415	0.013
LTA									0.002	-0.150***	0.189***	-0.107***
MB										-0.119***	0.020	0.191***
CFVAR											-0.129***	0.019
ROA(%)												0.055*

Note:

*** indicates significance at the 1 per cent level; ** indicates significance at the 5 per cent level; and * indicates significance at the 10 per cent level.

4.2 Effects of earnings management on equity liquidity

4.2.1 Evidence from the Enron crisis period

The first sample period in this study covers the period from 1 October 2001 to 31 December 2001. This study examines the effects of earnings management on equity liquidity based on the *EM* for the year 2001, which could provide tests on the information content of the *EM* for the present year.

Although the main proposition in this paper is that earnings management positively affects the bid-ask spread, Richardson (2000) demonstrates that the bid-ask spread has a positive effect on the earnings management behavior of a firm; in other words, discretionary accruals could be simultaneous. This paper therefore estimates the regression model using the three-stage least squared (3SLS) method. Table 3 (Table 4) presents the regression results for the simultaneous equation model on *EM* and the percentage spread (stock turnover) for the Enron crisis period.

Table 3 3SLS regression results of *EM* and *PSP*, October-December 2001

Variables ^a	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A				
Intercept	0.0170 ***	17.60	0.0101 ***	10.43
EM	0.0180 **	2.38	0.0236 ***	3.36
SDRET	0.1193 ***	9.81	0.1012 ***	9.34
LNTV	-0.0026 ***	-10.84	-0.0005 *	-1.89
LNCLP	-0.0015 ***	-6.25	-0.0023 ***	-10.41
LNTR	0.0004 *	1.66	-0.0027 ***	-9.48
LNMV	0.0011 ***	6.02	0.0012 ***	7.55
DEXCH			0.0047 ***	15.86
Panel B				
Intercept	0.0169	1.22	-0.0025	-0.20
PSP	-1.7008 ***	2.88	2.2035 ***	4.43
LEV	-0.0325 ***	-3.16	-0.0295 ***	-3.04
CFVAR	0.0018 **	2.03	0.0015 *	1.74
LTA	0.0054 ***	3.20	0.0080 ***	5.25
MB	0.0035 ***	5.78	0.0033 ***	5.77
ROA(%)	-0.0012 ***	-7.78	-0.0012 ***	-8.10
GROWTH	0.0025	0.47	0.0001	0.00
Total No. of Obs.	999		999	

Notes:

^a The dependent variable in the first equation is the average percentage spread (*PSP*) for the sample period, 1 October to 31 December 2001. The dependent variable in the second equation is the absolute value of the discretionary accruals for the year 2001. The variables are defined as in Table 1.

Table 4 3SLS regression results of *EM* and *TURNOVER*, October-December 2001

Variables ^a	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A				
Intercept	-0.1317	-0.91	-0.5341 ***	-3.55
EM	-7.3672 ***	-5.42	-7.2511 ***	-5.59
SDRET	9.4698 ***	6.42	8.7213 ***	6.15
LNTV	0.7015 ***	20.98	0.8299 ***	22.53
LNCLP	-0.0269	-0.83	-0.0744 **	-2.34
LNTR	0.0255	0.83	-0.1578 ***	-3.99
LNMV	-0.5630 ***	-23.20	-0.5617 ***	-24.20
DEXCH	–	–	0.2827 ***	6.94
Panel B				
Intercept	0.0158 **	2.00	-0.0192 **	2.42
TURNOVER	-0.0075 ***	-3.88	-0.0067 ***	-3.46
LEV	-0.0260 ***	-3.52	-0.0276 ***	-3.72
CFVAR	0.0001	0.08	0.0004	0.07
LTA	0.0090 ***	8.77	0.0082 ***	7.94
MB	0.0026 ***	5.64	0.0028 ***	6.00
ROA(%)	-0.0011 ***	-8.74	-0.0010 ***	-8.34
GROWTH	-0.0093 **	-2.41	-0.0076 *	-1.96
Total No. of Obs.	999		999	

Notes:

^a The dependent variable in the first equation is stock turnover (*TURNOVER*) for the sample period, 1 October to 31 December 2001. The dependent variable in the second equation is the absolute value of the discretionary accruals for the year 2001. The variables are defined as in Table 1.

Stoll (2000) notes that several empirical studies had demonstrated that market structure appeared to have an effect on spreads. Van Ness, Van Ness, and Warr, (2002) also find the adverse selection is actually higher for NASDAQ stocks than for NYSE and AMEX stocks. This paper therefore further tests the relationship between earnings management and equity liquidity by adding in an extra market structure dummy variable, $DEXCH_i$ which is equal to 1 if firm i is listed on the NASDAQ and zero if the firm is listed on the NYSE or the AMEX.

As reported in Table 3, the positive relationship between earnings management and percentage spread persists, with the coefficient of $DEXCH$ being significantly positive, indicating a significant difference in the percentage bid-ask spreads between the two market structures. Table 4 presents the results of the effects of EM on the $TURNOVER$. The coefficient of EM is significantly positive at the 0.01 level in pre-SOX period, indicating that firms with high EM will have reduced stock trading turnover. The regression results for earnings management, which explain the variations in absolute discretionary accruals, are presented in Panel B of Table 3 and Table 4. Earnings management is positively (negatively) related to percentage spread (stock turnover) and significantly different from zero at less than the 0.01 level.

Table 3 also finds that earnings management has a negative correlation with firm leverage (LEV) and a positive correlation with growth opportunities, which is

measured by the market-to-book ratio; these results are consistent with those of Park and Shin (2004). Finally, the coefficient on cash flow volatility (*CFVAR*) is significantly positive, as in Richardson (2000). All of these results reveal that the simultaneity existing between earnings management and the average percentage spread is statistically significant.

