

國立交通大學

經營管理研究所

碩士論文

盈餘管理與權益流動性

Earnings Management and Equity Liquidity



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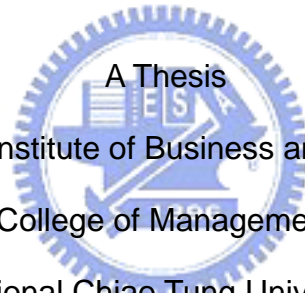
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摘要

盈餘管理的議題是越來越重要在伴隨著最近一連串的會計醜聞的風波下，文獻中大部分的研究都著重在盈餘管理與股票報酬上。只有少許的理論分析模型在探討盈餘管理與權益流動性，然而這兩者之間的關係還欠缺實證研究去檢驗它，本篇實際去驗證是否盈餘管理影響權益市場的流動性，我檢驗的樣本總共有620家在紐約證券交易所上市的公司，研究結果顯示出盈餘管理與權益流動性之間有顯著的正相關在三階最小平方法上，我們發現這個現象與市場將會透過市場機制懲罰那些有操弄盈餘的公司的概念一致。



關鍵字：會計醜聞，盈餘管理，股票報酬，權益流動性，三階最小平方法，市場機制

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ABSTRACT

The issue of earnings management is more and more important by the recent spate of corporate accounting scandals. Most studies in the literature focus on relation between earnings management and stock returns. Only few analytical models study the relation between earnings management and equity liquidity. This relation still lack of empirical work to investigate it. This paper empirically examines whether earnings management affects the liquidity in equity market. I examine a sample of 620 U.S. public companies that listed in NYSE. The result shows a significant positive relation between earnings managements and equity liquidity with the Three Stage Least Squares (3SLS) estimation. Our findings are consistent with the idea that market does punish the firms manipulating reported earnings through market mechanism.

Keywords: Accounting Scandals, Earnings Management, Stock Returns,
Equity Liquidity, 3SLS, Market Mechanism

誌謝

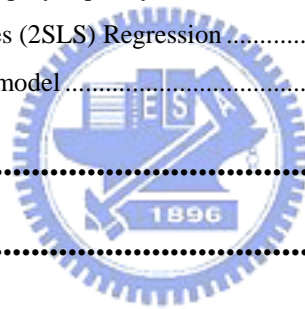
此時此刻的我心中感動萬分，對於論文的順利寫出，莫過於最感謝我的兩位最親愛的老師，許和鈞老師與鍾惠民老師。從他們身上不僅使我在學識上更上一層樓，更讓我學習在處理事情應對之間如何把事情做的圓融恰當，更是在書本上所學不到的。而在研究所這兩年中，計畫趕不上變化，許多事情都來的太突然，讓我心中有種莫名的感嘆，家父的去逝更是在我的心中留下無限的悔恨，悔樹欲靜而風不止，子欲養而親不待；恨蒼天無情，命運戲人，當然學習無常、瞭解無常，更是在我人生中最重要的一課，常是永恆、是固定的，而無常亦即是萬事不變唯有變的道理，說其實簡單，做更是困難，願在看誌謝的人，同時間可以在你心中起一點漣漪，盪起無常之心。

其次，要感謝論文口試委員陳達新老師、謝文良老師以及周冠男，因為有您們的細心審查與寶貴的意見，才能讓這本論文更臻完善。

再撰寫論文之際，更是感謝財金所同學偉立與禹丹的大力幫忙與指導，再則為志良、宥任、吟綺、麗婷、嘉哲、小陸、秉貞、為詩、志勳與健偉...太多感謝的人了，當然還有跟我一起修財金所課的學弟們，再一次的謝謝你們。

人家常說常說成功的男人背後一定有一個偉大的女人，雖然我不是一個成功的男人，但我的背後有兩個讓我值得依賴的女人，一個是媽媽，另一個則為女友玉琦，千言萬語都無法表達出心中的感激，唯有透過短短的幾句話，希望在這字裡行間希望多少能顯現出一點點的感謝之心。最後僅以此論文獻給天上的父親，身邊的每一位以及家人，願你們一起與我分享，這對社會與學術微不足道的貢獻，但對我自己卻是邁進一大腳步的碩士論文。

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1. Introduction

Earnings management has become a wide practice for US firms. Healy (1985), Perry and Williams (1994), and DeFond and Jiambalvo (1994) are examples of empirical research suggesting that earnings management is common among firms. However, most studies in the literature focus on the relation between earnings management and stock returns. Pervious studies also have some analytical models showing that the relation between earnings management and equity liquidity. This relation still lack of empirical work to investigate it. This paper fills this gap by examining the relation between earnings management and equity liquidity.

Investors and managers are very concern about firm's reported earnings. Financial news that a firm has raised earnings expectations, this event can immediately send it stock price raise. Therefore, investors can get return from it. Managers are interested in maintaining growth in earnings because their bonuses are often tied to their firm's profits. The focus on reported earnings is so intense that is has been suggested that the market fixates on firm's earnings management.

What is earnings management? According to Healy and Wahlen (1999), they define "earnings management occurs when manages use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". The issue of earnings management is more and more important by the recent spate of corporate accounting scandals. Managers have incentive to be aggressive in applying accounting rule so as not to disappoint investors. The Securities and Exchange Commission (2003) cites hundreds of cases where managers have used accounting

accruals to bloat their firm's profits. For example, Enron, Worldcom and Xerox have inflated reported earnings to create a false impression of high-profile firms.

