國立交通大學

財 務 金 融 研 究 所 碩 士 班

碩 士 論 文

公司治理與股票流動性：

S&P透明度與揭露評等之分析

Corporate Governance and Equity Liquidity:

An Analysis of S&P Transparency and Disclosure Ranking

研 究 生：廖偉立

指導教授：李正福 博士

鍾惠民 博士

中華民國九十四年六月

公司治理與股票流動性：S&P 透明度與揭露評等之分析

Corporate Governance and Equity Liquidity: An Analysis of S&P Transparency and Disclosure Ranking

研 究 生：廖偉立　　Student：Wei-Li Liao

指導教授：李正福 博士　　Advisor：Dr. Cheng-Few Lee

鍾惠民 博士　　Dr. Huimin Chung

國 立 交 通 大 學

財 務 金 融 研 究 所 碩 士 班

碩 士 論 文

A Thesis

Submitted to Graduate Institute of Finance

National Chiao Tung University

in partial Fulfillment of the Requirements

for the Degree of

Master of Science

in

Finance

June 2005

Hsinchu, Taiwan, Republic of China

中華民國九十四年六月

公司治理與股票流動性：

S&P 透明度與揭露評等之分析

學生：廖偉立　　指導教授：李正福 博士

鍾惠民 博士

國立交通大學財務金融研究所碩士班

2005 年六月

摘要

本論文研究資訊揭露以及其他公司治理機制對股票流動性之影響。我們假設資訊揭露與財務透明度較差的公司將招致較嚴重的資訊不對稱問題。較差的公司治理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面對相對較高的逆選擇風險，因而會加大有效價差中的資訊不對稱成分。本研究使用 S&P 500 指數成分股的 S&P 透明度與揭露評等來檢驗擁有較高透明度與揭露評等的公司，其股票是否能有較低的資訊不對稱成分及買賣價差。實證結果顯示資訊揭露與財務透明度較差的公司，將付出較大的經濟成本在其股票流動性上，亦即其股票將有較高的有效買賣價差與報價買賣價差。

關鍵字：公司治理、透明度與資訊揭露、資訊不對稱成本、流動性

Corporate Governance and Equity Liquidity:

An Analysis of S&P Transparency and Disclosure Ranking

Student: Wei-Li Liao

Advisors: Dr. Cheng-Few Lee

Dr. Huming Chung

Graduate Institute of Finance

National Chiao Tung University

June 2005

ABSTRACT

This paper investigates the effects of disclosure and other corporate governance mechanism on equity liquidity. We posit that companies with poor information disclosure and transparency practices incur more serious information asymmetry problem. Since poor corporate governance leads to greater information asymmetry, liquidity providers will incur relatively higher adverse information risks and will therefore offer higher information asymmetry components of the effective bid-ask spreads. The S&P T&D rankings on the individual stocks of S&P 500 index are employed to examine whether firms with greater T&D rankings have lower information asymmetry component and lower spread of their stocks. Our results reveal that companies with poor information disclosure and transparency practices have larger economic costs of equity liquidity, i.e., the effective spread and the quoted half-spread.

JEL classification: G10; G30; G34

Keywords: Corporate Governance, Transparency and Disclosure, Asymmetric information costs, Liquidity

致　謝　辭

對於許多商學院或是理工學院畢業的人來說，財務金融碩士學位的求學生涯可能只是延續或應用擴充大學時代所學的一個歷程。但對於像我這樣一個由教育學院畢業的學生來說，這不僅是一場難打的硬仗，更是對自我意志與極限的挑戰。在這一個幾乎接近不可能的任務過程中，若沒有許多貴人在旁給予適時的幫助與鼓勵，我想我是沒有辦法克服重重的困難與煎熬而完成今天這一篇的碩士論文。

我最先也最應該要感謝的是我親愛的父母親，沒有你們對我放棄教師資格的諒解、沒有你們對我轉考商科研究所的支持、沒有你們在這一路走來提供我優渥的經濟支撐而使我可以無後顧之憂的專心在課業上，我想我是不可能會有今天的成就。因此，我所能表達我感恩之心的最好方式，便是將這篇碩士論文獻給辛苦生我育我的爸爸跟媽媽。

其次，我要感謝我的兩位指導老師，鐘惠民老師與李正福老師。鍾老師總是耐心的指導我提出的任何問題，並且逐步引導我、訓練我，讓我從一個財務金融學問與知識都很弱的菜鳥，變成今日可以自己處理問題的研究生。本篇論文題目的構想以及論文內容裡許多財務概念的聯結，也都仰賴鍾老師給了我許多關鍵性的建議才得以順利架構並完成此篇文章。除了學業上，鍾老師在生活上也十分注意且照顧我，在我低潮的時候給我適時的激勵，並且與我分享許多他的生活經驗。如果我沒有遇見鍾老師並請他指導我的話，我想這兩年我不會那麼快地找到自己學習的方向，也無法那麼順利地完成我的碩士論文。李老師則是我對自己論文要求更嚴格的重要背後推手，與老師每次的討論都能由老師豐富的研究經驗中獲得寶貴的啟示，並找出自己論文的盲點與缺陷。李老師給我許多關於研究方法與寫作上的建議，若沒有這些寶貴的意見，本篇論文將遜色大半。

而在我這兩年碩士生涯中，陪我走過一切風風雨雨與喜怒哀樂的朋友們，我也要好好感謝妳們，因為少了你們的鼓勵與歡笑，我將無力獨自一人完成本篇論文。明俊、信德、亨懋、智琦、禹丹、婉儀、筱芳與燕晴等研究所班上的好同學們，我不會忘記跟你們在一起度過的這些日子，無論是為學業與論文奮鬥的辛苦日子、分享彼此心情的感性時間，或是一起玩樂放鬆的快樂時光。還有師大的好朋友們，我要特別謝謝妳們在我失戀與洩氣的時候，很夠意思地不停安慰我與鼓勵我，讓我充分地體會到與妳們深厚的友情所散發出的光輝與溫暖。最後，特別感謝我在大學時期的兩位啟蒙老師：呂建政老師與溫明忠老師。沒有兩位老師開啟我的求知慾與對商學的興趣，我現在的身份可能就是一位國中教師而非今日的財務金融碩士，謝謝你們改變了我的一生！

Content

1. Introduction

Financial transparency and information disclosure are important elements of corporate governance. In the firms with poor financial transparency and information disclosure, managers are more likely to use their information advantage to pursue their private benefit of control, and this will increase agency cost faced by shareholders. When agency problem become worse, insiders such as executives or controlling owners easily exploit the wealth and rights of small shareholders. For this reason, poor corporate governance is associated with bad disclosure practice.

Improving transparency and disclosure practice leads to better corporate governance because disclosure practice can be viewed as an effective protection mechanism of outsider rights. Better transparency and disclosure practice can help shareholders to understand more amply about firm's management and reduce the information asymmetry faced by investors. Reflecting on the equity market, investors are not only willing to pay higher price to buy the stocks of companies with better information disclosure but are also more willing to trade them. On the contrary, when firms reveal poor corporate governance, liquidity suppliers such as market makers or dealers will take their price protection action, broadening the spreads of the stocks, to compensate possible loss from trading these equities with informed traders.

Recently, the issue on firm's financial transparency and information disclosure has gained much attention by market regulators and investors. Ranking institutions such as Standard & Poor's and Moody tend to use financial transparency and information disclosure as one of their criteria of assessing firm's managing ability and reputation. On October 16, 2002, Standard & Poor's publish the results of their Transparency and Disclosure Study (T&D

Study)[1]. According to each firm's T&D practice, this study provides firm's Transparency and Disclosure rankings (T&D rankings) in three disclosure categories and then calculating a final ranking. These rankings provide a reference that enables investors to assess firm's transparency and disclosure practice.

This paper investigates the relationship between corporate governance and equity liquidity. We conjecture that companies with poor corporate governance incur higher agency cost and information asymmetric risk. Liquidity suppliers will broaden the spreads of equities when firms exhibit poor corporate governance, and this price protection action will reduce market liquidity of these equities. The S&P T&D ranking is used as a proxy variable for corporate governance, and is employed to examine whether firms with higher rankings have better market liquidity of their stocks.

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 sale is usually made at the bid price, and immediate purchase is 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. Furthermore, from their empirical result, Lin, Sanger, and Booth (1995) argue that demanders of immediacy services rarely receive prices which were less favorable than prevailing quotes on the NYSE. Therefore, another better measure, the effective spread, which is defined as the absolute value of the difference between the transaction price and the quote midpoint just prior the trade, is viewed as a more precise measure of firm's market liquidity. We use both the quoted bid-ask spread and effective

[1] The T&D study focus on several questions such as: which companies provide the most extensive disclosure in their basic corporate filings? Which companies disclose above and beyond what the law requires? See Patel and Dallas (2002) for a detail description.

spread as the measures of firm's market liquidity and examine whether they are influenced by S&P T&D ranking.

From the view of the liquidity suppliers, the effective spread is primarily composed of three components: the order processing cost, the inventory cost, and the adverse selection cost of information asymmetry (Lin, Sanger, and Booth, 1995). The information asymmetry component is a compensation that arises from information asymmetric risk faced by liquidity suppliers. Appropriate information asymmetry component of the effective spread must exist to compensate adverse selection cost, and the liquidity providers therefore can maintain their operation against informed trading activities. Intuitively, T&D ranking should be directly correlated with the information asymmetry component. This is because that the worse T&D ranking implies worse disclosure practice and thus induces higher information asymmetric risk faced by liquidity suppliers. To compensate this higher risk, liquidity suppliers have to increase the information asymmetry component of the effective spread in response. For the reason above-mentioned, we follow the model suggested by Huang and Stoll (1994), Lin (1992), and Lin, Sanger, and Booth (1995) to calculate the information asymmetry component of the effective spread, and use it as a measure of immediate transaction cost due to information asymmetric risk of the firm. We predict that there should be stronger negative relation between the firm's T&D ranking and the information asymmetry component of the effective spread.

Several past works, including theoretical and empirical ones, have indicated that simultaneity may exist in the determination of bid-ask spread and firm's disclosure policy (Dye, 1985; Lang and Lundholm, 1993; Welker, 1995). When a manager determines firm's disclosure policy, he or she is likely to consider present market liquidity of firm's stock. Besides, when liquidity suppliers quote the bid and ask price of a stock, they necessarily take this firm's disclosure practice as important reference of the degree of information asymmetry.