In general, this paper find that after controlling for cross sectional differences in firms' trading characteristic variables, such as price, volatility, trading value, number of trades, market value and stock exchange differences, the liquidity amongst those companies with higher absolute discretionary accruals are lower. Therefore, the results in Table 3 and Table 4 support the proposition that firms with high abnormal discretionary accruals induce higher equity trading costs.

Table 5 presents the results of the effects of earnings management (*EM*) on the asymmetric information component of percentage spread. There are fewer observations in Table 5 than in Table 3, essentially because the GKN method fails to produce reliable estimates of the information asymmetry coefficients for some of the companies.

Table 5 3SLS regression results *EM* and *IA*, October-December 2001

Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	0.0066 ***	13.08	0.0072 ***	12.75
EM	0.0092 **	2.37	0.0092 **	2.39
SDRET	0.0369 ***	5.84	0.0379 ***	6.00
LNTV	-0.0001	-0.64	-0.0003 *	-1.70
LNCLP	-0.0011 ***	-8.78	-0.0011 ***	-8.02
LNTR	-0.0012 ***	-9.07	-0.0010 ***	-5.38
LNMV	0.0003 ***	3.18	0.0003 ***	3.04
DEXCH			-0.0004 **	-2.18
Panel B ^c				
Intercept	0.0158	1.34	0.0183	1.55
IA	3.7553 ***	3.12	3.5756 ***	2.97
LEV	-0.0335 ***	-3.07	-0.0334 ***	-3.06
CFVAR	0.0030 ***	3.06	0.0030 **	3.08
LTA	0.0055 ***	3.69	0.0051 ***	3.44
MB	0.0033 ***	5.06	0.0033 ***	5.07
ROA(%)	-0.0012 ***	-7.87	-0.0012 ***	-7.79
GROWTH	-0.0026	-0.47	-0.0022	-0.39
Total No. of Obs.	921		921	

Notes:

^a The dependent variable in the first equation is the information asymmetry component of percentage spread (*IA*) for the sample period, 1 October to 31 December 2001. The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*) for the year 2001. *IA* is the information asymmetry components of the percentage spread. The other variables are defined as in Table 1.

Following Lin, Sanger, and Booth, (1995), the information asymmetry component of percentage spread is calculated as the estimated coefficient of the information asymmetry $(1 - \pi_1)$ times the percentage spread. The coefficient of *EM* is significantly positive at the 5 per cent level, indicating that firms with a high *EM* will incur higher equity liquidity costs due to the higher degree of asymmetric information that may be perceived by market makers.

The case in which the NASDAQ market dummy variable is added is considered in Model 2 of Table 5, from which it is found that the NASDAQ stocks in the sample appear to have higher information asymmetry costs. The results of the asymmetric information cost effects are similar to those in Model 1.

In summary, the results presented in Tables 3, Table 4 and Table 5 support the argument that earnings manipulation provides a clear signal of aggressive accounting practices with the sole intention of the managers being to obtain certain private benefits, and the rational response of liquidity providers being to widen the bid-ask spreads so as to afford themselves some measure of price-protection.

4.2.2 Evidence from the post-SOX period

The Sarbanes-Oxley (SOX) Act was promulgated on 30 July 2002, largely in response to a number of major corporate and accounting scandals, the effects of which are still being felt throughout the US economy. The Act requires executives, boards of

directors and auditors to take specific measures to bring about greater corporate accountability and transparency. Jain et al. (2008) demonstrate that the above provisions improved market liquidity and the improvements were more conspicuous for the firms with better financial report quality. This indicates that, after the implementation of the SOX Act, market participants attach greater importance to the quality of financial report.

Since section 302 of the SOX Act requires that ‘the CEO and CFO of each issuer shall prepare a statement to accompany the audit report to certify the appropriateness of the financial statements and disclosures contained in the periodic report, and that those financial statements and disclosures fairly represent, in all material respects, the operations and financial condition of the issuer’, there may, as a result, be an increase in the adverse selection costs of earnings management. The effects of the cross-sectional differences in earnings management on equity liquidity are tested for the post-SOX period from 1 October 2002 to 31 December 2002; the results are presented in Tables 6, Table 7 and Table 8.

Table 6 to Table 8 present the results for the post-SOX period, showing that percentage spread and information asymmetry components of the percent spread are both significantly affected by the *EM* of the same year and that the reverse effect holds. However, the effect of *EM* on stock turnover is insignificant in Table 7. As

shown in Table 6 and Table 8, percentage spread is positively related to return volatility and market value, while it is negatively related to trading value and closing price (largely in line with the results presented in Table 3 and Table 5). The total number of firms in the sample is larger than the pre-SOX period, and the exchange dummy controlling for the NASDAQ stocks is also significantly positive, indicating that NASDAQ stocks have higher trading costs. The signs of the coefficients across the two periods are the same, with the coefficients of *EM* and *PSP* both being statistically significant at less than the 0.01 level.



Table 6 3SLS regression results *EM* and *PSP*, October-December 2002

Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	0.0079 ***	4.46	0.0074 ***	6.36
EM	0.1261 ***	4.62	0.0760 ***	4.36
SDRET	0.0722 ***	5.64	0.0683 ***	6.83
LNTV	-0.0016 ***	-4.32	0.0000	0.10
LNCLP	-0.0017 ***	-5.20	-0.0024 ***	-8.82
LNTR	-0.0005	-1.38	-0.0033 ***	-8.89
LNMV	0.0010 ***	4.35	0.0011 ***	6.68
DEXCH			0.0046 ***	16.15
Panel B ^b				
Intercept	0.0505 ***	6.34	0.0240 ***	2.73
PSP	-1.3159 ***	3.04	1.8496 ***	4.60
LEV	-0.0149 ***	-2.82	-0.0189 ***	-2.82
CFVAR	0.0003	0.64	0.0004	0.67
LTA	-0.0002	-0.24	0.0034 ***	3.06
MB	0.0029 ***	4.59	0.0031 ***	4.66
ROA(%)	-0.0003 ***	-4.37	-0.0004 ***	-4.25
GROWTH	0.0103 ***	3.49	0.0092 **	2.36
Total No. of Obs.	1,059		1,059	