What are the incentives of managers to manipulate reported earnings? Shivakumar (1996) and Rangan (1998) indicate that management faces the incentive to manage earnings upwards around a seasoned equity offering to maximize the offer price for its shares of stock. They provide evidence of earnings management around seasoned equity offerings. Leuz et al. (2003) argue that the incentive to misrepresent firm performance through earnings management is a conflict of interest between insiders and outsiders. They report that insiders are like controlling owners or managers that can use their control rights get benefits to themselves and at the expense of other stakeholders. For example, insider can use their discretionary current accruals to create reserves for future periods by understating earnings in years of good performance, in others word, effectively making reported earnings less than the firm's true economic performance. Insider also can use discretionary current accruals to overstate earnings and conceal loss earnings realizations. So insiders will acquire private control benefits through earnings management. However, insiders also have incentives to hide their private control benefits from earnings management. The reason is that these private control benefits were be found, the outsiders will take disciplinary action against them (Zingales,1994 ; Shleifer and Vishny, 1997).

Liquidity is usually defined as the ability that an asset can be trade quickly with the least cost of searching counterpart and the least price concession. Stoll (2000) indicates that immediate sales are usually made at the bid price, and immediate purchase are usually made at ask price. On the one hand, the spread is the price concession needed for an immediate transaction to liquidity demanders; on the other hand, it is the revenue earned by liquidity suppliers such as market makers or dealers. Thus, the quoted bid-ask spread is often used as a measure of market liquidity.

According to Akerlof (1970), he has pointed out the adverse effects information asymmetries have on the functioning of markets. Information asymmetry is thought to promote unwillingness to trade and increase the cost of capital as investors price protect against potential losses from trading with better informed market participants (Bhattacharya and Spiegel 1991). Lev (1988) argues that observable measures of market liquidity can be used to identify the perceived level of information asymmetry facing participants in equity markets. Bid-ask spreads are one such measure of equity liquidity that has been used extensively in previous research as a measure of information asymmetry between insiders and outsiders. This paper follows previous studies, I use bid-ask spreads proxy for equity liquidity.

Richardson (2000) reported that when information asymmetry is high, stakeholders may don't have the necessary information to penetrate manipulation earnings. Richardson also mentions other possible explanation is that the high level of information asymmetry is evidence of shareholders without sufficient resources, incentives, or access to relevant information to monitor manager's action. So it may increase the practice of earnings management. Anyway, Richardson provides the evidences which the magnitude of information asymmetry affects the magnitude of earnings management practiced by firm managers.

This paper not only extends previous Richardson empirical work but also hypothesizes that the magnitude of earnings management affects the magnitude of equity liquidity. When the magnitude of earnings management is high, I expect the information asymmetry between insiders and outsiders is high. It was implied low equity liquidity and large spread. On the other hand, as insiders can easy manipulate reported earnings; the high level of information asymmetry must exist in between insiders and outsiders. Another possible explanation is that the outsiders detect manager manipulate reported earnings, they would unwilling to trade this firm's stock

in equity market. Market will punish the firms which manipulate reported earnings through market mechanism, at the same time, the equity liquidity is low.

The result of this paper is a significant positive relation between earnings managements and liquidity in equity market. In the ordinary least squares (OLS) estimation, the results show that earnings management and equity liquidity exhibit a significantly positive association as predicted by our hypothesis. It shows the earnings management affects the liquidity in equity market. Similar results are obtained if all the other control variables are used as instruments in the three-stage least squares (3SLS) estimation. Our empirical results not only consist with Richardson's (2000) empirical result but also provide a comprehensive empirical work to discuss the relationship between earnings management and information asymmetry on equity liquidity.

The empirical findings are subject to several limitations. First, earnings management is difficult to measure, especially as it manifests itself in different forms. I attempt to capture earnings management activities by using the most popular accrual model (Jones Model). Second, some studies report that bonus and board composition are determinants of the earnings management activities. Management may have incentive to manipulate reported earnings to maximize their bonuses over time. Many studies document evidence consistent with the manipulation of reported earnings caused by bonus-maximizing incentives (Healy (1985), Holthausen et al. (1995), and Gaver et al. (1995)). Competition in the outside directors' labor market, as discussed by Fama and Jensen (1983), suggests that outside directors may have an incentive to monitor earnings management. Consistent with this view, Dechow et al. (1996) and Beasley (1996) provide US evidence that outside board members are effective in constraining earnings frauds. In this paper, our control variables of earnings management ignore these two variables.

Because our database lack of these two variables and they are difficult to measure.

Moreover, the existence of complementarities raises concerns about endogeneity bias. I attempt to address these concerns with two-stage least squares (2SLS) and three-stage least squares (3SLS) estimation. However, I acknowledge that the endogeneity bias may still exist in two-stage least squares (2SLS). Finally, this endogeneity problem has been controlled by using three-stage least squares (3SLS) estimation. The remainder of this paper is organized as follows. Section 2 discusses the relevant literature. Section 3 describes the method used to measure equity liquidity and earnings management. Section 4 describes the data and the research methodology. Section 5 shows the empirical results. Section 6 concludes the paper.