Accordingly, robust estimations and tests are needed to eliminate potential endogeneity problem. Welker (1995) constructs simultaneous equations in which the spread and disclosure policy appear as endogenous variables and uses two-stage least squares (2SLS) analysis to simultaneously estimate these two equations and do valid tests. Although 2SLS method can provide consistent estimates and valid tests, the 2SLS estimators are not the most efficient estimators. For this reason we adopt a more robust estimation method, three-stage least squares (3SLS), to obtain more efficient estimates and more robust test results. In addition, we employ the generalized method of moments (GMM) estimation which places no restrictions on either the unconditional or conditional variance matrix of the disturbance term. Under the GMM framework we can obtain the asymptotically efficient estimator without making any additional assumptions, and this means that we can get the most robust results.

After controlling firm's trading characteristics and several determinants of disclosure practice, our empirical results of 3SLS and GMM estimations reveal significant negative relation between T&D rankings and our liquidity measures. Strongly negative relation between T&D rankings and information asymmetry components is also found in our empirical results. The findings are consistent with our hypothesis which indicates that better corporate governance is associated with better equity liquidity. Besides, we find that none of our liquidity measures represents a significant explanatory variable to the T&D ranking in our simultaneous equations, so there is weak evidence that the simultaneity problem exists in our data.

This study has several contributions to the financial literature and practice. First, we link the conceptions of disclosure practice, information asymmetry, agency problem, and corporate governance to the equity liquidity. The empirical results are not only statistically significant but are also consistent with our hypothesis that better corporate governance accompanies better equity liquidity. Second, this study employs two advanced estimation

methods, 3SLS and GMM, to provide more reliable empirical evidence for examining the impact of corporate governance on equity liquidity. Third, we estimate the information asymmetry components of effective spread to measure the information asymmetric cost requested by liquidity suppliers to compensate possible loss from informed trading activities. We find that the T&D rankings are significantly and negatively related to the information asymmetry component, implying the worse disclosure practice lower the equity liquidity by increasing the information asymmetric cost requested by liquidity suppliers under the fact that the order processing cost are usually fixed. Finally, our study indirectly examines the quality of S&P T&D ranking, and we suggest that it may have some measurement error in assessing firm's disclosure practice. Therefore, investors should be more careful about making use of this ranking directly to assess the extent of financial transparency and disclosure practice of a company.

The remainder of this paper is organized as follows: a review of the related literature and hypothesis development is undertaken in the next section. In the next two chapters, we introduce the models of our liquidity measures and the control variables of our dependent variables. Then we provide a description of the data and the research methodology adopted for our study in the following two chapters. The penultimate section presents the empirical results of our research, with the final section providing some concluding remarks drawn from this study.

2. Literature Review and Hypothesis Development

2.1 Disclosure Practice, Corporate Governance, and Information Asymmetry

Previous literature has already pointed out the relationship between disclosure practice and corporate governance. Lowenstein (1996) argues that good disclosure is a most efficient and effective mechanism for inducing managers to manage better. This implies that firms with better information disclosure may have better corporate governance. Lopez-de-Silanes, Shleifer, and Vishny (LLSV, 1998) suggest that financial transparency performs in the crucial role of corporate governance by informing investors. Ho and Wong (2001) relate four major corporate governance attributes with the extent of voluntary disclosure provided by listed firms in Hong Kong market and find out some significant relationships. Mitton (2002) uses disclosure quality as one of the firm-level corporate governance proxy measures to examine if corporate governance practice can affect stock price performance. In the report of S&P Transparency and Disclosure methodology and study, Patel and Dalas (2002) argues that good corporate governance includes a vigilant board of directors, timely and adequate disclosure of financial information, meaningful disclosure about the board and management process, and a transparent ownership structure identifying any conflicts of interests between managers, directors, shareholders, and other related parties. Therefore, financial transparency and disclosure are very important and basic elements of corporate governance, implying that good corporate governance is associated with good disclosure practice

The extent of disclosure practice can affect corporate governance by reducing the information asymmetry faced by investors. Botosan (1997) finds that firm's increasing disclosure can reduce the information asymmetry between managers and investors and thus reduce firm's cost of equity capital. Lang and Lundholm (1999) indicate that higher levels of disclosure should lead to lower cost of capital by reducing the information risk and the

transaction costs. Patel and Dallas (2002) also show that both the composite and the annual basis T&D rankings have negative relationship with market risk. In particular, Leuz, Nanda, and Wysocki (2003) point out that strong and well-enforced outsider rights can limit insiders' acquisition of private control benefits, and consequently, mitigate insiders' incentives to manage accounting earnings because they have little to conceal from outsiders. Because disclosure practice can be viewed as an effective protection mechanism of outsider rights, it can prevent managers from using information advantage to pursue their private benefit of control by helping shareholders to understand more amply about firm's management. Consequently, the agency cost will be smaller in the firms with better financial disclosure practice, and these firms will have better corporate governance. Accordingly, we argue that if S&P T&D rankings can describe firms' disclosure practices well, the firms with higher T&D rankings will have better disclosure practices which accompany lower information asymmetric risk and better corporate governance.

2.2 Corporate Governance and Market Liquidity

It is commonly agreed that corporate governance is an important factor in financial market development, firm value, the ownership concentration, and many other different respects of firm performance[2]. But there are still few studies investigating the impact of corporate governance on firm's equity liquidity.

When firms reveal poor corporate governance, liquidity suppliers such as market makers or dealers will take their price protection action, broadening the spreads of the stocks, to compensate possible loss from informed trading activities. Therefore, poor corporate governance will lower market liquidity of firm's equity. Welker (1995) considers that the

[2] See Lopez-de-Silanes, Shleifer, and Vishny (LLSV, 1997, 1998, 1999, 2000), Conyon and Peck (1998), Himmelberg et al. (1999), Vafeas (1999), Johnson et al. (2000), Mitton (2002), Gompers et al. (2003), Alves and Mendes (2004), Brown and Caylor (2004), Cremers and Nair (2004), Klapper and Love (2004), Lee and Yeh (2004), and Nelson (2005).

quoted bid-ask spreads set by market specialists are an increasing function of the information asymmetry risk perceived by specialists, and perceived information asymmetry risk is a function of firms' disclosure practices. He uses simultaneous equations in which both spreads and disclosure practice rankings appear as endogenous variables to conduct tests for cross-sectional differences in the relation between disclosure policy and bid-ask spreads. After controlling for return volatility, trading volume, and share price, the empirical results reveal predicted negative relation between disclosure practice rankings and proportional quoted bid-ask spreads. Brockman and Chung (2003) investigate the relation between investor protection and firm liquidity by examining the difference between two distinct groups of stocks listed in Hong Kong market: blue chips and China-related firms. From the empirical results, they find that equity liquidity is significantly affected by investor protection. Accordingly, the first hypothesis in our study is:

Hypothesis.1: Firms with better disclosure practice (better corporate governance) will have relatively better market liquidity of their equities

Market 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 (Demsetz, 1968; Lippman and Mccall, 1986). Under this view, the market liquidity is viewed as the price of immediacy, and the spread which determined by dealer's order processing cost, inventory holding cost, and information asymmetric cost is one measure of market liquidity. Stoll (1978) models the source of that spreads in the spirit of Demsetz (1968) by analyzing cross-sectional relation of the stock's proportional quoted half-spreads to firm's trading characteristics and finds that this relation is strong and has changed a little over time. Moreover, Lin, Sanger, and Booth (LSB, 1995) argue that demanders of immediacy services rarely receive prices which were less favorable than prevailing quotes on the NYSE. Therefore, another better measure, the effective spread, which is defined as the absolute value

of the difference between the trade price and the quote midpoint just prior the trade, is viewed as a more precise measure of firm's market liquidity. Following these previous works, this study uses both the quoted half-spread and the effective spread as proxies for firm's market liquidity.

Other views of market liquidity rely on information arguments as in Copeland and Galai (1983), Glosten and Milgrom (1985), Kyle (1985), and LSB (1995). These studies argue that the spread is the value of information lost to timelier or better informed traders. From the view of the liquidity suppliers, the spread is primarily composed of three components: the order processing cost, inventory cost, and information asymmetry cost (LSB, 1995). The estimation results of previous studies suggest that the inventory holding costs appear to be relative small[3]. Furthermore, LSB (1995) argue that the order processing costs are fixed with respect to any particular transaction because the order processing costs are the real costs of resource necessary to carry out the transaction[4].

The information asymmetry component is a compensation that arises from information asymmetric risk faced by liquidity suppliers. Because it is difficult to tell who the informed trader is, the liquidity suppliers cannot prevent the loss when they actually trade with an informed trader. Appropriate information asymmetry component of the effective spread must be existed to compensate this risk of loss, and the liquidity providers therefore could maintain their operation against informed trading activities. We follow the model suggested by Huang and Stoll (1994), Lin (1992), and LSB (1995) to calculate the information asymmetry component of the effective spread, and use it as a measure of immediate transaction cost due to information asymmetric risk of the firm.

Extending the research of Welker (1995) and Brockman and Chung (2003), this study

[3] See George, Kaul, and Nimalendran (1991), Madhavan and Smidt (1991), and Stoll (1989).
[4] See Copeland and Stoll (1990), and Lin, Sanger, and Booth (1995).

uses S&P T&D rankings as proxies for firms' disclosure practices, and we conjecture that the ranking could be a good measure of corporate governance and information asymmetric risk perceived by market makers or dealers. Furthermore, besides using the quoted bid-ask spread, we use the effective spread, a more precise measure of firm's liquidity, and adverse information component of the effective spread to examining the relation between firm's disclosure practice and its market liquidity. If S&P T&D ranking is indeed a good proxy for firm's disclosure practices, we expect that the firm with higher T&D ranking will have smaller quoted spread, effective spread and information asymmetry component, implying that good market liquidity is associated with good corporate governance.

