行政院國家科學委員會專題研究計畫　成果報告

盈餘管理與證券流動性之研究：財務資訊揭露危機時期之分析

計畫類別：個別型計畫
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計畫主持人：鍾惠民

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行政院國家科學委員會補助專題研究計畫 ■ 成 果 報 告
□期中進度報告

盈餘管理與證券流動性之研究：

財務資訊揭露危險時期之分析

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成果報告類型(依經費核定清單規定繳交)：■精簡報告　□完整報告

本成果報告包括以下應繳交之附件：
■赴國外出差或研習心得報告一份
□赴大陸地區出差或研習心得報告一份
□出席國際學術會議心得報告及發表之論文各一份
□國際合作研究計畫國外研究報告書一份

執行單位：國立交通大學財務金融研究所

中　華　民　國　95　年　10　月　27　日

(一)中、英文摘要及關鍵詞(keywords)。

當管理者與股東之間潛在利益不一致時，管理者從事盈餘操縱以創造較佳之營運績效來獲得其個人私有利益的極大化(而非使公司價值極大化)之可能性將增加。管理者藉由盈餘管理來謀取其個人私有利益最大，將使股東權益受損。因此，當管理者決定從事更多之盈餘操縱也隱含更大的資訊不對稱成本，此類成本在公司財務資訊揭露危機時期，如美國 Enron, Worldcom 事件時期將更爲顯著。在市場微結構理論中，資訊不對稱成本提高將帶給流動性提供者更大之成本，證券之買賣價差將較大。因此，在財務資訊揭露危機時期，當一公司異常的裁量性應計科目愈大，資訊不對稱成本將變大，不具資訊優勢之交易者交易該證券之意願將下降，流動性交易者同時提高其買賣價差，因此該公司證券之流動性將下降。本研究運用市場微結構中常用之流動性變數如買賣價差、資訊不對稱成本，來分析上述議題，在控制重要變數後分析盈餘管理與證券流動性之關係。將運用 Enron 事件前後期間爲研究期間，以 NYSE 與 Nasdaq 公司約 1150 家爲樣本，分析盈餘管理對證券流動性之影響，除考慮二變數之間的潛在內生性(endogeneity)問題外，將運用工具變數之方法計進行估計。本研究有助於瞭解公司盈餘管理所必須付出之證券流動性經濟成本。

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 (due, in part, to a conflict of interest between firms' insiders and outsiders), a higher degree of earnings management may signal greater adverse selection costs. If the manipulation of earnings reveals aggressive accounting practices, with the sole intention of managers being to obtain private benefits, liquidity providers may tend to widen the bid-ask spreads so as to provide themselves with some measure of price protection. 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.

(二)報告內容

1. Introduction (前言與研究目的)

Accounting standards permit discretion in the application of the accounting methods used to report financial statements in order to allow the performance of firms to be more properly expressed; however, when this discretion is intentionally used to manage a company's reported results, this is known as 'earnings management'. Although some of the prior studies have demonstrated that smoothing enhances the information value of reported earnings,[1] Jensen (2005) nevertheless argued that the smoothing of earnings to meet market projections actually leads to poor decisions that can ultimately undermine the value of a firm. Leuz et al. (2003) examined the differences in earnings management from a cross-county perspective, arguing that much of the difference was due to attempts by insiders to use earnings management to conceal the actual performance of the firm from outsiders, and thereby protect their private control benefits.

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. 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. For example, Bartov and Mohanram (2004) found that the private information used by top-level executives in their timing of abnormally large stock-option exercises followed on from earnings managements, with the sole purpose being to increase the cash payout of such exercises.

Bergstresser and Philippon (2006) found that as CEOs' compensation packages (comprising of stock or options holdings) became more sensitive to current share prices, there was an increase in the management of accruals, while Burns and Kedia (2006) also found that the sensitivity of the CEOs' option portfolios to stock prices had a significant and positive correlation with the propensity for misreporting.[2]

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1 See, for example, Wang and Williams (1994).

2 Park and Park (2004) noted that managers tended to time their insider sales after observing unusually higher accruals, and that they were also more likely to be actively involved in earnings management for their own benefit than insider sales. A similar argument was followed by Beneish and Vargus (2002) and Cheng and Warfield (2005), whereas Erickson et al. (2006) found no consistent evidence to show that executive equity incentives were associated

This research sets out to investigate the economic costs 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, which may well lead to an increase in the proportion of informed traders in the firm's equity,[3] along with a corresponding decline in the willingness of uninformed traders (liquidity traders) to trade in such equities with abnormal accruals.