2. Literature review

2.1 Earnings Management

Firms manipulate reported earnings have been documented in many studies. (see, for example, Healy (1985), Perry and Williams (1994), and DeFond and Jiambalvo (1994)). Prior research has focused almost exclusively on understanding whether earnings management exists and why. The findings indicate that earnings management occurs for a variety of reasons, including to influence stock market perceptions, to increase management's compensation, to reduce the likelihood of violating lending agreements, and avoid regulatory intervention (Healy and Wahlen (1999)). Park and Shin (2003) report that earnings manipulations range from earnings frauds, which violate Generally Accepted Accounting Principles (GAAP), to earnings management, which does not. Even in the absence of fraudulent reporting, firms can manipulate reported accounting earnings because GAAP allows alternative representations of accounting events. Teoh et al. (1998) documented that the sources of earnings manipulations within GAAP include the choice of accounting methods, the application of accounting methods, and the timing of asset acquisitions and dispositions. The choice of accounting methods affects the timing of when revenues and expenses are recognized in income. If input prices are falling, LIFO (last-in-first-out) costs of goods sold (based on later lower prices) are lower than FIFO (first-in-first-out) costs. For depreciable assets, straight-line depreciation charges lower depreciation expenses more than accelerated depreciation in the initial periods. Even after managers have chosen the accounting methods, there remains discretion in terms of how the accounting principles are applied. For instance, Managers has discretion in the estimates of salvage values of depreciable assets, lives of intangibles, uncollectible rate on accounts receivable, the actuarial cost basis for

pension plan and for pension accounting (Teoh et al. (1998)). The timing of asset acquisitions and dispositions can affect reported earnings. Sum up, Managers can smooth reported earnings by choosing an accounting method that advances (delays) the recognition of revenues and delays (advances) the recognition of expenses in order to increase (decrease) reported earnings. Once an accounting method is chosen, management can smooth reported earnings further by using a wide range of discretionary accruals. Finally, management can smooth reported earnings by adjusting the timing of asset acquisitions and dispositions. Obviously, earnings manipulation increases information asymmetry between insider and outsider, and it has to decrease outsiders' wealth potentially.

Next, I will introduce some literature of detect earnings management. Jones (1991) proposes a model that relaxes the assumption that nondiscretionary accruals are constant and attempts to control for the effect of changes in a firm's economic circumstances on nondiscretionary accruals (Dechow et. al 1995). The pitfall of Jones Model is the estimate of earnings management to be biased toward zero. Jones Model implicitly assumes that discretion is not exercised over revenue in either the estimation period or the event period. Therefore, Dechow, Sloan and Sweeney (1995) introduce a modified version of Jones Model. The modified Jones Model implicitly assumes that all change in credit sales in the event period result form earnings management. This is based on the reasoning that it easier to manage earnings by exercising discretion over the recognition of revenue on cash sales. Dechow et. al (1995) reported that if this modification is successful, then the estimate of earnings management should no longer be biased toward zero in samples where earnings management has taken place through the management of revenues. Finally, Teoh et al., (1998) use an extension of the cross-sectional Jones Model decomposed accruals into four components: discretionary and nondiscretionary current accruals, and

discretionary and nondiscretionary long-term accruals. Nondiscretionary accruals are the asset-scaled proxies for unmanipulated accruals dictated by business conditions. Discretionary accruals are the asset-scaled proxies for manipulated earnings determined at the discretion of management. Guenther (1994) showed that entrepreneurs have more discretion over short-term than over long-term accruals. Teoh et al. (1998) consider that discretionary current accruals (DCA) are the superior proxy for earnings management. So I follow Teoh et al. (1998) to calculate the index of earnings management in this paper.

2.2 Equity Liquidity

Equity liquidity could be measured by how long it takes optimally to trade a given amount of an asset, or be measured by the price concession for an immediate transaction (Lippman and McCall, 1986; Demsetz, 1968). Under this view, the equity liquidity is viewed as the price of immediacy, and bid-ask spreads which determined by dealer's order processing cost, inventory holding cost, and information asymmetric cost is one measure of market liquidity. Bid-ask spreads have been used extensively in previous research as a measure of information asymmetry between management and shareholders. Evidence of the ability of bid-ask spreads to capture the information environment of the firm is provided by Healy, Palepu, and Sweeney (1995) and Welker (1995) who report evidence of a negative relationship between bid-ask spreads and firm's disclosure policies. When information asymmetry exists between managers and shareholders, managers consistently provide incomplete information to shareholders. The market maker increases the bid-ask spreads to offset the potential losses of trading with informed traders and gain from trading with uninformed traders. When information asymmetry is high, it also stands for equity liquidity is low. So in this paper, I use bid-ask spread proxy for the information asymmetry between insiders

and outsiders. At the same time, bid-ask spread also stands for the equity liquidity. When the spread is narrow, it means greater liquidity in equity market and smaller information asymmetry.

2.3 Earnings Management and Equity Liquidity

A large number of papers have indicated the relationship between earnings management and stock returns. Sloan (1996) finds that stocks with high accruals consistently underperform stocks with low accruals for three years. Teoh et al. (1998) documented that issuers with higher discretionary accruals have poorer stock returns performance in the subsequent three years. Chan et al. (2003) further show that accruals are reliably, negatively associated with future stock returns. When firms manipulate reported earnings by increasing accruals, it would lead to poor future stock returns. This paper differs from those papers in investigating the relationship between earnings management and equity liquidity.

Investors and financial analysts use accounting information to help value stocks can create an incentive for managers to manipulate reported earnings in attempt to affect short term stock price performance. This paper not only hypothesizes the magnitude of information asymmetry affects the magnitude of earnings management by managers but also hypothesizes the magnitude of earnings management affects the magnitude of information asymmetry. Therefore, I expect the positive relation between bid-ask spreads and earnings management.