2.3 Proxy Variable of Corporate Governance: the S&P Transparency and Disclosure Ranking

The proxy for firm's disclosure practice in our study is the Transparency and Disclosure Ranking (T&D ranking) provided by S&P Transparency and Disclosure study. The study identifies 98 disclosure items, classified into three broad categories (Patel and Dallas, 2002):

(1) Ownership structure and investor rights,

(2) Financial transparency and information disclosure, and

(3) Board and management structure and process.

The study indicates whether these individual items are disclosed, focusing primarily on annual reports as the primary source of information disclosure. In addition, this study also considers about additional forms of regulatory filings for another source of corporate disclosure. Therefore, the study evaluates disclosure patterns both on annual report alone, which is called annual basis, and on a composite basis, which incorporates annual reports, 10-Ks, and other proxy statements. Each ranking of the three categories is evaluated on both two bases and then the final rankings of these two bases are calculated.

Although Patel and Dallas (2002) claim that while transparency and disclosure are key components of corporate governance, T&D rankings are not proxies for corporate governance, they still find that the rankings reveal some interesting relations to firm's market risk, price to book ratio, and capitalization. Several recent studies also provide evidence that T&D ranking could be a good proxy for corporate governance. Durnev and Kim (2002) show that the S&P T&D rankings are positively correlated with the strength of corporate governance in emerging countries. Cheng, Collins, and Huang (2003) use T&D rankings as proxies for corporate governance to investigate the effects of the level of these rankings and the differential rankings between composite and annual report rankings on three market metrics: market beta, risk-adjusted abnormal returns and earnings response coefficients surrounding the announcement date. The results reveal that the release of the S&P T&D rankings brought new information to the market and that the rankings affect shareholder wealth in a manner that is consistent with the rankings measuring the strength of corporate governance. In this study, we also view S&P T&D ranking as a good proxy for corporate governance, and use both the annual basis T&D final ranking (AFR) and the composite basis T&D final ranking (CFR) to examine whether firms with higher S&P T&D rankings have better equity liquidity.

2.4 Simultaneity of the Equity Spread and Firm's Disclosure Practice

Several past studies, including theoretical and empirical ones, have indicated that simultaneity may exist in the determination of bid-ask spread and firm's disclosure policy. Dye (1985) designs a theoretical model in which the information asymmetry between managers and investors can influence firms' disclosure policies. Lang and Lundholm (1993) analyzes the determinants of voluntary disclosure policy and argues that there is simultaneity in the determination of bid-ask spread and disclosure practice. Welker (1995) suggests that disclosure policy choice may be influenced by the level of information asymmetry between management and uninformed investors as well as other determinants of bid-ask spreads.

Hence, we follow these works and develop our second hypothesis as follows,

Hypothesis.2: The determination of the spread and firm's disclosure practice is simultaneous.

If the simultaneity indeed exists, employing the OLS procedure for estimation will generate inconsistent estimates, and the inferences are invalid. Accordingly, we utilize the determinants of the disclosure practice and the spread as instrumental variables to construct a system of simultaneous equations, and employ three-stage least squares (3SLS) method to estimate and test the coefficients in our simultaneous equations. Furthermore, we also use a more robust estimation method, the general method of moments (GMM), to estimate and test the simultaneous equations. If the coefficient of our liquidity measure (the quoted spread, effective spread, or information asymmetry component) did not reveal strongly explanatory ability to the disclosure practice, we will argue that there might be no simultaneity existing in the determination of the spread and disclosure practice.

3. Estimating the Measures of Equity Liquidity and the Information Asymmetry Component

3.1 The Model

In this section, we introduce the model of liquidity measures and information asymmetry component of the spread used in this study.

The first two measures of equity liquidity are the quoted half-spread and the proportional quoted half-spread suggested by Stoll (1978a, 1978b, 1989, 2000), Welker (1995)[5], and others. The proportional quoted half-spread (PSP) is defined as the quoted half-spread divided by the quote midpoint. The quoted half-spread (QSP) and quote midpoint (Q) are defined as

$$QSP_{i,t} = (ap_{i,t} - bp_{i,t})/2 \quad (1),$$

$$Q_{i,t} = (ap_{i,t} + bp_{i,t})/2 \quad (2),$$

where ap_{it} and bp_{it} are the quoted ask and bid prices at time t of firm *i*. Therefore, the proportional quoted half-spread (PSP) can be written as

$$PSP_{i,t} = QSP_{i,t}/Q_{i,t} \quad (3).$$

The other two measures of market liquidity are the effective spread and the relative effective spread, and the information asymmetry component is decomposed from the effective spread. We follow the model suggested by Huang and Stoll (1994), Lin (1992), Stoll (1989) and Lin, Sanger, and Booth (1995):

[5] Welker (1995) uses the proportional quoted bid-ask spread instead of the proportional quoted half-spread as his liquidity measure. The only difference of these two liquidity measures is that the former uses the bid-ask spread as numerator and the latter uses the half of bid-ask spread.

$$Q_{i,t+1} - Q_{i,t} = \lambda_{i,t} z_{i,t} + \varepsilon_{i,t+1} \quad (4),$$

$$z_{i,t+1} = \theta_{i,t} z_{i,t} + \eta_{i,t+1} \quad (5),$$

where $Q_{i,t}$ is the prevailing quote midpoint for the transaction at time t of firm *i* , and z_{it} is the one-half signed effective spread, defined as the transaction price minus the prevailing quote midpoint, with $z_{i,t}$ <0 for a sell order and $z_{i,t}$ >0 for a buy order. Van Ness et al. (2001) indicate that the idea of this model is that both bid and ask quotes at time t+1 will have quote revisions of λz to reflect possible adverse information revealed by the trade at time t. Since λ reflects the quote revision in response to a trade as a fraction of the effective spread, it can be viewed as the information asymmetry component of the effective spread. The effective spread is defined as the absolute value of the one-half signed effective spread:

$$ESP_{i,t} = |z_{i,t}| = |P_{i,t} - Q_{i,t}| \quad (6),$$

where $P_{i,t}$ is the trade price for the trade at time t of firm *i* and $Q_{i,t}$ is the prevailing quote midpoint for the transaction at time t of firm *i*. In addition, we define the relative effective spread (RESP) as the effective spread divided by the prevailing quote midpoint:

$$RESP_{i,t} = ESP_{i,t}/Q_{i,t} \quad (7).$$

3.2 Estimation

To estimate our measures of equity liquidity and the information asymmetry component of the effective spread, we obtain the intraday transaction and quote data from the Trade and Quote (TAQ) database which contains intraday data of every 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.

For each security in our sample, we use intraday quotes to calculate the quoted half-spread (QSP) and the proportional quoted half-spread (PSP). We first compute the quoted half-spread and the proportional quoted half-spread by each quote during the normal transaction time of a day and then calculate daily averages of these two measures. After obtaining the daily averages, we then use them to calculate annual averages of the quoted half-spread and the proportional quoted half-spread for every security in our sample.

To estimate the model of the effective spread and the information asymmetry component, we additionally need intraday transaction data besides quote data. Following the procedure of Lin, Sanger, and Booth (1995), the transaction time, the trade price, and the prevailing bid and ask prices are identified for each transaction[6]. After obtained the transaction data with prevailing quotes, we estimate Equation (4) by OLS to obtain the daily estimate of the information asymmetry component, $\hat{\lambda}$, for each equity in our sample by using all transaction data with prevailing quotes in each day, and then calculate the annual average information asymmetry component of each firm[7]. To obtain the real cost of information asymmetric risk induced by informed trading, we multiply each stock's annual average information asymmetry component by annual average of its effective spread, so our measure of information asymmetry cost of the effective spread is defined as follows,

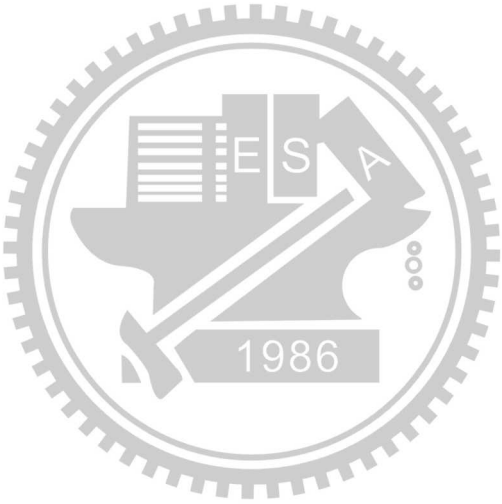
$$\mathrm{INF}_{i,} = \hat{\lambda}_{i,} \times \mathrm{ESP}_{i,} \qquad (8).$$

The effective spreads and relative effective spreads are calculated from the transaction

[6] Lin, Sanger, and Booth (1995) follow the suggestion of Ready (1991) to identify the prevailing quotes for each transaction as the quotes that are in effect five seconds earlier and are eligible for inclusion in the National Market System and NASD best bid and offer calculation. After identifying the prevailing quotes for each trade and deleting the transaction data without prevailing quotes, there are 127,217,081 transaction data with prevailing quotes used in our study.

[7] Following Lin, Sanger, and Booth (1995) and Van Ness et al. (2001), the logarithms of the transaction price and the quote midpoint are used to yield a continuously compounded rate of return for the dependent variable and a relative spread for the independent variable. This transformation can generate estimates of the information asymmetry components as a percent of the effective spread and reduce the problem of price discreteness.

data with prevailing quotes. For each security in our sample, we first compute the dollar effective spread and relative effective spread for each transaction during the normal transaction time of a day, and then calculate their daily averages for each trading day during our studying period. Finally, the annual averages of them are calculated by using their daily averages.



4. The Determinants of Equity Liquidity and Disclosure Practice

In order to construct a system of simultaneous equations of our liquidity measure and the S&P T&D ranking for 3SLS and GMM estimation, we need to specify the models of the liquidity measure and the T&D final ranking. In each model, the dependent variable of the other equation will be used as one of the explanatory variables; that is, both the liquidity measure and the T&D ranking appear as endogenous variables in the simultaneous equations. Besides, other determinants of the liquidity measure and disclosure practice must be used as exogenous instrumental variables and be controlled for the estimation and tests in this simultaneous system. Because there is more doubt about the extent of the quality of S&P T&D ranking measuring the disclosure practice, the determinants of T&D ranking have to satisfy several conditions for instrumental variables estimation. We discuss these conditions and filter out some inadequate instrumental variables later in Chapter 6.