Notes:

^a The dependent variable in the first equation is the average percentage spread (*PSP*) for the sample period, 1 October to 31 December 2002. The dependent variable in the second equation is the absolute value of the discretionary accruals for the year 2002. *EM* is the absolute value of discretionary accruals for the year 2002; *SDRET* is the standard deviation of daily stock returns from 1 October to 31 December 2002; *LNTV* is the natural log of the average daily trading dollar volume for the sample period; *LNCLP* represents the natural log

of the average closing stock price for the sample period; *LNTR* is the natural log of the average daily total number of trades from 1 October to 31 December 2002; *LNMV* is the natural log of the market value of the firm (i.e. the closing price at the end of 2002 multiplied by the company's common shares outstanding); and *DEXCH* is the dummy variable which is equal to 1 if the company is listed on the NASDAQ, otherwise 0.

^b *PSP* is the average percentage spread; *LEV* is the debt to total asset ratio at the end of 2002; *CFVAR* represents the standard deviation of quarterly operating cash flows over the period from Q4 1999 to Q3 2002 divided by the average quarterly operating cash flows over the period; *LTA* represents the natural log of total assets at the end of 2002; *MB* is the market to book ratio (i.e., the closing price at the end of 2002 multiplied by the company's common shares outstanding, divided by the common equity as reported); *ROA* is the return on assets for the year 2002; and *GROWTH* is the growth rate in net revenue for the year 2002.



Table 7 3SLS regression results of *EM* and *TURNOVER*, October-December 2002

Variables ^a	Model 1		Model 2	
	Coefficient	t-value	Coefficient	t-value
Panel A				
Intercept	-0.3940 ***	-3.15	-0.4118 ***	-3.39
EM	2.4338	1.62	-1.9085	-1.23
SDRET	3.9320 ***	3.25	4.1875 ***	3.52
LNTV	0.7191 ***	24.55	0.8339 ***	23.75
LNCLP	0.0915 ***	3.06	0.0498	1.60
LNTR	0.0827 ***	2.73	-0.0817 *	-1.95
LNMV	-0.6983 ***	-35.00	-0.7030 ***	-36.26
DEXCH			0.2566 ***	7.11
Panel B				
Intercept	0.0701 ***	8.89	0.0498 ***	6.28
TURNOVER	-0.0058 ***	2.84	-0.0010	-0.49
LEV	-0.0019	-0.20	0.0113	-1.16
CFVAR	0.0025 ***	2.89	0.0027 ***	3.17
LTA	-0.0041 ***	-3.75	0.0004	0.37
MB	0.0015 **	1.96	0.0026 ***	3.37
ROA(%)	-0.0001	-0.94	-0.0004 ***	-3.48
GROWTH	0.0067	1.15	0.0024	0.41
Total No. of Obs.	1,059		1,059	

Notes:

^a The dependent variable in the first equation is stock turnover (*TURNOVER*) for the sample period, 1 October to 31 December 2002. The dependent variable in the second equation is *EM* for the year 2002. The variables are defined as in Table 6.

Table 8 3SLS regression results of *EM* and *IA*, October-December 2002

Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	0.0065 ***	11.34	0.0061 ***	12.21
EM	0.0266 ***	3.46	0.0168 **	2.44
SDRET	0.0283 ***	5.82	0.0281 ***	5.99
LNTV	-0.0005 ***	-4.13	-0.0001 *	-0.90
LNCLP	-0.0009 ***	-7.02	-0.0011 ***	-8.49
LNTR	-0.0008 ***	-5.75	-0.0014 ***	-8.16
LNMV	0.0004 ***	5.15	0.0005 ***	6.17
DEXCH			0.0010 ***	6.67
Panel B				
Intercept	0.0331 ***	3.26	0.0238 **	2.24
IA	3.8560 ***	3.68	4.2791 ***	4.07
LEV	-0.0156 **	-2.02	-0.0171 *	-1.95
CFVAR	0.0011	1.56	0.0015 **	2.00
LTA	0.0016	1.32	0.0028 **	2.15
MB	0.0034 ***	4.70	0.0033 ***	4.42
ROA(%)	-0.0003 ***	-2.94	-0.0003 ***	-2.72
GROWTH	0.0132 ***	3.06	0.0121 **	2.41
Total No. of Obs.	1,005		1,005	

Notes:

^a The dependent variable in the first equation is the information asymmetry component of percentage spread (*IA*) for the post-SOX period. The dependent variable in the second equation is *EM* for the year 2002. *IA* is the information asymmetry components of the percentage spread. The other variables are defined as in Table 6.

The empirical results indicate that when firms increase abnormal accruals to 1% of total assets, market makers will widen the percentage spread by 2.4 (7.6) basis points, reaching to 5.1% (17.7%) of average percentage spreads in the pre- (post-) SOX Act period. To test if the impact of earnings management on equity liquidity of the pre-SOX period is different from which of the post-SOX period, Table 9 and Table 10 present the regression results for pooling the data of 2001 and 2002. This work includes a new dummy variable dI which is equal to 1 for the 2002 sample data to control for the potential difference due to the 2002 sample. This approach helps to directly examine the statistical significance of the change in the coefficients on EM . Two regression models are presented respectively in Table 9, Table 10 and Table 11.