Several analytical papers have extended the analysis between information asymmetry on equity liquidity and earnings management (Trueman and Titman, 1988; Dye, 1988). However, there has been little empirical testing work to investigate this relationship. Schipper (1989) argues that this lack of empirical testing of the information environment surrounding earnings management represents a slippage

between analytical models and empirical tests of earnings management. Schipper also suggests the need for empirical work that addresses the environmental conditions surrounding the practice of earnings management. Later, Richardson (2000) only investigate the magnitude of information asymmetry affects the magnitude of earnings management by firm managers. Richardson also finds that information asymmetry affects managers manipulate reported earnings significantly. However, it still lacks of a comprehensive empirical work to discuss the relationship between earnings management and information asymmetry on equity liquidity. On other hands, Richardson's empirical work absence of the magnitude of earnings management affects the magnitude of information asymmetry.

The purpose of this paper is to fill this gap and to provide more complete research in investigating the relationship between earnings management and equity liquidity.



3. Measurement of Equity Liquidity and Earnings Management

3.1. Measuring Equity Liquidity

Bid-ask spread is one such measure of market liquidity that has been used extensively in previous research as a measure of measure of information asymmetry between inform traders and noinform traders. In order to measure equity liquidity and information asymmetry, I use percentage bid-ask spread (PSP) to proxy it.

$$PSP = \frac{Ask_i - Bid_i}{Mid_i},$$

where Ask_i is the quoted ask price for stock i . Bid_i is the quoted bid price for stock i . Mid_i is the midpoint of Ask_i and Bid_i .

I follow Chung et al. (2004) to minimize the potential errors in TAQ data.

1. Quotes if either the ask price or the bid price is less than or equal to zero.
2. Quotes if either the ask size or the bid size is less than or equal to zero.
3. Quotes if the bid price is greater than or equal to the ask price.
4. Quotes if the bid ask spread is greater than \$5.
5. Trades if the price or volume is less than or equal to zero.

The empirical analysis is designed to test predictions developed in the preceding section earnings management to percentage bid-ask spread (PSP). Percentage bid-ask spread is predicted to be wider and more sensitive to variations in earnings management as the insider manipulate the reported earnings largely.

3.2. Measuring earnings management

This section describes the earnings management measures used in our empirical analysis. Managers can conceal changes in their firm's economic performance using both real operating decisions and financial reported choices. Here, I focus on manager's financial reported choices. When managers want to smooth their reported earnings by altering the accounting component of accounting, namely accruals.

According Sloan et al. (1996), I measure the accruals as:

$$\begin{aligned} Accruals_{it} &= (\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta STD_{it} - \Delta TP_{it}) - Dep_{it} \\ &= (\Delta AR_{it} + \Delta INV_{it} + \Delta OCA_{it}) - (\Delta AP_{it} + \Delta OCL_{it}) - Dep_{it} \end{aligned} \quad (1)$$

where ΔCA_{it} is the change in total current assets (Compustat annual data item 4). $\Delta Cash_{it}$ is the change in cash (item 1). ΔCL_{it} is the change in total current liabilities (item 5). ΔSTD_{it} is the change in debt include in current liabilities (item 34). ΔTP_{it} is the change in income taxes payable (item 71). Dep_{it} is depreciation and amortization expense for firm i in year t (item 14). The components of accruals can further decompose by ΔAR_{it} is the change in accounts receivable (item 2); ΔINV_{it} is the change in inventories (item 3); ΔOCA_{it} the change in other current assets (item 68); ΔAP_{it} is the change in accounts payable (item 70); ΔOCL_{it} is the change in other current liabilities (item 72).

I follow Jones (1991) model to identify firm's earnings management. The purpose of Jones model is to decompose the level of accruals into nondiscretionary accruals and discretionary accruals. So accruals equal to nondiscretionary accruals plus discretionary accruals. Most of the existing earnings managements studies focus on the analysis of discretionary accruals. Because nondiscretionary accruals simply reflect a business condition, such as sales vary across firm. It don't relate to earnings management. Controlling for the effects of business conditions may help tease out more clearly role of managerial discretion in using accruals to manipulate earnings.

Therefore, the nondiscretionary accruals only capture the impact of business conditions while the discretionary accruals reflect managerial choices.

How to measure earnings management? There is no perfect way to compute it. In pervious studies, a widely accepted proxy is the discretionary current accruals, which proxy for management discretion on reported earnings (see Teoh et al. (1998)).

In order to measure DCA and NDCA, I use the most popular cross-sectional modification of the Jones model (Jones, 1991; Dechow et al., 1995; Teoh et al., 1998).

I run the following cross-sectional OLS regression:

$$\frac{CA_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{\Delta Sales_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t}, \quad (2)$$

where $CA_{i,t}$ is current accruals for firm i in year t , it be measured as equation (1).

$\Delta Sales_{i,t}$ is the change in sales for firm i in year t . $TA_{i,t-1}$ is the book value of total assets for firm i in year $t-1$. Park and Shin (2003) documented that the regression equation is deflated by lagged assets in order to reduce heteroskedasticity. I use each industry-year to estimate each regression coefficient. The industry classification is based on the first two-digit SIC code. If the industry-year observations fewer than six, it will be excluded form the analysis.

Following Teoh et al., (1998), I measure each sample firm's nondiscretionary current accruals (NDCA) as:

$$NDCA_{i,t} = \hat{\beta}_0 \frac{1}{TA_{i,t-1}} + \hat{\beta}_1 \frac{\Delta Sales_{i,t} - \Delta TR_{i,t}}{TA_{i,t-1}}, \quad (3)$$

where $\hat{\beta}_0$ and $\hat{\beta}_1$ are be estimated the regression parameters in equation (2).

$\Delta TR_{i,t}$ is the change in trade receivables (item 151) for firm i in year t . Why subtract the increase in trade receivables from the change in sales? Teoh et al., (1998) mention that it reduces the possibility of credit sales manipulation by the firm.