4.1 The Determinants of the Liquidity Measure

Previous cross-sectional studies of spreads suggest a number of spread determinants other than disclosure policy that should be controlled in the empirical analysis (Welker, 1995). The closing price, daily dollar volume, return volatility, number of trades per day, and market value, are most common determinants of the spread adopted in these studies such as Agrawal et al. (2004), Brockman and Chung (2003), LSB (1995), Stoll (2000), Van Ness et al. (2001), Welker (1995), and others. In particular, Stoll (2000) models the source of the spread, and find that the closing price, daily dollar volume, return volatility, number of trades per day, and market value, have significant relations to the proportional quoted half-spread. He finds that these variables can explain over 65 percent of the cross-sectional variance in proportional quoted half-spread. Therefore, in addition to the T&D ranking, we follow Stoll (2000) and use stock's closing price (CLP), daily dollar volume (DOLVOL), return standard deviation

(RETSTD), number of trades (N), and market value (MKV) as our preliminary candidates of control variables of our liquidity measures (, i.e. the proportional quoted half-spread, the quoted half-spread, the effective spread, the relative effective spread, and the information asymmetry component). The definitions of these control variables of liquidity measures are described as follows:

CLP_i = the average of closing prices of all trading days during our studying period for firm i. (9)

$DOLVOL_i$ = the average of daily dollar volume of all trading days during our studying period for firm i. (10)

$RETSTD_i$ = the standard deviation of stock's daily returns in the prior year for firm i. (11)

N_i = the average of daily number of trades during our studying period for firm i. (12)

MKV_i = the average of monthly market value during our studying period for firm i. (13)

According to the empirical evidence of Stoll (2000) and other studies mentioned above, we predict that the increases in the dollar volume, number of trades, and market value increase the liquidity of equity and lower the spread. The stock's return volatility reflects the risk of price change of a stock, and thus we predict that higher return volatility is associated with higher spread. Price controls for the effect of discreteness and is an additional proxy for risk in that low price stocks tend to be riskier (Stoll, 2000).Therefore, we predict that price is positively related with the quoted half-spread, the effective spread and the information asymmetry component, but is negatively related with the proportional quoted half-spread, and

the relative effective spread because the quote midpoint, the denominator used to calculate these two measures, is highly related to the closing price.

4.2 The Determinants of Disclosure Practice

The determinants of disclosure practice used in our study are mainly referred to Lang and Lundholm (1993), Welker (1995), and Ho and Wong (2001). Lang and Lundholm (1993) find that both the market adjusted return and firm size are positively related to disclosure policy, and that the disclosure policy is negatively related to return standard deviation and return-earnings correlation. Welker (1995) follows the findings of Lang and Lundholm (1993) and uses share price, security offering, market adjusted return, and return standard deviation as the determinants of disclosure practice. Ho and Wong test a theoretical framework relating four major corporate governance attributes to the extent of voluntary disclosure provided by listed firms in Hong Kong. They follow several previous works investigating the decision of voluntary disclosure and use firm size (Chow and Won-Boren, 1987), asset-in-place (Hossain et al., 1994), financial leverage (Bradbury, 1992), profitability (Meek et al. 1995) and industry type (Meek et al., 1995) as control variables in their empirical model. Thus, following these studies, we preliminarily choose firm size (Size), return standard deviation (RETSTD), closing price (CLP), asset-in-place (AIP), financial leverage (LEV), profitability (PROFIT), and dummy variable of industry type as the initial candidates of control variables of firm's disclosure practice. The empirical findings of previous studies mentioned above suggest that the firm size, price, asset-in-place, and profitability are positively related to firm's disclosure practice, and that return volatility, and financial leverage are negatively related with firm's disclosure quality.

The control variables of disclosure practice that we didn't define yet in section 4.1 are defined as follows:

$Size_i$ = the total assets of firm i at the end of 2002. (14)

AIP_i = the ratio of net book value of fixed assets to total assets of firm i at the end of 2002. (15)

LEV_i = the ratio of total debt to total equity of firm i at the end of 2002. (16)

$PROFIT_i$ = the return on capital employed at the end of 2002. (17)

$D1_i$ =1, when the firm's S&P Industry Index Code belongs to the Financials group with the codes 700-719, and zero otherwise. (18)

$D2_i$ =1, when the firm's S&P Industry Index Code belongs to the Information Technology group with the codes 900-921, and zero otherwise. (19)

5. Data

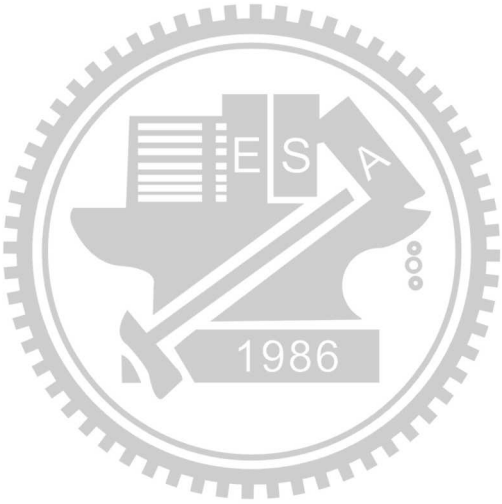
The report of S&P Transparency and Disclosure study (Patel and Dallas, 2002) only provides the T&D rankings for the constituent firms of S&P 500 index, so the companies studied in this paper are these constituent firms. We use annual basis T&D final ranking (AFR) and composite basis T&D final ranking (CFR) respectively as the proxy for firm's corporate governance. Because the S&P T&D study report is published on October 16, 2002, we choose whole trading days of 2002 as our studying period.

There are many empirical studies comparing dealer and auction markets, such as NASDAQ and NYSE (Barclay et al, 1999; Huang and Stoll, 1996), and Stoll (2000) indicates that the empirical evidence of these studies shows that market design appears to have an effect on spread. In particular, the spreads in dealer markets are wider than those in auction markets because dealers may have more market power in dealer markets. The reason is that dealers or market makers with stronger market power are expected to increase their revenues by widening spreads. In order to eliminate this difference among the constituent stocks of S&P 500 index, we only choose the stocks listed in NYSE. Under this condition, our sample size becomes 424 stocks. For the same reason, the intraday data used to estimate and calculate our liquidity measures are only the transactions and quotes taken place in NYSE.

The daily intraday transaction and quote data for these 424 stocks are obtained from the Trade and Quote (TAQ) database, which has already been introduced in section 3.2. We use this database to obtain intraday transaction and quote data such as transaction times, transaction prices, and quoted bid and ask prices[8]. The daily number of trades, daily dollar volume, and closing price of each stock are also obtained from this database. In addition, we

[8] There are 301,845,521 intraday quotes and 146,630,782 transaction data of our sample equities obtained from the TAQ database, and we use the data to calculate and estimate our two measures of equity liquidity and the information asymmetry component.

download stock’s daily returns without dividends from the CRSP database to calculate the return standard deviation in prior year. Finally, the accounting data used to calculate other selected variables in our study are all obtained from the Compustat database. After calculating the values of all selected variables, we delete the firm with at least one variable that has missing value. This step reduces our sample size to 341.



6. Research Design

The research design and methodology of this study are described in this chapter. We first calculate the variation inflation factors (VIFs) of the control variables of the liquidity measures and those of firm's disclosure practice. The variation inflation factor measures the extent of the multicolinearity existing in the selected explanatory variables. The explanatory variables with higher variation inflation factors have more serious multicolinearity problem and are more likely affect the estimation result of the regression. After calculate the variation inflation factors (VIFs) of the control variables of our liquidity measures we find that VIFs of daily dollar volume (DOLVOL), market value (MKV), and daily number of trades (N) are larger than other control variables. When we omit any two variables of them, VIFs of the all independent variables of the liquidity measures will be lower than 2 which means that the multicolinearity problem is solved. Because the OLS coefficient estimates of market value and daily number of trades are less significant than daily dollar volume, and daily dollar volume is more often used in microstructure literature than these two variables, we omit them and keep daily dollar volume in the equation of the equity liquidity. Therefore, the control variables of our liquidity measure are now the closing price (CLP), daily dollar volume (DOLVOL), and return standard deviation in prior year (RETSTD). The VIFs of the predetermined control variables of firm's disclosure practice are all less than 2, and indicate that there is no serious multicolinearity problem existing in these selected control variables.

The second step is to filter out inadequate instrumental variables for instrumental variables estimation methods, 3SLS and GMM. Wooldridge (2002) indicate that the key condition on instrumental variables estimation is that the selected additional instruments for an endogenous variable must be partially correlated with it once all the other exogenous

variables in all equations have been netted out[9]. In order to check this condition, we require the linear projection of the endogenous variable onto all exogenous variables and then test if the selected instruments are partially correlated with the endogenous variable under OLS procedure. This is called the first-stage regression[10]. For the all liquidity measures, the results of the first-stage regression reveal that the three control variables, the closing price (CLP), daily dollar volume (DOLVOL), and return standard deviation in prior year (RETSTD), are strongly partially correlated with our liquidity measures. For S&P T&D final rankings, the results of the first-stage regression reveal that only firm size (SIZE), and asset-in-place (AIP) are partially correlated with composite basis final rankings, and that firm size (SIZE), asset-in-place (AIP), and return standard deviation (RETSTD) are partially correlated with annual basis final rankings. Therefore, after we exclude inadequate instrumental variables from the equations, our simultaneous systems of equations can be constructed as follows:

$$\begin{aligned} \text{Liquidity}_i &= \alpha_{10} + \alpha_{11}\text{CFR}_i + \alpha_{12}\text{lnDOLVOL}_i + \alpha_{13}\text{CLP}_i + \alpha_{14}\text{RETSTD}_i + \varepsilon_{1,i} \\ \text{CFR}_i &= \alpha_{20} + \alpha_{21}\text{Liquidity}_i + \alpha_{22}\text{lnSIZE}_i + \alpha_{23}\text{AIP}_i + \varepsilon_{2,i} \end{aligned} \quad (20),$$

$$\begin{aligned} \text{Liquidity}_i &= \beta_{10} + \beta_{11}\text{CFR}_i + \beta_{12}\text{lnDOLVOL}_i + \beta_{13}\text{CLP}_i + \beta_{14}\text{RETSTD}_i + u_{1,i} \\ \text{AFR}_i &= \beta_{20} + \beta_{21}\text{Liquidity}_i + \beta_{22}\text{lnSIZE}_i + \beta_{23}\text{AIP}_i + \beta_{24}\text{RETSTD}_i + u_{2,i} \end{aligned} \quad (21),$$

where lnDOLVOL_i and lnSIZE_i are the logarithms of DOLVOL_i and SIZE_i; Liquidity_i represents the liquidity measure, and can be replaced by any of our liquidity measures: QSP, PSP, ESP, RESP, and the information asymmetry component (INF)[11].