The first model assumes that there is no structural change in the control variables such as return volatility, trading volume, closing price, number of trade, and market value of stocks, whereas the second one assumes that these variables have structural change after the implementation of the SOX Act. The results show that for all models the estimated coefficients on the ' $EM \times dI$ ' variable are significantly positive. For example, in Table 9, the estimated coefficient in model 2 of table 9 is 0.0298 at 7 percent significant level, providing some evidence that the effect of earnings management on equity trading costs is higher for the Oct.-Dec. 2002 sample period. However, the estimated coefficient of ' $EM \times dI$ ' variable in model 2 of Table

10 is insignificant.

The effect of earnings management on liquidity is higher during the post-SOX period, which can be explained by examining the costs and benefits of earnings management. During the period of the financial reporting crises (the 4th quarter in 2001), the regulations on information disclosure were relatively limp, as were the related penalties for accounting fraud. Although investors' impressions of EM were bad, the costs for executives to engage in such practices were still relatively lower; thus they may engage in earnings management for less benefit. The information asymmetry costs of liquidity providers were therefore smaller.

The main contents of the SOX Act include establishment of audit committee, rotation of auditors, requirement for certification, prohibition of simultaneous non-audit and audit services by accounting firms, disclosure of insider trading, assessment of internal controls, protection for 'whistleblowers' and criminal penalties for violations of securities laws. The costs of earnings management therefore became much higher for executives in the post-SOX period. If firms continued to engage in aggressive earnings management after the promulgation of the SOX Act, this meant that executives did so to pursue greater private benefits to cover their higher costs. Market makers would thus be faced with higher asymmetric information costs, and would therefore need to widen the bid-ask spreads more so as to afford themselves

some measure of price protection. Accordingly, despite the liquidity measures (e.g., spreads) being improved by the passage of the Act (Jain et al, 2008), there may have been a higher effect of EM on spreads in the post-SOX period.

One shortcoming of simultaneous equation is that market makers and liquidity traders do not seem to have the *EM* information available for the current year exactly. For robustness, this paper also verifies that the results hold if the *EM* for the previous year is used in the estimation of Equation (7) and two stage least squares regression model (2SLS) is adopted. Since this research aims to investigate the effect of earnings management on security liquidity, this work focuses on the analysis of Equation (7). The results are provided in Appendix C. With regard to the regression model in which the NASDAQ market dummy variable is included, Table C1 shows that the coefficient on *EM* is significantly positive with *PSP* at the 10 percent level, which may suggests that aggressive earnings management induces information asymmetry, and hence reduces liquidity in the equity market. Table C2 in Appendix C presents the results for the tow sub-periods, showing that the effect of earnings management on liquidity is higher during the post-SOX period.

Table 9 3SLS regression results of *EM* and *PSP* for the two sub-sample periods

Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	0.0088 ***	13.49	0.0090 ***	12.04
EM	0.0368 ***	5.96	0.0267 ***	3.56
SDRET	0.0853 ***	12.26	0.1079 ***	10.12
LNTV	-0.0002	-0.91	-0.0003	-1.44
LNCLP	-0.0023 ***	-14.86	-0.0023 ***	-10.64
LNTR	-0.0031 ***	-16.17	-0.0029 ***	-10.45
LNMV	0.0011 ***	10.29	0.0012 ***	7.77
DEXCH	0.0048 ***	24.08	0.0047 ***	16.23
EM × d1	0.0115 ***	4.07	0.0298 *	1.80
SDRET × d1			-0.0404 ***	-2.58
LNTV × d1			0.0003	0.81
LNCLP × d1			-0.0002	-0.61
LNTR × d1			-0.0004	-0.88
LNMV × d1			-0.0000	-0.21
DEXCH × d1			0.0000	0.08
Panel B				
Intercept	0.0092	1.23	0.0100	1.34
PSP	2.2619 ***	6.25	1.9627 ***	5.06
LEV	-0.0263 ***	-3.21	-0.0255 ***	-3.10
CFVAR	0.0010	1.45	0.0011	1.54
LTA	0.0064 ***	6.51	0.0065 ***	6.53

(Table 9 continued)

MB	0.0030 ***	6.17	0.0031 ***	6.29
ROA(%)	-0.0011 ***	-8.45	-0.0011 ***	-8.43
GROWTH	-0.0002	-0.04	-0.0006	-0.15
PSP × d1	-0.2136	-0.57	0.1573	0.34
LEV × d1	0.0039	0.36	0.0023	0.21
CFVAR × d1	0.0001	0.04	-0.0000	-0.02
LTA × d1	-0.0015 **	-2.42	-0.0016 **	-2.45
MB × d1	0.0010	1.34	0.0007	0.83
ROA(%) × d1	0.0008 ***	4.57	0.0007 **	4.28
GROWTH × d1	0.0121 *	1.87	0.0115 *	1.76
Total No. of Obs.		2,058		2,058

Note:

^a The dependent variable in the first equation is the average percentage spread (*PSP*). The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*). The sample data includes data of the two sub-sample periods: i.e., 1 October to 31 December 2001 and 1 October to 31 December 2002.

Table 10 3SLS regression results of *EM* and *TURNOVER* for the two sub-sample periods

Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	-0.3384 ***	-3.64	-0.4761 ***	-4.37
EM	-5.8487 ***	-6.63	-7.9960 ***	-7.35
SDRET	6.3436 ***	6.90	10.7305 ***	7.24
LNTV	0.8259 ***	34.55	0.8947 ***	24.24
LNCLP	-0.0177	-0.82	-0.1096 ***	-3.37
LNTR	-0.1173 ***	-4.52	-0.2051 ***	-5.10
LNMV	-0.6288 ***	-40.69	-0.6134 ***	-27.00
DEXCH	0.2756 ***	10.46	0.3348 ***	8.02
EM × d1	-0.8016 **	-2.11	7.4166	1.18
SDRET × d1			-7.5033 ***	-3.56
LNTV × d1			-0.1196 **	-2.02
LNCLP × d1			0.1907 **	4.35
LNTR × d1			0.1885 ***	2.70
LNMV × d1			-0.0637 **	-2.03
DEXCH × d1			-0.1107	-1.81
Panel B				
Intercept	0.0305 ***	5.49	0.0386 ***	6.79
TURNOVER	-0.0063 ***	-3.58	-0.0027	-1.40
LEV	-0.0248 ***	-3.03	-0.0204 **	-2.22
CFVAR	0.0013	0.19	0.0003	0.40
LTA	0.0065 ***	7.74	0.0040 ***	5.01
MB	0.0028 ***	5.83	0.0023 ***	4.27