Therefore, I obtain discretionary current accruals as:

$$DCA_{i,t} = \frac{CA_{i,t}}{TA_{i,t-1}} - NDCA_{i,t}, \quad (4)$$

Finally, I take absolute value of the discretionary current accruals. Because I don't rely on the direction of the managed accrual, but rather on the level of the manipulate accrual. Our test statistics are based on the absolute value of the discretionary current accruals (ADCA).



4. Data and Research Methodology

4.1. Data selection and descriptive statistics

The sample period extends from 1999 to 2001. Firms that are listed on NASDAQ are not included in the sample. Christie and Schultz (1994) pointed out that there is some evidence of collusion among markets in setting the bid and offer prices in the NASDAQ. Stoll (2000) indicated that several previous empirical studies have shown that market structure appears to have an effect on spread. Spreads continue to be larger significantly on the NASDAQ dealer market than on the NYSE/AMEX auction market. In order to reduce the problem of market structure, I only use the stocks of Russell 3000 index listed in NYSE. Additionally, the industry-year observations fewer than six, it will be excluded from the sample. The sample comprises all firms of Russell 3000 index listed on the New York Stock Exchange (NYSE) which are covered on both Trade and Quote (TAQ) database and the COMPUSTAT. Banks and financial institutions (SIC codes 6000-6999) are excluded from the sample because they use different accrual procedures. The final sample consists of 1860 firm-year observations and 620 unique firms for the fiscal years from 1999 to 2001.

Trade and Quote (TAQ) database contains intraday transactions data (trades and quotes) for all securities listed on the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX), as well as Nasdaq National Market System (NMS) and SmallCap issues. I obtain intraday trading and quoted data such as closing prices, bid and ask prices, and daily dollar volume from TAQ database. COMPUSTAT database provides superior accounting statement information on companies from around the world. I also obtain stocks' daily returns without

dividends, financial leverage (LEV), Sales and Market to Book ratio (MBRT) from the Center for Research in Security Prices (CRSP) and the COMPUSTAT database.

Table 1 shows characteristic of the sample firms. The average of absolute value of discretionary current accruals (ADCA) is 6 percent and range between 0.5 percent and 54 percent. The average of percentage spread (PSP) is approximately 0.6 percent and range between 0.1 percent and 4 percent. The average of market to book ratio (MBRT) for our sample is approximately 3.1, and ranges are between 0.16 and 17. The mean financial leverage (LEV) is approximately 0.28, and ranges are between 0 and 0.77. The mean size is approximately 7.7, and ranges are between 4.7 and 12.6. The return volatility (SDRET) has the average value about 0.03, and the sample range is from 0.01 to 0.07.

Table 2 reports univariate correlation coefficients between selected variables. The correlation between percentage bid-ask spread and each explanatory variable are all in the expected direction. Price and dollar value of volume are negatively related to spreads, and return standard deviation is positively related to spreads, as suggested by the previous literature. From the table 2, it also indicates a correlation between earnings management (ADCA) and percentage bid-ask spreads is 0.033. Simple correlation is consistent with our hypothesis, there is a positive correlation between earnings management and percentage bid-ask spread.

Table 1

Data statistics of variables

Variable	N	Mean	Std	Minimum	Maximum
ADCA	1860	0.06306	0.04264	0.00518	0.54284
MBRT	1860	3.10389	2.65281	0.1613	17.0338
LEV	1860	0.27885	0.15394	0	0.7686
SIZE	1860	7.66704	1.36851	4.66451	12.61126
PSP	1860	0.00582	0.00438	0.00109	0.03964
lnDOLVOL	1860	12.999	1.61831	9.8156	17.60339
lnCLP	1860	3.14806	0.591	0.33558	6.29862
SDRET	1860	0.03017	0.00927	0.0127	0.07207

Absolute value of discretionary current accruals (ADCA) are measured by actual current accruals subtract the nondiscretionary current accruals then take absolute value. MBRT is the market to book ratio of assets. LEV is the ratio of long-term debt and short-term debt to total assets. SIZE is the natural log of total assets. Percentage bid-ask spread (PSP) is the spread divided by the average of the bid and ask price. lnDOLVOL is the natural log of dollar value of volume. lnCLP is the natural log of the stock price. SDRET is the standard deviation of stock return. The sample period is 1999 – 2001. The sample consists of 1860 firm-year observations and 620 unique firms.

Table 2

Pearson correlation coefficients

	ADCA	MB	LEV	SIZE	lnDOLVOL	lnCLP	SDRET	PSP
ADCA	1.000							
MB	0.040 (0.085)	1.000						
LEV	-0.030 (0.190)	-0.086 (<0.001)	1.000					
SIZE	-0.057 (0.014)	0.148 ($<.0001$)	0.275 ($<.0001$)	1.000				
lnDOLVOL	0.017 (0.467)	0.442 ($<.0001$)	-0.065 (0.005)	0.771 ($<.0001$)	1.000			
lnCLP	-0.061 (0.008)	0.331 ($<.0001$)	-0.136 ($<.0001$)	0.462 ($<.0001$)	0.647 ($<.0001$)	1.000		
SDRET	0.176 ($<.0001$)	-0.066 (0.004)	-0.037 (0.111)	-0.223 ($<.0001$)	-0.062 (0.007)	-0.424 ($<.0001$)	1.000	
PSP	0.033 (0.150)	-0.286 ($<.0001$)	0.103 ($<.0001$)	-0.472 ($<.0001$)	-0.673 ($<.0001$)	-0.770 ($<.0001$)	0.466 ($<.0001$)	1.000

Absolute value of discretionary current accruals (ADCA) are measured by actual current accruals subtract the nondiscretionary current accruals then take absolute value. MBRT is the market to book ratio of assets. LEV is the ratio of long-term debt and short-term debt to total assets. SIZE is the natural log of total assets. Percentage bid-ask spread (PSP) is the spread divided by the average of the bid and ask price. lnDOLVOL is the natural log of dollar value of volume. lnCLP is the natural log of the stock price. SDRET is the standard deviation of stock return. The sample period is 1999 – 2001. The sample consists of 1860 firm-year observations and 620 unique firms.