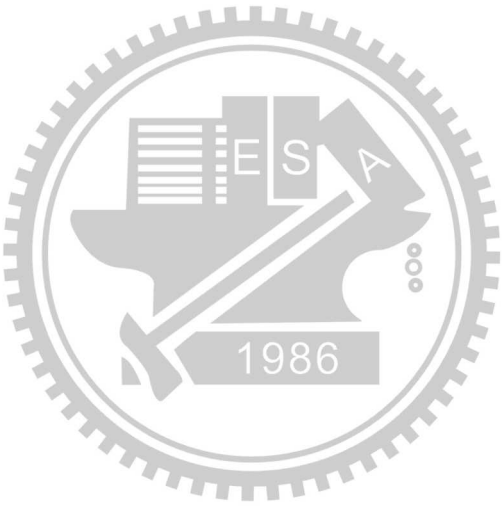
In addition to ordinary least squares (OLS), two other advanced estimation methods,

[9] See Wooldridge (2002), chapter 5 and chapter 6.

[10] We use the "first" command in the "proc syslin" program of SAS software to obtain estimation and test results of the first-stage regression

[11] The values of QSP_i, ESP_i, and INF_i are so small that our estimated coefficients of the control variables of these liquidity measures are also very small, thus we multiply these measures by 100. Consequently, the unit of these measures becomes cents.

three-stage least squares (3SLS) and generalized method of moments (GMM), are applied to estimating these systems of simultaneous equations at last.



7. Empirical Results and Analysis

7.1 Summary Statistics and Correlations

Panel A of Table 1 shows the descriptive statistics of our five liquidity measures and their control variables. Our sample period is from January 1 2002– December 31 2002, 252 trading days. The mean of quoted half-spread (QSP) is about 2.2046 cents per share, and its range is about 3.522 cents. The mean of proportional quoted half-spread (PSP) is around 0.0716 percent with the range from 0.0281 percent to 0.3220 percent. The average effective spread (ESP) is 1.6166 cents with the range about 2.9434 cents, and is about 73 percent of the quoted half-spread. The finding that the average effective spread is less than the average proportional quoted half-spread is consistent with the argument suggested by Lin, Sanger, and Booth (1995)[12]. The relative effective spread (RESP) has the mean about 0.0519 percent which is about 72 percent of the proportional quoted half-spread, and its range is between 0.0218 percent and 0.2170 percent. The information asymmetry cost of the effective spread (INF) has the average value about 0.6577 cents, and its range is from 0.2172 cents to 1.3402 cents. The average closing price (CLP) for our sample is approximately $38.01, and the range is between $4.56 and $121.73. The mean of daily dollar volume (DOLVOL) is around $66.64 millions and the sample range is from $ 4.41 millions to $610.33 millions. The return volatility (RETSTD) has the average value about 0.0264, and the sample range is from 0.0138 to 0.0768. The Pearson correlation coefficients of our five liquidity measures and their control variables are shown in Panel B of Table 2. There is one thing catching our attention: the information asymmetry component, quoted half-spread, and effective spread are strongly positive correlated, implying that the higher information asymmetry cost induces higher equity spread under the fact that order processing cost is fixed.

[12] Lin, Sanger, and Booth (1995) argue that demanders of immediacy services rarely received prices which were less favorable than prevailing quotes on the NYSE.

The descriptive statistics of the S&P T&D final rankings and their control variables are shown in the Panel A of Table 2. The mean of composite basis T&D final ranking (CFR) is about 7.55 with the range between 7 and 9. The average of annual basis T&D final ranking (AFR) is around 4.78 with the range from 1 to 8. Taking notice of the difference between these two rankings, the annual basis rankings have lower mean but larger range while the composite basis rankings have higher mean but smaller range. This characteristic is consistent with the argument of Pantel and Dallas (2002). They suggest that the annual basis rankings which only focus on firms' annual reports could be viewed as firms' voluntary disclosures. On the contrary, the composite basis rankings which include annual reports, 10-Ks, and other proxy statements might be regarded as regulatory disclosure practices. Thus, due to strict laws of investor protections and severe disclosure regulations in U.S., the firms reveal consistently higher rankings on composite basis and smaller differences between firms' composite basis rankings than their annual basis rankings. Panel B of Table 2 presents Pearson correlation coefficients of the S&P T&D final rankings and their control variables. The firm size (SIZE) and asset-in-place (AIP) reveal positive correlations to both composite and annual basis T&D final rankings, but the positive correlation between firm size and these two rankings are insignificant. The return standard deviation (RETSTD) is significantly negative correlated with annual basis T&D final ranking, but is insignificantly negative correlated to composite basis T&D final ranking. This finding is consistent with the results of the first-stage regression. We argue that the reason of return volatility presenting more power to explain annual basis final ranking than composite basis final ranking is due to annual basis final ranking relate more closely to firm's voluntary disclosure than do composite basis final ranking.

7.2 OLS, 3SLS and GMM estimation results of the quoted half-spread, effective spread and two S&P T&D final rankings

We first examine the relationship between the quoted half-spread and S&P T&D rankings by applying 3SLS and GMM estimation to system (20) and system (21). Table 3 presents the estimation results of the quoted half-spread (QSP) and composite basis final ranking (CFR) while Table 4 presents the estimation results of the quoted half-spread (QSP) and annual basis final ranking (AFR). The OLS estimation results are also provided for comparison in Table 3 and Table 4. The p-value of each coefficient estimate is provided in the parenthesis below it.

The composite basis final ranking (CFR) reveals a significantly negative relation to the quoted half-spread (QSP) under both 3SLS and GMM estimations of the first equation, and the results support our hypothesis that firms with better disclosure practice have relatively better market liquidity of their stocks. Comparing 3SLS and GMM results with OLS result, we find that the negative relation between composite basis final ranking and the quoted half-spread is not statistical significant in the first equation under OLS estimation. Moreover, the simultaneous estimation of the second equation shows that the quoted half-spread is not significantly related to composite basis final ranking, indicating that there is probably no simultaneity existing in the determination of the quoted half-spread and composite basis final ranking. Because there are big differences between OLS estimation and other two instrumental variables estimations without significant simultaneous problem in our model, we argue that there may be other endogenous problem due to measurement error of the composite basis T&D final ranking in assessing firm's disclosure practice. All control variables of the quoted half-spread present significant coefficient estimates and the signs of them are consistent with our expectation. The instruments of composite basis final ranking reveal predicted signs of their coefficient estimates, and all of them are statistically significant at

common confident level.

Table 4 shows the simultaneous estimation results of the quoted half-spread (QSP) and annual basis T&D final ranking (AFR). The results are very similar to the former. The annual basis final ranking also presents a significantly negative relation to the quoted half-spread under both 3SLS and GMM estimations of the first equation, and the results support our hypothesis that firms with better disclosure practice have relatively better market liquidity of their stocks. But the negative relation between composite basis final ranking and the quoted half-spread is not significant in the first equation under OLS estimation. Again, the simultaneous estimation of the second equation shows that the quoted half-spread is not significantly related to annual basis final ranking, implying that there might be no simultaneity existing in the determination of the quoted half-spread and annual basis final ranking. All control variables of the quoted half-spread except return standard deviation (RETSTD) present significant coefficient estimates and the signs of them are consistent with our expectation. The instruments of annual basis final ranking reveal predicted signs of their coefficient estimates, and all of them are statistically significant at common confident level.

Table 5 and Table 6 report the estimation results of the effective spread and two S&P T&D final rankings. The empirical results are similar to results of the quoted half-spread and two S&P T&D final rankings. Both composite and annual basis T&D rankings reveal significantly negative relations to the effective spread (ESP) under 3SLS and GMM estimations of the first equation, and the results support our hypothesis that firms with higher T&D rankings have relatively lower effective spreads of their stocks. We also find that the negative relation between two final rankings and the effective half-spread are not statistically significant in the first equation under OLS estimation. Moreover, the simultaneous estimation of the second equation shows that the effective spread is insignificanly related to two final rankings, indicating that there is probably no simultaneity existing in the determination of the

effective spread and disclosure practice. All control variables of the effective spread present significant coefficient estimates and the signs of them are consistent with our expectation. The instruments of two final rankings reveal predicted signs of their coefficient estimates, and all of them are statistically significant at common confident level.

7.3 OLS, 3SLS and GMM estimation results of the proportional quoted half-spread, relative effective spread and two S&P T&D final rankings

Table 7 to Table 10 report the OLS, 3SLS and GMM estimation results of the proportional quoted half-spread (PSP), relative effective spread (RESP) and two S&P T&D final rankings. The differences between these estimation results and the former estimation results are that the estimated coefficients of composite and annual basis rankings in the first equation under 3SLS and GMM estimations do not reveal significantly negative relations to both proportional quoted half-spread and relative effective spread. There are several possible reasons for these differences. First, previous studies consider the effect of the institutional feature that the spreads are quoted in eighths or sixteenths, and thus use the proportional spread measures to catch the fact that low priced stocks have higher relative spreads in practice. But the studying period of this study is the year 2002, when the spreads are no longer quoted in eighths or sixteenths. Second, we argue that because the quoted half-spread and the effective spread represent the dollar value of the actual cost and revenue obtained by liquidity suppliers, and the S&P T&D ranking is related to information asymmetric risk of the stock, the dollar measures of liquidity should be more significantly correlated with S&P T&D ranking than the proportional measures of liquidity. In addition, the quoted half-spreads and the effective spreads are not only very smaller than quoted price, but their ranges are also narrower than the range of quoted price. Therefore, when the quoted half-spreads and the effective spreads are divided by quote midpoint, the stock price will dominate these two proportional measures and cause our insignificant results of the negative effect of S&P T&D

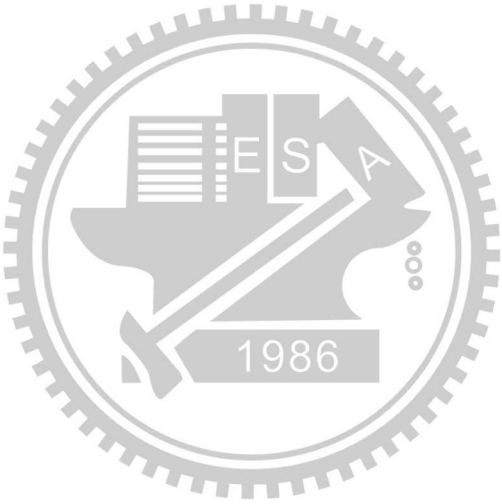
ranking on these two proportional measures.