(Table 10 continued)

ROA(%)	-0.0011 ***	-9.30	-0.0011 ***	-8.32
GROWTH	-0.0084 *	-1.92	-0.0079	-1.60
TURNOVER × d1	0.0005	0.26	-0.0002	-0.11
LEV × d1	0.0063	0.56	0.0038	0.30
CFVAR × d1	0.0018 *	1.90	0.0026 **	2.35
LTA × d1	-0.0017 **	-2.24	-0.0020 **	-2.31
MB × d1	-0.0001	-0.09	0.0009	1.05
ROA(%) × d1	0.0005 ***	3.48	0.0006 ***	3.58
GROWTH × d1	0.0072	1.11	0.0101	1.37
Total No. of Obs.		2,058		2,058

Note:

^a The dependent variable in the first equation is stock turnover (*TURNOVER*). The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*). The sample data includes data of the two sub-sample periods: i.e., 1 October to 31 December 2001 and 1 October to 31 December 2002.

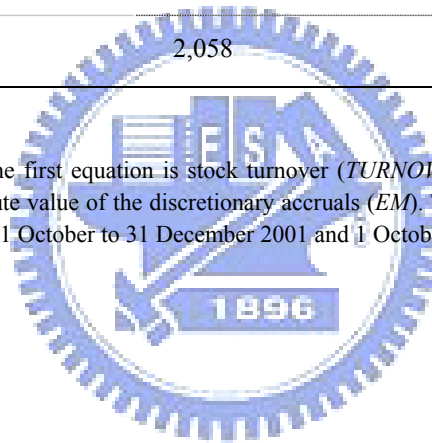


Table 11 3SLS regression results of *EM* and *IA* for the two sub-sample periods

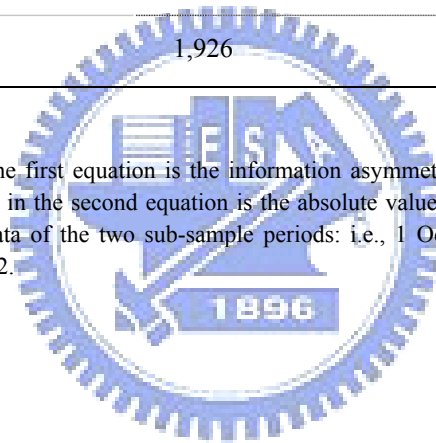
Variables	Model 1		Model 2	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Panel A ^a				
Intercept	0.0065 ***	18.63	0.0066 ***	17.51
EM	0.0109 ***	3.50	0.0099 ***	2.79
SDRET	0.0305 ***	8.04	0.0409 ***	7.33
LNTV	-0.0002 **	-2.18	-0.0002	-1.54
LNCLP	-0.0010 ***	-11.95	-0.0010 ***	-8.70
LNTR	-0.0011 ***	-10.58	-0.0010 ***	-6.76
LNMV	0.0003 ***	6.16	0.0003 ***	-3.64
DEXCH	0.0003 ***	3.09	-0.0003 **	-2.01
EM × d1	0.0065 ***	4.46	0.0028	0.37
SDRET × d1			-0.0145 *	-1.90
LNTV × d1			0.0001	0.33
LNCLP × d1			-0.0001	-0.59
LNTR × d1			-0.0003	-1.45
LNMV × d1			0.0001 *	1.65
DEXCH × d1			0.0012 ***	5.60
Panel B				
Intercept	0.0150 *	1.92	0.0198 **	2.48
IA	4.0316 ***	4.14	3.8311 ***	3.72
LEV	-0.0304 ***	-3.20	-0.0322 ***	-3.28
CFVAR	0.0028 ***	3.33	0.0028 ***	3.20
LTA	0.0055 ***	5.26	0.0048 ***	4.54
MB	0.0031 ***	5.64	0.0032 ***	5.69

(Table 10 continued)

ROA(%)	-0.0011 ***	-8.49	-0.0011 ***	-8.00
GROWTH	-0.0028	-0.58	-0.0023	-0.45
IA × d1	1.2867	1.21	0.4423	0.37
LEV × d1	0.0079	0.62	0.0125	0.95
CFVAR × d1	-0.0010	-0.93	-0.0008	-0.70
LTA × d1	-0.0018 ***	-2.69	-0.0015 **	-2.13
MB × d1	-0.0007	0.84	0.0002	0.29
ROA(%) × d1	0.0009 ***	5.20	0.0008 ***	4.44
GROWTH × d1	0.0161 **	2.22	0.0143 *	1.89
Total No. of Obs.		1,926		1,926

Note:

^a The dependent variable in the first equation is the information asymmetry component of percentage spread (*IA*). The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*). The sample data includes data of the two sub-sample periods: i.e., 1 October to 31 December 2001 and 1 October to 31 December 2002.