4.2. Research Methodology

4.2.1. Regression analysis of equity liquidity

In this section, I examine the effect of earnings management on equity liquidity by using regression models. I use cross-sectional regression method to see whether the earnings management reduces equity liquidity. In order to provide a baseline regression against which subsequent test can be compared, I estimate equation (5) by simple ordinary least squares estimation (OLS) regression.

$$PSP_i = \alpha + \beta_1 ADCA_i + \varepsilon_i, \quad (5)$$

From previous discussion, I hypothesize more earnings management affects the percentage spread larger. When the insider can easily manipulate reported earnings, the information asymmetric between insider and outsider is large. So I expect the coefficient on β_1 is positive.

Previous cross-sectional studies of spreads suggest that a number of spread determinants should be controlled for in the empirical analysis; the strongest and most consistent findings are that relative spreads are negatively related to share price, trading volume, and competition in the market to provide liquidity, and positively related to return volatility and the adverse selection problem confronting specialists (Welker 1995). Following Welker (1995), the return volatility (SDRET), dollar value of volume (DOLVOL) and stock's closing price (CLP) are added to the cross-sectional regression model as control variables.

The further regression model is as follows:

$$\ln PSP_i = \beta + \beta_1 ADCA_i + \beta_2 \ln DOLVOL_i + \beta_3 \ln CLP_i + \beta_4 \ln SDRET_i + \varepsilon_i, \quad (6)$$

According to Welker (1995), I take the natural log of percentage bid-ask spread to control for heterosecdasticity. At the same time, the dollar value of volume (DOLVOL), the return volatility (SDRET) and stock's closing price (CLP) are added to the cross-sectional regression model as control variables. In order to smooth the data, we take log value on dollar value of volume (DOLVOL), the return volatility (SDRET) and stock's closing price (CLP). Finally, according to previous studies, we predict that the stocks with large return volatility will have wider spreads, and the stocks having larger price and daily dollar volume will have smaller spreads. So we expect the coefficient on β_2 and β_3 are negative; the others coefficient on β_1 and β_4 are positive.

4.2.2. Two-Stage Least Squares (2SLS) Regression

However, the multiple regression models assume that absolute value of discretionary current accruals (ADCA) is exogenous variables. On the other hand, if earnings management is endogenous variable; our result will suffer from an endogeneity problem (omitted variables bias). Omitted variables appear when we would like to control for one or more additional variables but usually because of data unavailability, we cannot include them in regression model. At the same the time, it means ADCA is correlated with the disturbance. Hence we cannot expect ordinary least squares estimation (OLS) to consistently estimate any coefficient on independent variables. In this section, we use two-stage least squares (2SLS) regression to solve this problem. We address this concern by using market to book ratio (MBRT) as instruments for the earnings management variables (ADCA). Park and Shin (2003) point that the market to book ratio (MBRT) has been significant influences the level of earnings management in empirical result. The higher growth opportunities (MBRT) will result in the higher earnings management.

4.2.3. Simultaneous equation model

In this section, we consider the percentage bid-ask spread (PSP) and earnings management (ADCA) are simultaneously determined; our results may suffer from simultaneous equation bias. Accordingly, a system of equations in which both percentage bid-ask spread (equation 7) and earnings management (equation 8) are treated as an endogenous variable is estimated. In this viewpoint, I apply the Three Stage Least Squares (3SLS) to estimate parameters in a set of simultaneous equations. The simultaneous equation set shows below :

$$\ln PSP_i = \beta_0 + \beta_1 \ln ADCA_i + \beta_2 \ln SDRET_i + \beta_3 \ln DOLVOL_i + \beta_4 \ln CLP_i + \varepsilon_i, \quad (7)$$

$$\ln ADCA_i = \lambda_0 + \lambda_1 \ln PSP_i + \lambda_2 \ln LEV_i + \lambda_3 \ln SIZE_i + \lambda_4 \ln MBRT_i + \omega_i, \quad (8)$$

In the simultaneous equation set, the endogenous variables are bid-ask spread (PSP) and earnings management (ADCA) and the instrument variables are SDRET, DOLVOL, CLP, LEV, SIZE and MBRT. In order to smooth the data and to get elasticity coefficients from the estimated equation, we take log value on all variables.

According to Park and Shin (2003), the financial leverage (LEV), firm's size (SIZE) and growth opportunities (MBRT) are added to another regression model (Equation B4) as control variables. Highly financial leverage (LEV) firms may be less able to manipulate reported earnings because they have been monitored closely by lenders. Therefore, if the lender monitoring effect prevails, then earnings management will decrease with financial leverage (LEV). Firm size (SIZE) may be capturing the firm's information environment. The level of disclosure information will more transparent with firm size. Big firms are less likely to hide the behavior of manipulate earnings than small firms. However, Zmijewski and Hagerman (1981) suggest that political costs increase with firm size and with firm risk. Managers of large and/or

high-risk firms, therefore, have greater incentives to exploit the latitude in accounting to reduce these political costs. Besides the positive theory implications of firm size, but the size of the firm may also be capturing the firm's information environment and could thus have a negative relationship with the level of managed accruals. Therefore, I do not predict the sign of the relationship between firm size (SIZE) and the level of earnings management. I consider that a firm's growth opportunities as a potential determinant of earnings management. Park and Shin (2003) reported that firms with high growth opportunities may need to overinvest intentionally in current assets in anticipation of future sales growth. The temporary overinvestment in current assets can lead to a positive relationship between absolute of discretionary current accruals (ADCA) and growth opportunities (MBRT). So, we expect the growth opportunities (MBRT) have a positive relation with earnings management.