7.4 OLS, 3SLS and GMM estimation results of the information asymmetry component and two S&P T&D final rankings

The information asymmetry component of the effective spread represents the information asymmetry cost faced by market liquidity suppliers when trading with informed traders and therefore reflects market perception of the firm's information asymmetry risk. Further, the S&P T&D ranking measures the extent of firm's corporate governance and is predicted to be directly related to firm's information asymmetry risk. Therefore, in this section, we examine the relationship between the dollar value of information asymmetry component and S&P T&D ranking by applying 3SLS and GMM estimation to show whether better corporate governance is associated with better equity liquidity.

Table 11 shows the simultaneous estimation results of the dollar value of information asymmetry component (INF) and composite basis T&D final ranking (CFR), and Table 12 presents the results of the dollar value of information asymmetry component (INF) and annual basis T&D final ranking (AFR). We find that both composite and annual basis T&D final rankings have significantly negative relation to information asymmetry component in the first equation under 3SLS and GMM estimations, but the negative partial relation is not statistically significant under OLS estimation. Furthermore, information asymmetry component does not reveal significant relation to both composite and annual basis T&D final rankings in the second equation under all three estimation methods, indicating that there might be no simultaneity existed in the determination of information asymmetry component and these two S&P T&D final rankings. Again, the significantly negative relationships between information asymmetry component and two S&P T&D final rankings in the first equation under 3SLS and GMM estimation support our hypothesis that firms with better

disclosure practice have better corporate governance and thus have lower information asymmetry components of their stocks. We also argue that the two S&P T&D final rankings may have measurement error in measuring the extent of firm's disclosure practice and information asymmetry, and thus cause the inconsistent estimation result in OLS estimation in the first equation of the simultaneous system.



8. Conclusions

This study investigates the relationship between corporate governance and equity liquidity. We suggest that the firms with poor financial transparency and information disclosure have higher agency cost due to managers' increasing incentives to use their information advantage to pursue their private benefit of control. When agency problem becomes worse, the wealth and rights of small shareholders are easily exploited by insiders such as executives or controlling owners, which causes worse corporate governance. The company with poorer disclosure practice accompanies worse corporate governance and higher information asymmetric risk. Liquidity suppliers will broaden the spread of firm's equity when it exhibit poor corporate governance, and this price protection action will decrease market liquidity of the stock.

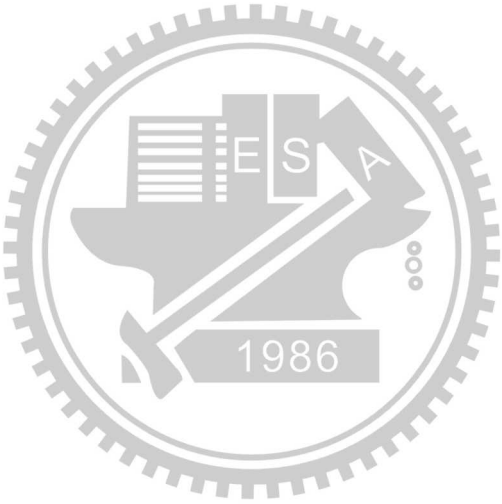
In this study, we use S&P T&D ranking as a proxy variable for corporate governance, and employ it to examine whether firms with higher rankings have better market liquidity of their stocks. We provide four variables, the quoted half-spread, the proportional half-spread, the effective spread, and the relative effective spread, suggested by previous studies to measure equity liquidity. In addition, the information asymmetry component of the effective spread is estimated to measure the information asymmetry cost faced by liquidity suppliers to compensate possible loss when they trade with unidentifiable informed traders.

The empirical evidence supports our hypothesis that the companies with better corporate governance have better market liquidity of their stocks: both the composite and annual basis T&D final rankings have significantly negative partial effects on the quoted half-spread and the effective spread under the 3SLS and GMM estimations. We also find that both the composite and annual basis T&D final rankings are significantly and negatively related to the information asymmetry component of the effective spread, which implies that better

disclosure practice can reduce the information asymmetric risk perceived by market and thus lower the spread of the equity by decrease the information asymmetric cost requested by liquidity supplier to compensate possible loss from informed trading activities. Besides, we find that none of our liquidity measures represents a significant explanatory variable to the T&D ranking in our simultaneous equations, so there is weak evidence that the simultaneity problem exists in our data.

This study has several contributions to the financial literature and practice. First, we link the conceptions of disclosure practice, information asymmetry, agency problem, and corporate governance to the equity liquidity. The empirical results are not only consistent with our prediction but also statistically significant, which supports our hypothesis that better corporate governance accompanies better equity liquidity. Second, this study employs two advanced estimation methods, 3SLS and GMM, to provide more reliable empirical evidence for examining the impact of corporate governance on equity liquidity. Third, we additionally estimate the information asymmetry components of the effective spread to measure the information asymmetry cost requested by liquidity suppliers to compensate possible loss from informed trading activities. We find that the T&D rankings are significantly and negatively related to the information asymmetry component, implying the worse disclosure practice lower the equity liquidity by increasing the information asymmetric cost requested by liquidity suppliers under the fact that the order processing cost are usually fixed. Fourth, our study indirectly examines the quality of S&P T&D ranking, and we suggest that it may have some measurement error in assessing firm's disclosure practice. Therefore, investors should be more careful about making use of this ranking directly to assess the extent of financial transparency and disclosure practice of a company. Finally, the results of our study have some important meaning for corporate governance: the managers should endeavor to conform to various disclosure regulations and investor protection codes by disclosing firm's information

to the best of their abilities. When a firm can provide better disclosure and transparency, the information asymmetry and agency problem will be mitigated, and the quality of firm's corporate governance improves. Consequently, the firm will have smaller information asymmetry component, effective spread, and quoted spread, which implies better market liquidity of its stock.



References

Agrawal, V., Kothare, M., Rao, R.K.S., and Wadhwa, P., 2004, "Bid-ask spreads, informed investors, and firm's financial condition," *The Quarterly Review of Economics and Finance* 44, 58–76.

Alves, C., and Mendes, V., 2004, "Corporate governance policy and company performance: the Portuguese case," *Corporate Government: An International Review* 12, 290-301.

Barclay, M.J., Christie, W.G., Harris, J.H., Kandel, E., and Schultz, P.H., 1999, "Effects of market reform on the trading costs and depths of Nasdaq stocks," *Journal of Finance* 54, 1-34.

Botosan, C.A., 1997, "Disclosure level and rs, and the the cost of equity capital," *the Accounting Review* 72:3, 323-350.

Brockman, P., and Chung, D.Y., 2003, "Investor protection and firm liquidity," *Journal of Finance* 58, 921-937

Brown, L.D., and Caylor, M.L., 2004, "Corporate governance and firm performance," Georgia State University, Working Paper, 1-30.

Cheng, A.C.S., Collins, D., Huang, H., 2003, "The effect of the S&P T&D rankings on market beta, abnormal returns and earnings response coefficients in the period surrounding the report release date," University of Houston C.T. Bauer College of Business, Working Paper, 1-44.

Conyon, M.J. and Peck, S.I., 1998, "Board size and corporate performance: evidence from European countries," *The European Journal of Finance* 4, 291-304.

Copeland, T.E., and Galai, D., 1983, "Information effects of the bid-ask spread," *Journal of Finance* 38, 1457-1469.

Cremers, K.J.M, and Nair, V.B., 2004, "Governance mechanisms and equity prices," *Journal of Finance*, forthcoming.

Demsetz, H., 1968, "The cost of transacting," *Quarterly Journal of Economics* 82, 33-53.

Durnev, A., and Kim, E., 2002, "To steal or not to steal: Firm attributes, legal environment, and valuation," University of Michigan Business School, Working Paper,

Dye, R.A., 1985, "Disclosure of nonproprietary information," *Journal of Accounting Research*, 123-145.

George, T.J., Kaul, G., and Nimalendran, M., 1991, “Estimation of bid-ask spread and its components: A new approach,” *The Review of Financial Studies* 4, 623-656.

Glosten, L.R., and Milgrom, P.R., 1985, “Bid, ask and transaction prices in a specialist market with heterogeneously informed traders,” *Journal of Financial Economics* 14, 71-100.

Gompers, P.A., Ishii, J.L., and Metrick, A., 2003, “Corporate governance and equity prices,” *Quarterly Journal of Economics* 118, 107-155.

Himmelberg C.P., Hubbard R.G., and Palia, D., 1999, “Understanding the determinants of managerial ownership and the link between ownership and performance,” *Journal of Financial Economic* 53, 353-384.

Ho, S.S.M., and Wong, K.S., 2001, “A study of the relationship between corporate governance structures and the extent of voluntary disclosure,” *Journal of International Accounting, Auditing & Taxation* 10, 139-156.

Huang, R.D., and Stoll, H.R., 1994, “Market microstructure and stock return predictions,” *Review of Financial Studies* 7, 179-213.

Huang, R.D., and Stoll, H.R., 1996, “Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE,” *Journal of Financial Economics* 41, 313-357.

Johon, S., Boone, P., Breach, A., and Friedman, E., 2000, “Corporate governance in the Asian financial crisis,” *Journal of Financial Economics* 58, 141-186.