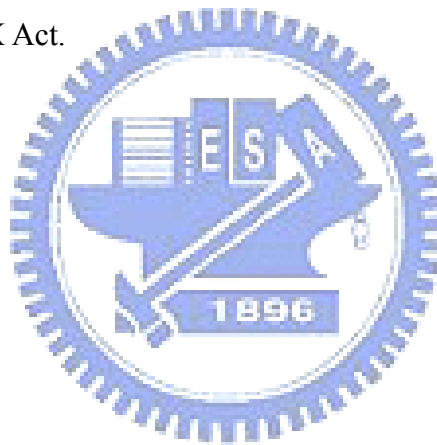


Chapter 5 Conclusions

Recent corporate accounting scandals have shown that aggressive earnings management behavior by executives creates serious losses for shareholders; hence, earnings management could provide an important signal that managers are pursuing private benefits whilst sacrificing the wealth of shareholders. In order to correspond with the financial scandal crisis period and the regulatory effects of the SOX Act, this study limits the sample to October to December in 2001 and 2002. This paper posits that aggressive earnings management signals greater managerial agency costs, and thus greater asymmetric information costs; liquidity providers will incur relatively higher costs and will therefore offer higher bid-ask spreads. The empirical results support this hypothesis, and show that the rational response from liquidity providers is to widen the bid-ask spreads so as to provide themselves with some measure of price protection. Since aggressive earnings management indicates a lower quality of corporate accounting information, this may well result in a corresponding rise in the proportion of informed traders dealing in the firm's equity. As a result, the incentives for uninformed traders (liquidity traders) to trade in those equities with abnormal accruals may well be reduced, particularly where the reporting of accounts takes place during crisis periods.

The results show a positive simultaneous relationship between earnings management and equity trading costs, with this positive relationship persisting even

after controlling for trading characteristics and financial variables such as volatility, trading volume, stock price, leverage, firm size and growth opportunities. This paper has also tested the relationship between information asymmetry and earnings management after the adoption of Section 302 of the Sarbanes-Oxley Act, and provide some evidence of increased sensitivity between information asymmetry and earnings management during this period. The evidence may support the argument that there was an increase in the adverse selection costs of earnings management following the promulgation of the SOX Act.



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Appendix A

Important provisions of SOX:

Sect. Provisions

101 *Establishment of Public Company Accounting Oversight Board (PCAOB)*

The PCAOB is an independent, non-governmental accounting oversight board to oversee the audit of publicly traded companies. Public accounting firms that prepare audit reports for issuers are required to register with PCAOB.

201 *Auditor Independence*

Registered public accounting firms are prohibited from providing any non-audit services to an issuer contemporaneously with the audit.

203 *Audit Partner Rotation*

The lead audit coordinating partner and reviewing partner of the registered accounting firm must rotate off of the audit every five years.

206 *Conflicts of Interest*

The registered accounting firm is prohibited to perform audit for an issuer who's CEO, CFO, controller, chief accounting officer or person in an equivalent employed by the accounting firm during the 1-year period preceding the audit.

301 *Public Company Audit Committees*

Each member of the audit committee shall be an independent member of the board of directors. The audit committee shall be directly responsible for the appointment, compensation, and oversight of the work of any registered public accounting firm associated by the issuer.

302 *Corporate Responsibility for Financial Reports*

Certification of each annual and quarterly financial report by CEOs and CFOs.

304 *Forfeiture of Certain Bonuses and Profits*

CEOs and CFOs who revise company's financial statement for the material noncompliance with any financial reporting requirements must pay back any bonuses or stock options awarded because of the misstatement.

401 *Disclosures in Periodic Reports*

Each financial report that is required in accordance with GAAP shall reflect all material correcting adjustments that have been identified by the auditors. Each financial report shall disclose all material off-balance sheet transactions and other relationships with unconsolidated entities that may have a material current or future effect on the financial conditions of the issuer.

402 *Extended Conflict of Interest Provisions*

It is unlawful for the issuer to extend credit or personal loans to any directors

or executive officers.

- 404 **Management Assessments of Internal Control**
Periodic the assessment of the adequacy and effectiveness of the issuer internal control structure and procedures.
- 705 *Study on Investment Banks*
Directs the Comptroller General to conduct a study and report the findings to congress regarding the role of investment bankers and financial advisors assisted public companies in manipulating their earnings and obfuscating their true financial condition.
- 802 *Criminal Penalties for Altering Documents*
Criminal penalties for document destruction, alternation, or concealment with the intent to impede federal investigations or in a federal bankruptcy case include fines and maximum imprisonment of 20 years.
- 803 *No Discharge of Debts in a Bankruptcy Proceeding*
Liability for securities law or fraud violations may not be discharged under the U.S. Bankruptcy Code.
- 804 *Statute of Limitations for Securities Fraud*
Statute of limitations to recover for a private action for securities fraud lengthened to the earlier of two years after the date of discovery or five years after the fraudulent activities.
- 806 *Whistleblower Protection*
Provides whistleblower protections for employee of any issuers who willingly provides evidence of fraud or violations of securities by that issuer.
- 1106 *Criminal Penalties for Violations of the 1934 Act*
Increases criminal penalties for violations of the 1934 Act from \$1 million to \$5 million for individuals; from 10 years to 20 years imprisonment for each violation; and from \$2.5 million to \$25 million for each entity.

Source: Jain et al. (2008)

Appendix B

Table B1 Sample Selection Procedure

Sample selection of 999 firms subject to Russell 3000	
Initial sample size (Russell 3000)	3,018
less banks and financial institutions	- 676
less firm numbers of less than six in one industry, where there was insufficient data to estimate the earnings management proxy and financial control variables	- 687
less firms lacking relevant data to calculating control variables	- 435
less firms lacking relevant data on CRSP and TAQ	- 187
less firms having average number of trades less than 3 or extreme value of instrument variables (greater than 99% or less than 1%)	- 34
Final Sample	999