5. Empirical results

To provide descriptive evidence on between the earnings management and equity liquidity, we begin with an ordinary least squares estimation OLS regression.

$$PSP_i = \alpha + \beta_1 ADCA_i + \varepsilon_i,$$

The coefficient on (ADCA) β_1 is 0.007 with a t statistic of 1.69, which is statistically significant at less than 0.1 level. The result simple shows earnings management affects liquidity in equity.

Further empirical tests include the following control variables which are return volatility (SDRET), dollar value of volume (DOLVOL) and stock's closing price (CLP). Table 3 reports that the coefficients on dollar value of volume (DOLVOL) and stock's closing price (CLP) (β_3 and β_4) are reliably negative, and the coefficient on return volatility (SDRET) (β_2) is reliably positive, as predicted. However, the coefficient on the level of earnings management (ADCA) (β_1) isn't reliably positive. Besides, percentage bid-ask spread can be strong explained by these control variables. It implies that there is not much space for other variables to explain the percentage bid-ask spread. The other problem is the result maybe suffers from endogeneity bias. So these reason may result in the coefficient on earnings management (ADCA) (β_1) isn't significant.

Table 3

$$\ln PSP_i = \alpha + \beta_1 ADCA_i + \beta_2 \ln DOLVOL_i + \beta_3 \ln CLP_i + \beta_4 \ln SDRET_i + \varepsilon_i,$$

Variable	Prediction	Estimated Coefficient	t Value	Pr > t
Intercept		0.45912	4.58	<.0001
$\ln CLP_i$	-	-0.37491	-23.46	<.0001
$\ln DOLVOL_i$	-	-0.23286	-45.51	<.0001
$\ln SDRET$	+	0.46634	18.25	<.0001
$ADCA_i$	+	0.02077	0.14	0.8863
Adjusted R ²	0.83			

Variable definitions:

$\ln CLP_i$ = the natural log of the mean stock's close price for firm i during our sampling period

$\ln DOLVOL_i$ = the natural log of the mean dollar value of volume for firm i during our sampling period

$\ln SDRET$ = the natural log of the mean for firm i of daily returns during our sampling period

$ADCA_i$ = the mean for firm i of absolute value of discretionary current accruals during our sampling period

In order to solve omitted variables problem, I use two-stage least squares (2SLS) regression. Two-stage least square estimation involves two steps. In the first stage, the endogenous variable ($ADCA_i$) is regressed on all exogenous variables included in the model ($\ln CLP_i$, $\ln DOLVOL_i$, $\ln SDRET$ and $MBRT_i$). The predicted values of $ADCA_i$ which should exhibit less correlation with the error term. In the second stage, the predicted values of $ADCA_i$ be used as he explanatory variables in the regressions that estimate equation (6). Table 4 presents the results of estimating equation (6) using two-stage least squares (2SLS) estimation. Dollar value of volume and stock's close price are significant explanatory variables in the predicted direction. The coefficient on return volatility is also significant positive, as predicted direction. The coefficient on earnings management variable ($ADCA_i$) is positive, as predicted, but it isn't statistically significant. The results are similar to previous multiple regression analysis. The endogeneity bias usually arises in one of three ways: omitted variables, measurement error and simultaneity. Simultaneity arises when at least one of the explanatory variables is determined simultaneously along with dependent variables. Because we consider the percentage bid-ask spread (PSP) and earnings management ($ADCA$) are simultaneously determined. Therefore, the two-stage least squares (2SLS) estimation is inefficiency in here.

Table 4

2SLS regression results showing the effects of the earnings management ($ADCA_i$), the natural log of return volatility, dollar value of volume and price on percentage bid-ask spreads.

$$\ln PSP_i = \alpha + \beta_1 ADCA_i + \beta_2 \ln DOLVOL_i + \beta_3 \ln CLP_i + \beta_4 \ln SDRET_i + \varepsilon_i,$$

Variable	Prediction	Estimate	t Value	Pr > t
Intercept		0.271908	0.43	0.6663
$\ln CLP_i$	-	-0.38193	-13.4	<.0001
$\ln DOLVOL_i$	-	-0.23222	-40.97	<.0001
$\ln SDRET_i$	+	0.424637	3.01	0.0027
$ADCA_i$	+	0.856009	0.31	0.7581
Adjusted R ²	0.56			

Variable definitions:

$\ln CLP_i$ = the natural log of the mean close price for firm i during our sampling period

$\ln DOLVOL_i$ = the natural log of the mean dollar value of volume for firm i during our sampling period

$\ln SDRET_i$ = the natural log of the mean for firm i of daily returns during our sampling period

$ADCA_i$ = the mean for firm i of Absolute value of discretionary current accruals during our sampling period

The simultaneous equation set can solve the endogeneity problem among factors. The result of 3SLS shows in Table 5. Hence, the endogenous problem does exist from the cross section regression and 2SLS. After taking the endogenous problem into account, I find that the relation between the earnings management and equity liquidity is significantly positively. On the one hand, the coefficient on $\ln ADCA_i$ (β_1) is 0.67 with a t statistic of 1.81, which is statistically significant at less than 0.1 level.