Klapper, L.F., and Love, I., 2004, “Corporate governance, investor protection, and performance in emerging markets,” *Journal of Corporate Finance* 10, 703-728

Kyle, A.S., 1985, “Continuous auctions and insider trading,” *Econometrica* 53, 1315-1335.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1997, “Legal determinants of external finance,” *Jounal of Finance* 52, 1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1998, “Law and finance,” *Jounal of Political Economy* 106, 1115-1155.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 1999, “Corporate ownership around the world,” *Jounal of Finance* 54, 471-517.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1998, “Investor protection and corporate

governance," *Jounal of Financial Economic* 58, 3-27.

Lang, M. and Lundholm, R., 1993, "Cross-sectional determinants of analyst ratings of corporate disclosures," *Journal of Accounting Research*, 246-271.

Lang, M. and Lundholm, R., 1999, "Corporate disclosure policy and analyst behavior," *The Accounting Review* 71, 467-493.

Lee, T.-S., and Yeh, Y.-H., 2004, "Corporate governance and financial distress: evidence from Taiwan," *Corporate Government: An International Review* 12, 378-388.

Leuz, C., Nanda, D, and Wysocki, P.D., 2003, "Earnings management and investor protection:an international comparison," *Journal of Financial Economics* 69, 505–527

Lin, J.-C., 1992, "Order persistence, adverse selection, and gross profits earned by NYSE specialists," *Journal of Finance* 48, 1108.

Lin, J.-C., Sanger, G.C., and Booth, G., 1995, "Trade size and components of the bid-ask spread," *The Review of Financial Studies* 8,1153-1183.

Lippman, S.A., and McCall, J.J., 1986, "An operational measure of liquidity," *American Economic Review* 76, 43-55.

Lowenstein, L., 1996, "Financial transparency and corporate governance," *Columbia Law Review* 96, April.

Mitton, T., 2002, "A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis," *Journal of Financial Economics* 64, 215-241.

Nelson, J., 2005, "Corporate governance practices, CEO characteristics and firm performance," *Journal of Corporate Finance* 11, 197-228

Patel, S.A., and Dallas, G., 2002, "Transparency and Disclosure: Overview of Methodology and Study Results – United States," Standard & Poor's, http://governance.standardandpoors.com., 1-29.

Stoll, H.R., 1978a, "The supply of dealer services in securities markets," *Journal of Finance* 33, 1122-1151.

Stoll, H.R., 1978b, "The pricing of security dealer services: An empirical study of NASDAQ stocks," *Journal of Finance* 33, 1153-1172.

Stoll, H.R., 2000, "Friction," *Journal of Finance* 55, 1479-1514.

Vafeas, N., 1999, “Board meeting frequency and firm performance,” *Journal of Financial Economics* 53, 113-142.

Van Ness, B.F., Van Ness, R.A., and Warr R.S., 2001, “How well do adverse selection components measure adverse selection?” *Finacial Management*, 77-98.

Welker, M., 1995, “Disclosure policy, information asymmetry, and liquidity in equity markets,” *Contemporary Accounting Research* 11, 801-827.

Wooldridge, J. M., 2002, *Econometric Analysis of Cross Section and Panel Data*, Massachusetts Institute of Technology, Cambridge, Massachusetts, the MIT press.

TABLE 1

Descriptive statistics and Pearson correlations coefficients of the selected liquidity measures and their control variables

This table contains descriptive statistics and Pearson correlations coefficients of our five liquidity measures and their control variables. Our samples are the S&P 500 constituents stocks listed in NYSE from January 1 2002– December 31 2002, and the sample size is 341.

Panel A : Descriptive statistics

	N	Mean	Std Dev	Minimum	Maximum
QSP (cent's)	341	2.2046	0.0060	0.7839	4.3059
PSP (%)	341	0.0716	0.0362	0.0281	0.3220
ESP (cent's)	341	1.6166	0.0046	0.6652	3.6069
RESP (%)	341	0.0519	0.0246	0.0218	0.2170
INF (cent's)	341	0.6577	0.2170	0.2172	1.3402
CLP	341	38.0115	18.7849	4.5627	121.7333
DOLVOL (million's)	341	66.6429	80.4993	4.4059	610.3353
RETSTD	341	0.0264	0.0098	0.0138	0.0768

QSP= the quoted half-spread

PSP= the proportional quoted half-spread

ESP= the effective spread

RESP= the relative effective spread

INF= the dollar value of the information asymmetry component of the effective spread

CLP = the closing price

DOLVOL = the daily dollar volume

RETSTD= the return standard deviation in prior year

TABLE 1 (continued)

PANEL B: Pearson correlation coefficients

	QSP	PSP	ESP	RESP	INF	CLP	DOLVOL	RETSTD
QSP	1							
PSP	-0.4015**	1						
	(<0.0001)							
ESP	0.9694**	-0.4732**	1					
	(<0.0001)	(<0.0001)						
RESP	-0.4260**	0.9891**	-0.4729**	1				
	(<0.0001)	(<0.0001)	(<0.0001)					
INF	0.9668**	-0.4278**	0.9441**	-0.4469**	1			
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)				
CLP	0.8107**	-0.6738**	0.8834**	-0.6669**	0.8010**	1		
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)			
DOLVOL	-0.0281	-0.3437**	0.1328**	-0.2948**	-0.09032**	0.3494**	1	
	(0.6045)	(<0.0001)	(0.0141)	(<0.0001)	(0.0959)	(<0.0001)		
RETSTD	-0.3301**	0.6798**	-0.3123**	0.7232**	-0.3643**	-0.4590**	-0.0107	1
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)	(0.8445)	

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

TABLE 2

Descriptive statistics and Pearson correlations coefficients of the S&P T&D final rankings and their control variables

This table contains descriptive statistics and Pearson correlations coefficients of two S&P T&D final rankings and their control variables. Our samples are the S&P 500 constituents stocks listed in NYSE from January 1 2002– December 31 2002, and the sample size is 341.

Panel A : Descriptive statistics

	N	Mean	Std Dev	Minimum	Maximum
CFR	341	7.5455	0.5161	7.0000	9.0000
AFR	341	4.7771	0.9986	1.0000	8.0000
SIZE (million's)	341	39391	107730	669	887515
AIP (%)	341	30.5985	23.2217	0.0000	93.2126
RETSTD	341	0.0264	0.0098	0.0138	0.0768

CFR= the composite basis S&P T&D final ranking

AFR= the annual basis S&P T&D final ranking

SIZE= the firm's total asset at the end of 2002

AIP= the asst-in-place defined as the book value of fix asset divided by total asset

RETSTD= the return standard deviation in prior year

Panel B: Pearson correlation coefficients

	CFR	AFR	SIZE	AIP	RETSTD
CFR	1				
AFR	0.2880**	1			
	(<0.0001)				
SIZE	0.0329	0.0565	1		
	(0.5444)	(0.2979)			
AIP	0.1841**	0.1423**	-0.2635**	1	
	(0.0006)	(0.0085)	(<0.0001)		
RETSTD	-0.0680	-0.1700**	-0.0494	0.0332	1
	(0.2102)	(0.0016)	(0.3631)	(0.5407)	

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 3

OLS, 3SLS and GMM estimation results of the quoted half-spread and composite basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the composite basis T&D ranking is significantly and negatively with the quoted half-spread in the first equation. In the second equation, the quoted half-spread does not reveal significant negative relation to the composite basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		6.1712**	9.4445**	9.2985**
		(<.0001)	(<.0001)	(<.0001)
CFR	−	-0.0171	-0.5168**	-0.4688**
		(0.4963)	(<.0001)	(0.0002)
CLP	+	0.0356**	0.0339**	0.0335**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.3138**	-0.2793**	-0.2911**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	11.8189**	10.1672**	10.4431**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.8435	0.6550	0.6903
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		6.3579**	6.0121**	6.2441**
		(<.0001)	(<.0001)	(<.0001)
QSP	−	-0.0275	-0.0454	-0.0502
		(0.5622)	(0.3791)	(0.3182)
lnSIZE	+	0.0480*	0.0666**	0.0560**
		(0.0210)	(0.0007)	(0.0049)
AIP	+	0.0045**	0.0030**	0.0037**
		(0.0003)	(0.0079)	(0.0001)
Adj. R^2		0.0439	0.0352	0.0412
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 4

OLS, 3SLS and GMM estimation results of the quoted half-spread and annual basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the annual basis T&D ranking is significantly and negatively with the quoted half-spread in the first equation. In the second equation, the quoted half-spread does not reveal significant negative relation to the annual basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		6.0431**	7.1516**	6.9888**
		(<.0001)	(<.0001)	(<.0001)
AFR	−	-0.0006	-0.3249**	-0.2931**
		(0.9638)	(<.0001)	(0.0003)
CLP	+	0.0357**	0.0339**	0.0330**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.3140**	-0.2740**	-0.2735**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	11.9265**	4.6206	6.3046
		(<.0001)	(0.0926)	(0.0524)
Adj. R^2		0.8432	0.5534	0.6061
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		2.8155**	2.4873*	2.7059**
		(0.0085)	(0.0194)	(0.0055)
QSP	−	-0.0208	-0.0839	-0.1262
		(0.8310)	(0.4338)	(0.1732)
lnSIZE	+	0.0970*	0.1222**	0.1137**
		(0.0160)	(0.0015)	(0.0010)
AIP	+	0.0073**	0.0042*	0.0053**
		(0.0020)	(0.0374)	(0.0050)
RETSTD	−	-17.5938**	-18.4220**	-16.3637*
		(0.0024)	(0.0017)	(0.0156)
Adj. R^2		0.0579	0.0495	0.0504
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 5

OLS, 3SLS and GMM estimation results of the effective spread and composite basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the composite basis T&D ranking is significantly and negatively with the effective spread in the first equation. In the second equation, the effective spread does not reveal significant negative relation to the composite basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		3.1752**	5.3428**	5.3952**
		(<.0001)	(<.0001)	(<.0001)
CFR	−	-0.0218	-0.3508**	-0.3302**
		(0.2255)	(0.0001)	(0.0002)
CLP	+	0.0274**	0.0260**	0.0260**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.1533**	-0.1307**	-0.1428**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	9.6523**	8.5048**	8.6485**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.8651	0.7276	0.7453
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		6.4060**	6.0807**	6.3222**
		(<.0001)	(<.0001)	(<.0001)
ESP	−	-0.0713	-0.0889	-0.0948
		(0.2398)	(0.1701)	(0.1299)
lnSIZE	+	0.0484**	0.0654**	0.0546**
		(0.0175)	(0.0007)	(0.0046)
AIP	+	0.0044**	0.0031**	0.0036**
		(0.0004)	(0.0062)	(0.0001)
Adj. R^2		0.0469	0.0405	0.0451
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 6