Table B2 SIC Distribution

Industry	SIC Distribution		
	2-Digit SIC Code	Freq.	%
Oil and Gas	13,29	40	4.0
Food Products	20	29	2.9
Paper and Paper Products	24-27	60	6.0
Chemical Products	28	97	9.7
Manufacturing	30-34	69	6.9
Computer Hardware and Software	35,73	186	18.7
Electronic Equipment	36	112	11.2
Transportation	37,39,40,42,45	63	6.3
Scientific Instruments	38	77	7.7
Communications	48	20	2.0
Durable Goods	50	30	3.0
Retail	53,54,56,57,59	74	7.4
Eating and Drinking Establishments	58	19	1.9
Entertainment Services	78,79	15	1.5
Health	80	18	1.8
Engineering Management services	87	18	1.8
Others	10,15,16,17,23,47,49,51,55,82	72	7.2
Total		999	100.0

Appendix C

Table C1 2SLS regression results of *EM* and equity liquidity, October-December 2001

Panel A ^a	October-December 2001		October-December 2002	
	PSP	TUNOVER	PSP	TUNOVER
Intercept	0.0107 ***	-0.7703 ***	0.0099 ***	-6.3781 ***
EM	0.0135 *	-1.4504 *	0.0316 ***	-0.6002
SDRET	0.1097 ***	8.3933 ***	0.0681 ***	4.4667 ***
LNTV	-0.0005	0.9014 ***	0.0001	0.8419 ***
LNCLP	-0.0027 ***	-0.0422 **	-0.0030 ***	0.0579 **
LNTR	-0.0031 ***	-0.2124 ***	-0.0040 ***	-0.0756 **
LNMV	0.0015 ***	-0.6552 ***	0.0016 ***	-0.7100 ***
DEXCH	0.0050 ***	0.3513 ***	0.0054 ***	0.2491 ***
Adj. R ²	0.6936	0.8215	0.6918	0.8540
No. of Obs.	979	979	1,106	1,106

Notes:

^a The instrumental variables for the 2SLS regressions include the following financial variables recorded at the end of 2000: debt to total asset ratio (*LEV*), the natural log of total assets at the end of 2000 (*LTA*), the market to book ratio (*MB*), the standard deviation of quarterly operating cash flows for the past three years (*CFVAR*), the return on assets (*ROA*) and the growth rate of net revenue for the year 2000 (*GROWTH*). The dependent variable is the average percentage spread for the sample period 1 October to 31 December 2001. *EM* is the absolute value of discretionary accruals for the year 2000 (assume that no public information on *EM* and the financial statements of firms for the year 2001 is available for liquidity traders during the sample period); *SDRET* is the standard deviation of daily stock returns; *LNTV* is the natural log of the average daily trading dollar volume; *LNCLP* represents the natural log of the average closing stock price; *LNTR* is the natural log of the average daily total number of trades; *LNMV* is the natural log of the market value of the firm; and *DEXCH* is the dummy variable which is equal to 1 if the company is listed on the NASDAQ, otherwise 0. The dependent variable in the first equation is the average percentage spread (*PSP*) or the turnover (*TURNOVER*) for the sample period. The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*). *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

Table C2 2SLS regression results of *EM* and equity liquidity for the two sub-sample periods

Variables ^a	Model 1		Model 2	
Panel A	PSP	TURNOVER	PSP	TUNOVER
Intercept	0.009 ***	-0.316 ***	0.010 ***	-2.018 ***
EM	0.027 ***	5.266 ***	0.014 **	-2.018
SDRET	0.081 ***	11.682 ***	0.110 ***	17.486 ***
LNTV	0.001	0.073 ***	-0.001	1.006 ***
LNCLP	-0.003 ***	0.315	-0.002 ***	0.027
LNTR	-0.004 ***	0.622 ***	-0.003 ***	-0.441 ***
LNMV	0.001 ***	-0.356 ***	0.001 ***	-0.575 ***
DEXCH	0.005 ***	-0.192 ***	0.005 ***	0.533 ***
EM × d1	-0.002	-5.224 ***	0.017 *	0.864
SDRET × d1			-0.042 ***	-15.212 ***
LNTV × d1			0.001	-0.665 ***
LNCLP × d1			-0.001	0.138 ***
LNTR × d1			-0.001 **	0.932 ***
LNMV × d1			0.001	0.004
DEXCH × d1			0.001	-0.671 ***
Panel B				
Intercept	0.056 ***	0.054 ***	0.056 ***	0.054 ***
PSP (TURNOVER)	0.250	0.010 ***	0.250	0.010 ***
LEV	-0.029 ***	-0.020 *	-0.029 **	-0.020 *
CFVAR	0.003 ***	0.002 **	0.003 ***	0.002 **

(Table C3 continued)

LTA	0.001	-0.001	0.001	-0.001
MB	0.001 *	0.001	0.001 **	0.001
ROA(%)	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
GROWTH	0.032 ***	0.026 ***	0.031 ***	0.026 ***
PSP × d1 (TURNOVER × d1)	0.165 *	-0.007 **	0.165	-0.007 **
LEV × d1	0.009	0.009	0.009	0.009
CFVAR × d1	-0.002	0.009	-0.002	0.009
LTA × d1	0.001	0.002 **	0.001	0.002 **
MB × d1	-0.001	0.001	-0.001	0.001
ROA(%) × d1	-0.001 **	-0.001 **	-0.001 **	-0.001 **
GROWTH × d1	-0.029 ***	-0.028 ***	-0.001 ***	-0.028 ***

^aThe dependent variable in the first equation is *PSP* or *TURNOVER*. The dependent variable in the second equation is the proxy of earnings management (*EM*). The number of observations is 2,085.

Appendix D

Table D1 3SLS regression results of the simultaneous equation model $-\Delta TR$ is omitted in Eq. (3) when estimating EM .