Secondly, in reporting periods which take place during periods of financial crisis, managerial agency costs are particularly severe for those firms with high discretionary accruals; as are the information asymmetry costs. 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.

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. Since those companies with high abnormal accruals will incur higher asymmetric information costs, thereby increasing the probability of trading against informed traders, liquidity providers will incur relatively higher costs; they will therefore offer wider bid-ask spreads.

Although many of the prior studies have already dealt with the relationship between

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with fraud.

[3] The evidence provided by Dechow and Dichev (2002) and Sloan (1996) showed that high accrual levels signified low quality and less persistent earnings.

asymmetric information costs and earnings management, to the best of our knowledge, no study has yet undertaken an examination of the economic costs of earnings management on equity liquidity. Given the recent period of crisis in the reporting of corporate accounts, we believe that our analysis may be particularly informative in terms of providing a better understanding of the economic costs of earnings management.

Using NYSE trade and quote (TAQ) data, this study aims to investigate the economic costs of earnings management on equity liquidity during the recent crisis period in financial reporting. This period of crisis, sparked off by the revelations at Enron and WorldCom, provides us with a valuable opportunity to examine the above hypothesis, and indeed, our results reveal that companies' past 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 the economic costs of equity liquidity appear to have been more severe after the promulgation of the Sarbanes-Oxley (SOX) Act.

2. Data Source

In this study, we analyze 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), we select those stocks which had an average price in excess of $1.00 and which had an average total of five or more daily trades. The sample period under examination runs from October to December 2001, a

period corresponding with the Enron crisis period.[4]

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

Following Huang and Stoll (1996), we attempted to further minimize data errors by the method they proposed. We identified an initial sample of firms included in the Russell 3000 index; however, based upon their different accrual procedures, all banks and financial institutions (comprising of 676 firms with SIC codes 6000-6999) were 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.

Following these selection criteria, we were left with a sample size of 1,345 firms; however, 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. 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 1,156 firms in 44 industries (see Appendix A).

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 was presented by Dechow et al. (1995) to show that this model was extremely powerful in detecting sales-based manipulations.

[4] On 16 October 2001, Enron announced that it was reducing both its after-tax net income (by $544 million) and its shareholders' equity (by 1.2 billion). On 8 November 2001, the company announced that as a result of accounting errors, it was restating its previously reported net income for the years 1997-2000, and subsequently reduced the previously reported net income by $586 million. Soon afterwards, on 2 December 2001, Enron declared bankruptcy.

We use 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 et al., 1998).

Bid-ask spread

We use the percentage spread as our 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 $Ask_{it} - Bid_{it}$, where Ask_{it} and Bid_{it} are the respective average intraday ask and bid prices at time *t* for security *i*. The percentage spread is calculated as:

$$Percentage\ Spread_{it} = \frac{Ask_{it} - Bid_{it}}{(Ask_{it} + Bid_{it})/2} \quad .$$

Information asymmetry component

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

We go on to investigate the impact of earnings management on the adverse selection components of the equity bid-ask spread. This issue is examined by testing the relationship that exists between the measures of earnings management and the adverse selection costs of the equities. In this study, we use the method adopted by Madhavan et al. (1997) since this is the method most often used in practice. The information asymmetry components of the bid-ask spreads are then calculated as the estimated value of θ times the percentage spread.

3. Econometric Methods

As noted in Madhaven (2000) and Stoll (2003), it has been 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, found that spreads were positively related to price and volume, whilst Stoll (1978) found that spreads were 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 averages of each of the underlying variables are taken across all of the days in the overall sample period in order to reduce the errors associated with a single day. We investigate the following regression model in order to control for the factors that might be important in determining the spread:

$$\begin{aligned} PSP_i = \alpha_0 + \alpha_1 ADA_i + \alpha_2 SDRET_i + \alpha_3 LNTV_i + \alpha_4 LNCLP_i \\ + \alpha_5 LNTR_i + \alpha_6 LNMV_i + \varepsilon_i \end{aligned} \quad (3)$$

where PSP_i is the average of the percentage spread for equity i; ADA_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 values; $LNCLP_i$ is the natural log of the mean daily closing stock price; $LNMV_i$ is the natural log of the market value of firm i, 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. Chen et al. (2004) demonstrated 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) showed that the proxy variable for information asymmetric costs (the bid-ask spread) could affect earnings management; hence, in our model, earnings management is endogenous, which demonstrates that an instrumental variable estimation procedure is more appropriate for the model structure. Following the prior studies, we adopt 'debt to asset ratio', 'quarterly operating cash flow volatility', 'firm size', 'market-to-book ratio', 'net revenue growth' and 'return on equity' as the instrumental variables used to estimate Equation (3).