OLS, 3SLS and GMM estimation results of the effective spread and annual basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the annual basis T&D ranking is significantly and negatively with the effective spread in the first equation. In the second equation, the effective spread does not reveal significant negative relation to the annual basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		2.9877**	3.7785**	3.6907**
		(<.0001)	(<.0001)	(<.0001)
AFR	−	0.0039	-0.2222**	-0.2025**
		(0.6752)	(<.0001)	(0.0005)
CLP	+	0.0275**	0.0260**	0.0258**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.1536**	-0.1259**	-0.1275**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	9.8913**	4.5792**	5.9191**
		(<.0001)	(0.0172)	(0.0094)
Adj. R^2		0.8646	0.6275	0.6662
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		2.8441**	2.5891**	2.6474**
		(0.0048)	(0.0089)	(0.0037)
ESP	−	-0.0468	-0.1580	-0.1898
		(0.7033)	(0.2327)	(0.0984)
lnSIZE	+	0.0975*	0.1214**	0.1182**
		(0.0132)	(0.0011)	(0.0004)
AIP	+	0.0072**	0.0044*	0.0054**
		(0.0022)	(0.0293)	(0.0044)
RETSTD	−	-17.8539**	-19.0721**	-16.9998*
		(0.0018)	(0.0010)	(0.0116)
Adj. R^2		0.0582	0.0503	0.0507
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 7

OLS, 3SLS and GMM estimation results of the proportional quoted half-spread and composite basis S&P T&D final ranking

The empirical results show that under all estimation methods the estimated coefficients of the composite basis T&D ranking are insignificant in the first equation. The estimated coefficients of the proportional quoted half-spreads under all estimation methods are also insignificant in the second equation.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		0.3258**	0.3187**	0.2881**
		(<.0001)	(<.0001)	(<.0001)
CFR	−	-0.0030	-0.0019	-0.0007
		(0.1241)	(0.8102)	(0.9193)
CLP	−	-0.0004**	-0.0004**	-0.0005**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.0155**	-0.0156**	-0.0137**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	2.1491**	2.1486**	1.7636**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.7500	0.7497	0.7364
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		6.2965**	6.0806**	5.9648**
		(<.0001)	(<.0001)	(<.0001)
PSP	−	-0.2475	0.5307	0.9027
		(0.7541)	(0.5654)	(0.3006)
lnSIZE	+	0.0486*	0.0556**	0.0591**
		(0.0220)	(0.0100)	(0.0046)
AIP	+	0.0046**	0.0046**	0.0046**
		(0.0001)	(0.0002)	(<.0001)
Adj. R^2		0.0432	0.0405	0.0371
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 8

OLS, 3SLS and GMM estimation results of the proportional quoted half-spread and annual basis S&P T&D final ranking

The empirical results show that under all estimation methods the estimated coefficients of the annual basis T&D ranking are insignificant in the first equation. The estimated coefficients of the proportional quoted half-spreads under all estimation methods are also insignificant in the second equation.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		0.3045**	0.3029**	0.2779**
		(<.0001)	(<.0001)	(<.0001)
AFR	−	-0.0003	0.0002	0.0003
		(0.7701)	(0.9666)	(0.9357)
CLP	−	-0.0004**	-0.0004**	-0.0005**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.0155**	-0.0156**	-0.0137**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	2.1637**	2.1788**	1.8373**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.7483	0.7481	0.7373
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		2.2607*	1.4168	1.1862
		(0.0238)	(0.1820)	(0.2266)
PSP	−	2.7101	6.9926*	7.2712*
		(0.1982)	(0.0214)	(0.0115)
lnSIZE	+	0.1175**	0.1531**	0.1603**
		(0.0047)	(0.0006)	(0.0002)
AIP	+	0.0075**	0.0071**	0.0071**
		(0.0012)	(0.0022)	(0.0011)
RETSTD	−	-23.8600**	-34.3381**	-31.9827**
		(0.0015)	(0.0002)	(0.0032)
Adj. R^2		0.0624	0.0505	0.0475
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 9

OLS, 3SLS and GMM estimation results of the relative effective spread and composite basis S&P T&D final ranking

The empirical results show that under all estimation methods the estimated coefficients of the composite basis T&D ranking are insignificant in the first equation. The estimated coefficients of the relative effective spreads under all estimation methods are also insignificant in the second equation.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		0.1928**	0.1819**	0.1687**
		(<.0001)	(<.0001)	(<.0001)
CFR	−	-0.0022	-0.0006	-0.0005
		(0.0912)	(0.9089)	(0.9148)
CLP	−	-0.0003**	-0.0003**	-0.0003**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.0088**	-0.0088**	-0.0077**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	1.5586**	1.5611**	1.2692**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.7498	0.7487	0.7340
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		6.3411**	6.1241**	6.0248**
		(<.0001)	(<.0001)	(<.0001)
RESP	−	-0.6822	0.4814	0.9616
		(0.5527)	(0.7189)	(0.4437)
lnSIZE	+	0.0474*	0.0543*	0.0571**
		(0.0237)	(0.0105)	(0.0055)
AIP	+	0.0046**	0.0045**	0.0046**
		(0.0001)	(0.0002)	(<.0001)
Adj. R^2		0.0440	0.0410	0.0379
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 10

OLS, 3SLS and GMM estimation results of the relative effective spread and annual basis S&P T&D final ranking

The empirical results show that under all estimation methods the estimated coefficients of the annual basis T&D ranking are insignificant in the first equation. The estimated coefficients of the relative effective spreads under all estimation methods are also insignificant in the second equation.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		0.1764**	0.1742**	0.1592**
		(<.0001)	(<.0001)	(<.0001)
AFR	−	-0.0001	0.0005	0.0004
		(0.8668)	(0.8748)	(0.8713)
CLP	−	-0.0003**	-0.0003**	-0.0003**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.0088**	-0.0089**	-0.0076**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	1.5717**	1.5891**	1.3423**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.7477	0.7471	0.7359
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		2.3242*	1.4764	1.2000
		(0.0185)	(0.1578)	(0.2102)
RESP	−	4.0762	11.3605*	12.0960**
		(0.2090)	(0.0216)	(0.0089)
lnSIZE	+	0.1147**	0.1504**	0.1596**
		(0.0051)	(0.0006)	(0.0001)
AIP	+	0.0075**	0.0070**	0.0069**
		(0.0012)	(0.0026)	(0.0015)
RETSTD	−	-24.4757**	-37.4211**	-35.5437**
		(0.0021)	(0.0003)	(0.0029)
Adj. R^2		0.0622	0.0476	0.0428
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 11

OLS, 3SLS and GMM estimation results of the information asymmetry component and composite basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the composite basis T&D ranking is significantly and negatively with the information asymmetry component in the first equation. In the second equation, the information asymmetry component does not reveal significant negative relation to the composite basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		2.3224**	3.6756**	3.6636**
		(<.0001)	(<.0001)	(<.0001)
CFR	−	-0.0040	-0.2119**	-0.1964**
		(0.6338)	(<.0001)	(<.0001)
CLP	+	0.0130**	0.0123**	0.0121**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.1266**	-0.1119**	-0.1175**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	3.5719**	2.8859**	2.8957**
		(<.0001)	(<.0001)	(<.0001)
Adj. R^2		0.8692	0.6215	0.6592
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		6.2964**	5.8641**	6.0649**
		(<.0001)	(<.0001)	(<.0001)
INF	−	-0.0378	-0.0984	-0.1376
		(0.7746)	(0.4862)	(0.3174)
lnSIZE	+	0.0490*	0.0718**	0.0633**
		(0.0197)	(0.0003)	(0.0013)
AIP	+	0.0045**	0.0027*	0.0034**
		(0.0002)	(0.0145)	(0.0003)
Adj. R^2		0.0432	0.0297	0.0364
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.

Table 12

OLS, 3SLS and GMM estimation results of the information asymmetry component and annual basis S&P T&D final ranking

The empirical results show that under 3SLS and GMM estimations the annual basis T&D ranking is significantly and negatively with the information asymmetry component in the first equation. In the second equation, the information asymmetry component does not reveal significant negative relation to the annual basis T&D ranking, indicating that there might be no simultaneity existing in the determination of spread and disclosure practice.

Panel A: Simultaneous estimation results of the first equation

	Prediction	OLS	3SLS	GMM
Intercept		2.2846**	2.7353**	2.7148**
		(<.0001)	(<.0001)	(<.0001)
AFR	−	0.0014	-0.1329**	-0.1253**
		(0.7462)	(<.0001)	(<.0001)
CLP	+	0.0130**	0.0123**	0.0119**
		(<.0001)	(<.0001)	(<.0001)
lnDOLVOL	−	-0.1267**	-0.1098**	-0.1106**
		(<.0001)	(<.0001)	(<.0001)
RETSTD	+	3.6304**	0.6446	1.1547
		(<.0001)	(0.5280)	(0.3692)
Adj. R^2		0.8692	0.4919	0.5333
Obs.	341			

Panel B: Simultaneous estimation results of the second equation

	Prediction	OLS	3SLS	GMM
Intercept		2.6666*	2.3048*	2.6203**
		(0.0136)	(0.0303)	(0.0076)
INF	−	0.0212	-0.1993	-0.3552
		(0.9385)	(0.5049)	(0.1706)
lnSIZE	+	0.1000*	0.1283**	0.1165**
		(0.0144)	(0.0009)	(0.0008)
AIP	+	0.0074**	0.0037	0.0046**
		(0.0017)	(0.0576)	(0.0090)
RETSTD	−	-16.9902**	-18.2533**	-16.5135*
		(0.0039)	(0.0023)	(0.0165)
Adj. R^2		0.0578	0.0457	0.0460
Obs.	341			

The p-value is showed in the parentheses below each coefficient estimate.

*: the coefficient estimate is statistically significant at alpha = 0.05 level.

**: the coefficient estimate is statistically significant at alpha = 0.01 level.