Panel A ^a	October-December 2001		October-December 2002	
	<i>PSP</i>	<i>TUNOVER</i>	<i>PSP</i>	<i>TUNOVER</i>
<i>Intercept</i>	0.010 ***	-0.505 ***	0.007 ***	-0.388 ***
<i>EM</i>	0.026 ***	-7.691 ***	0.083 ***	-2.579
<i>SDRET</i>	0.101 ***	8.643 ***	0.068 ***	4.304 ***
<i>LNTV</i>	-0.001 *	0.825 ***	0.001	0.835 ***
<i>LNCLP</i>	-0.002 ***	-0.074 **	-0.002 ***	0.047
<i>LNTR</i>	-0.003 ***	-0.156 ***	-0.003 ***	-0.084 **
<i>LNMV</i>	0.001 ***	-0.557 ***	0.001 ***	-0.700 ***
<i>DEXCH</i>	0.005 ***	0.280 ***	0.004 ***	0.259 ***
Panel B ^b	<i>EM</i>	<i>EM</i>	<i>EM</i>	<i>EM</i>
<i>Intercept</i>	-0.003	0.021 **	0.024 ***	0.046 ***
<i>PSP</i>	2.337 ***		1.703 ***	
<i>TURNOVER</i>		-0.007 ***		-0.001
<i>LEV</i>	-0.025 ***	-0.025 ***	-0.019 ***	-0.014
<i>CFVAR</i>	0.001	-0.001	0.001	0.002 ***
<i>LTA</i>	0.008 ***	0.007 ***	0.003 ***	0.001
<i>MB</i>	0.003 ***	0.003 ***	0.003 ***	0.003 ***
<i>ROA(%)</i>	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
<i>GROWTH</i>	0.001	-0.008 **	0.009 **	0.002
No. of Obs.	999	999	1,059	1,059

^a The dependent variable in the first equation is the average percentage spread (*PSP*) or the turnover (*TURNOVER*) for the sample period. The dependent variable in the second equation is the absolute value of the discretionary accruals (*EM*). *** indicates significance at the 1% level; ** indicates significance at the 5% level; and *

indicates significance at the 10% level. Figures in parentheses are p -values.

- ^b *LEV* is the debt to total asset ratio at the end of the sample period; *CFVAR* represents the standard deviation of quarterly operating cash flows over the 12 quarters before the sample periods and divided by the average quarterly operating cash flows over the period; *LTA* represents the natural log of total assets at the end of the sample periods; *MB* is the market to book ratio at the end of the sample periods; *ROA* is the return on assets for the given year; and *GROWTH* is the growth rate in net revenue.



Table D2 3SLS regression results of the simultaneous equation model for the two sub-sample periods $-\Delta TR$ is omitted in Eq. (3) when estimating EM .

Variables ^a	Model 1		Model 2	
Panel A	<i>PSP</i>	<i>TURNOVER</i>	<i>PSP</i>	<i>TUNOVER</i>
<i>Intercept</i>	0.008 ***	-0.329 ***	0.009 ***	-0.447 ***
<i>EM</i>	0.041 ***	-6.182 ***	0.030 ***	-8.497 ***
<i>SDRET</i>	0.084 ***	6.321 ***	0.107 ***	10.729 ***
<i>LNTV</i>	-0.001	0.823 ***	-0.001	0.892 ***
<i>LNCLP</i>	-0.002 ***	-0.018	-0.002 ***	-0.110 ***
<i>LNTR</i>	-0.003 ***	-0.116 ***	-0.003 ***	-0.205 ***
<i>LNMV</i>	0.001 ***	-0.624 ***	0.001 ***	-0.610 ***
<i>DEXCH</i>	0.005 ***	0.273 ***	0.005 ***	0.329 ***
<i>EM × d1</i>	0.012 ***	-0.787 **	0.033 *	7.249
<i>SDRET × d1</i>			-0.041 ***	-7.342 ***
<i>LNTV × d1</i>			0.001	-0.114 *
<i>LNCLP × d1</i>			-0.001	0.186 ***
<i>LNTR × d1</i>			-0.001	0.182 ***
<i>LNMV × d1</i>			-0.001	-0.063 **
<i>DEXCH × d1</i>			0.001	-0.102 *
Panel B	<i>EM</i>	<i>EM</i>	<i>EM</i>	<i>EM</i>
<i>Intercept</i>	0.009	0.030 ***	0.010	0.037 ***
<i>PSP</i>	2.332 ***		2.066 ***	
<i>TURNOVER</i>		-0.006 ***		-0.003
<i>LEV</i>	-0.022 ***	-0.022 ***	-0.022 ***	-0.017 **
<i>CFVAR</i>	0.001	0.001	0.001	0.001

(Table D2 continued)

<i>LTA</i>	0.006 ***	0.006 ***	0.006 ***	0.004 ***
<i>MB</i>	0.003 ***	0.003 ***	0.003 ***	0.002 ***
<i>ROA(%)</i>	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
<i>GROWTH</i>	-0.001	-0.009 **	-0.001	-0.008 *
<i>PSP</i> × <i>d1</i>	-0.372		0.080	
<i>TURNOVER</i> × <i>d1</i>		0.001		-0.001
<i>LEV</i> × <i>d1</i>	-0.001	0.003	0.002	-0.001
<i>CFVAR</i> × <i>d1</i>	-0.001	0.002 *	-0.001	0.002 **
<i>LTA</i> × <i>d1</i>	-0.001 **	-0.002 **	-0.001 *	-0.002 **
<i>MB</i> × <i>d1</i>	0.001	-0.001	0.001	0.001
<i>ROA(%)</i> × <i>d1</i>	0.001 ***	0.001 ***	0.001 ***	0.001 ***
<i>GROWTH</i> × <i>d1</i>	0.011 *	0.007	0.011 *	0.010

^aThe dependent variable in the first equation is *PSP* or *TURNOVER*. The dependent variable in the second equation is the proxy of earnings management (*EM*). The number of observations is 2,058. Figures in parentheses are *p*-values.

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在學期間著作

A. 期刊論文

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