The empirical research design of the relationship between earnings management and equity liquidity comprises of two parts. Firstly, since our main research interest focuses on the effects of earnings management on equity liquidity, we consider the estimation of Equation (3) for the period from October to December 2001 in isolation. Secondly, since market makers and liquidity traders did not seem to have the ADA information available for the current year (2001), the ADA for the previous year is used in the estimation of Equation (3). Furthermore, in order to control for the fact that ADA may be endogenous, Equation (3) is estimated by the two stage least squared (2SLS) estimation procedure, which uses 'debt to assets ratio', 'quarterly operating cash flow volatility', 'firm size', 'market-to-book ratio', 'growth opportunity' and 'return on equity' 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, we also test the relationship between earnings management and the information asymmetry component using the MRR approach.

4. Concluding remarks (結果與討論)

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. This research 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. Our 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.

Our 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.

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129-49.

(三)計畫成果自評部份

This research plans to provide new insight into the analysis of the economic costs of earnings management on equity liquidity. The research results could provide policy implication on the reform of financial system.

Research participants benefit from this research by increasing their research ability in econometric method, measure of earnings management and the market microstructure issues, particularly, corporate information asymmetric costs on equity liquidity costs, and conducting high frequency data analysis. Furthermore, this research will enhance our understanding of the cross sectional difference in equity liquidity. Besides, the research participants' ability of applying the financial econometrics methods will increase.

The research report has been rewritten as an academic paper which was presented in international conference, FMA 2006 annual meeting and is submitted to a referred academic journal.

赴國外參加研討會心得報告

本屆 Financial Management Association Annual Meeting 在美國猶他州鹽湖城舉辦，FMA 爲球最大的財務金融學會，美國一流大學及亞洲、中南美洲、歐洲知名大學的財金學者亦都參加。FMA 也是全球財金學術研討會中，除了 American Financial Association 年會、Western Finance Association 年會以外，最重要的財金學術研討會之一。此次研討會的 opening keynote address 是由在公司理財領域非常著名的 MIT 講座教授 Stewert C. Myers 主講。他的演講主題在探討 Corporate Finance and Corporate Governance，對於近幾年來十分熱門的公司治理主題如何影響著公司理財研究的發展，以及如何衝擊 corporate stakeholders 利益關係的更一致性有深刻的分析。

敝人在此次研討會報告了一篇關於 Economic Costs of Earnings Management on Equity Liquidity 之研究論文，論文之評論人爲 University of Delaware 的 Jeffrey Harris 教授，我所發表之論文論及，近年來企業財務資訊揭露不實的事件顯示，管理者從事盈餘操縱以創造較佳之營運績效來獲得其個人私有利益的極大化之可能性將增加。管理者藉由盈餘管理來謀取其個人私有利益最大，將使股東權益受損。因此，當管理者決定從事更多之盈餘操縱也隱含更大的資訊不對稱成本，本文以 NYSE 與 Nasdaq 掛牌之樣本公司爲例，發現此類成本在公司財務資訊揭露危機時期，資訊不對稱成本提高將帶給流動性提供者更大之成本，證券之買賣價差將較大，因此該公司證券之流動性將下降，實證結果支持

公司從事高度盈餘管理必須付出之較高的證券流動性經濟成本之假說。Jeffrey Harris 教授在研究市場交易機制及證券交易成本領域頗具知名度，他對於我所發展之論文，除認爲主題具重要且具發表潛力之外，也提供了論文許多建設性之修改意見。另外，本場次之論文發表主持人爲 University of Mississippi 的 Bonnie Van Ness 教授。她是在市場微結構領域近年來表現非常傑出之女姓學者，由於部分研究領域接近，我也與其交換許多研究議題合作之可行性。Drexel University 財金系系主任 Michael Gombola 也在會場中聆聽我的演講，他提出一些關於測度盈餘管理方法的相關問題，他也提供我許多論文內容之修改建議，另外，本次與會也與 University of Mississippi 的 Robert Van Ness 教授，Louisianan State University、CFTC、Georgetown University、University of Wisconsin Milwaukee、University of Utah 等等學校或機構的教授進行學術交流。FMA 本年度並辦理了一場 Pursuing high quality research 的座談，有趣的是與會者在介紹沒有 PhD program 下如何發表高品質的學術著作。此次會議也同時參加了許多場論文發表場次，其中關於 Multi-Market trading and Liquidity、Risk Management、公司治理、Managerial Incentive for Performance 等等研究論文發表都有參加。