The results are consistent with our pervious hypotheses show that the equity liquidity would be small as the insiders large manipulate reported earnings. It also implies the outsiders detect manager manipulate reported earnings, they would unwilling to trade this firm's stock in equity market. At the same time, market will punish the firms which manipulate reported earnings through market mechanism, the equity liquidity is small. On the other hand, the coefficient on $(\ln PSP)$ (λ_1) is 0.19 with a t statistic of 2.71, which is statistically significant at less than 0.01 level. The results reported that the level of earnings management increase as the level of information asymmetry increase.

Therefore, it's same with Richardson (2000) empirical work. About the others control variables, the return volatility (SDRET), dollar value of volume (DOLVOL) and stock's closing price (CLP). Panel A of Table 5 reports that the coefficients on dollar value of volume (DOLVOL) and stock's closing price (CLP) (β_3 and β_4) are reliably negative, and the coefficient on return volatility(SDRET) (β_2) is reliably positive, as predicted. The coefficient on financial leverage (LEV) (λ_2) is reliably negative and growth opportunities (MBRT) (λ_4) is reliably positive in the panel B of Table 5, as predicted. The coefficient on firm size (SIZE) (λ_3) is reliably positive. Even I don't predict the sign of firm size (SIZE). Some previous empirical studies show that the sign of firm size (SIZE) is negative.

Why our result different form previous empirical studies? It's a puzzle.

In summary, the regression results are consistent with the hypothesis that the insiders manipulated the reported earnings largely would result in the liquidity in equity market small. On the other aspect, the high level of information asymmetric between insider and outsider will cause the insider can easy manipulate reported earnings. This result is similar with Richardson (2000) empirical work.

Table 5

$$\ln PSP_i = \beta_0 + \beta_1 \ln ADCA_i + \beta_2 \ln SDRET_i + \beta_3 \ln DOLVOL_i + \beta_4 \ln CLP_i + \varepsilon_i, \quad (7)$$

$$\ln ADCA_i = \lambda_0 + \lambda_1 \ln PSP_i + \lambda_2 \ln LEV_i + \lambda_3 \ln SIZE_i + \lambda_4 \ln MBRT_i + \omega_i, \quad (8)$$

Three-stage least squares (3SLS) regression for Simultaneous equation model

Panel A: Equation (7)—3SLS				Panel B: Equation (8)—3SLS			
Variable	Estimate	t Value	Pr > t	Variable	Estimate	t Value	Pr > t
Intercept	2.769518	5.08	<.0001	Intercept	-2.85131	-10.43	<.0001
$\ln CLP_i$	-0.29394	-5.51	<.0001	$\ln MBRT_i$	0.046725	1.83	0.0678
$\ln DOLVOL_i$	-0.25362	-21.55	<.0001	$\ln LEV$	-0.021	-1.76	0.0784
$\ln SDRET_i$	0.512668	2.06	0.0402	$\ln SIZE_i$	0.083452	3.32	0.001
$\ln ADCA_i$	0.669188	1.81	0.0715	$\ln PSP$	0.192239	2.71	0.0069

Variable definitions:

$\ln CLP_i$ = the natural log of the mean close price for firm i during our sampling period

$\ln DOLVOL_i$ = the natural log of the mean dollar value of volume for firm i during our sampling period

$\ln SDRET_i$ = the natural log of the mean for firm i of daily returns during our sampling period

$ADCA_i$ = the mean for firm i of Absolute value of discretionary current accruals during our sampling period

$\ln MBRT_i$ = the natural log of the mean market-to-book ratio for firm i during our sampling period

$\ln LEV$ = the natural log of the mean the ratio of long-term debt and short-term debt to total assets for firm i during our sampling period

$\ln SIZE_i$ = the natural log of the mean total assets for firm i during our sampling period

$\ln PSP$ = the natural log of the mean for firm I of the percentage bid-ask spread period during our sampling period



6. Conclusion

In this paper, I predict a positive relation between earnings management and percentage bid-ask spread. Tests for cross-sectional regression in the relation between earnings management and percentage bid-ask spread generally support the predictions. However, the results are not statistically significant due to inconsistent and inefficient in Multiple Regression and two stage-least square (2SLS). Therefore, I use 3 three stage least squares (3SLS) to solve the inconsistent and inefficient problem. The coefficient relating earnings management to bid-ask spread is more positive in three-stage least squares (3SLS) estimation. It shows that there is a significant positive relation between earnings managements and liquidity in equity market. When the magnitude of earnings management is high, the information asymmetry between insiders and outsiders is high. On the other hand, as insiders can easy manipulate reported earnings; the high level of information asymmetry must exist in between insiders and outsiders. It also provides that the outsiders detect manager manipulate reported earnings, they would unwilling to trade this firm's stock in equity market. Market will punish the firms which manipulate reported earnings through market mechanism, at the same time, the equity liquidity is low.

This paper not only tests hypotheses of how the presence of information asymmetry affects management incentives to manipulate reported earnings but also tests hypotheses of how the level of earnings management affects equity liquidity. In the former, this is a direct test of Dye (1988) and Trueman and Titman's (1988) theory that the presence of information asymmetry is necessary condition for earnings management. And Richardson (2000) has evidenced the level of earnings management increases as the level of information asymmetry increases.

When information asymmetry is high, stakeholders may not have the necessary information to detect the manipulated earnings. In this paper, the results are consistent with Richardson (2000) empirical work. In the latter, my work mainly contribution is providing evidence about the level of earnings management affects the level of equity liquidity and providing more comprehensive research in investigating the relationship between earnings management and equity liquidity.



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