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交易機制對流動性之影響：以興櫃轉上市櫃公司為例

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中文摘要

有鑑於未上市櫃股票透過盤商仲介交易容易產生許多弊端，金管會證期局（前財政部證期會）乃委託櫃檯買賣中心於民國九十一年一月二日正式設立興櫃市場（Emerging Stock Market），將未上市股票的交易納入合法證券體系中。投資人在興櫃市場上交易未上市股票，可享受低交易風險、低交易成本和高流動性等好處。

櫃檯買賣中心對於申請成為興櫃股票的公司，並無特別的要求。申請公司只須符合下列三個條件：（一）已經申報上市（櫃）輔導；（二）經由二家以上證券商書面推薦；（三）在櫃檯買賣中心所在地設有專業股務代理機構辦理股務。因為櫃檯買賣中心對申請公司的成立年數、接受輔導期間、公司規模、營運損益狀況以及財報揭露次數等皆無任何要求，股票在興櫃市場交易的公司營運強度和穩定度必然良莠不齊，投資人的投資風險也相對升高。在這種情形下，負責推薦的證券商便扮演了重要的把關角色，也因此成為往後交易其推薦公司股票的造市者（market maker）。

投資人可經由經紀商與推薦券商議價或直接與推薦券商議價等兩種方式買賣興櫃股票。換言之，興櫃市場的交易機制（trading mechanism）是屬於經紀商市場（dealer market）或報價驅動市場（quote-driven market）。在像興櫃這樣的報價驅動市場中，推薦券商有責任至少於每日開盤時報出最佳買賣價以及在最佳買賣價下願意成交的單量。所以推薦券商的報價行為關係著興櫃股票的交易流動性。

從民國九十四年一月一日起，配合上市櫃公司取消輔導期的規定，將來欲上市櫃的公司必須先在興櫃市場交易滿六個月，方能申請到上市市場或櫃檯市場交易。一旦轉上市櫃成功，原來的興櫃公司股票便在不同的交易機制下交易了，因為上市櫃市場的交易機制是屬於間斷式競拍市場（call auction market）或下單驅動市場（order-driven market）。本研究主要目的便在於透過興櫃股票轉上市櫃後交易流動性的變化，探討不同的交易機制對交易相對清淡股票（thinly traded stocks）之流動性的影響。除此之外，本研究也藉由估計不同的價差成份因子模型，探討不同市場交易機制如何反映市場資訊，並進而影響不同類別投資人在不同交易機制下的交易行為。

根據 Christie and Huang (1994) 的事件研究法，我們發現：整體而言，交易清淡的股票可藉由轉上市櫃的方式，大幅改善其市場流動性。平均而言，流動性貼水指標（Liquidity Premium）由 1.66 元下降為 0.16 元，流動性貼水比率指標（Percentage Liquidity Premium）由 3.64%降低至 0.34%，買賣價差（Dollar Spread）則由 5.38 元減少為 0.422 元，最後的買賣價差比率指標（Percentage Dollar Spread）則由興櫃市場中的 11.33%下降至上市櫃市場中的 0.83%。以上的流動性改善幅度皆達統計上常用的顯著水準。

除了流動性的改善外，我們更利用兩個價差分解模型以進一步瞭解不同交易機制中交易成本結構的差異。我們採用的模型為 Lin, Sanger, and Booth (1995)與 Huang and Stoll (1997)等兩個模型，前者將價差分解為資訊不對稱成本（information asymmetry cost）以及下單處理成本（order processing cost）兩種因子，而後者則分解成三個因子，亦即資訊不對稱成本、存貨成本（inventory cost）和下單處理成本。這兩個模型都得到一致的結果：當興櫃公司轉上市櫃後，其投資人所面對的資訊不對稱成本（以價差的比例為標準）大幅攀升，亦即投資人在投資交易相對清淡的股票時，報價驅動的交易機制相較於下單驅動的交易機制對其較為有利。

關鍵詞：交易機制、流動性、買賣價差成份因子、興櫃轉上市櫃

英文摘要

On January 2nd, 2002, the GreTai Securities Market (GTSM) established the Emerging Stock Market (ESM) to officially regulate and facilitate the trading of unlisted stocks, which were usually traded in the underground stock market notorious for its high trading risk, price manipulation, and low liquidity. The ESM basically functions as a preparatory market for those public companies looking for being listed in the Taiwan Stock Exchange (TSE) and the GTSM in the future. To be eligible to register in the ESM, a public company needs to fulfill only three requirements: (1) To register their supervision agreement with recommending securities firms to the GSTM; (2) To have at least two recommending securities firms that act as the designed market makers for the recommended stocks and are responsible for providing recent one month financial statements and other important information of the company; (3) To obtain the service of registered house in the Taipei metropolitan area. Since these requirements are not restrictive, almost every public company can register in the ESM if it desires to do so.

The market makers are obliged to offer the information of bid and ask prices for their recommending emerging stocks on a continuous basis during the trading hours. Investors can trade emerging stocks by either entrusting a broker to negotiate with the market makers and settle the price based on the appointed price by the investors or negotiating with the market makers directly via phone or in person if the order volume is about 100,000 shares. In other words, the trading mechanism of the ESM is the same as that of a typical continuous dealer market or quote-driven market.

From January 1st, 2005, on, a public company, whose stocks have been traded in the ESM over a period of full six months, can apply for being listed in the TSE or the GTSM. The trading mechanism in the TSE and the GTSM is the same as that of a typical call auction market or periodical order-driven market. In the past three years, there are a lot of companies switching their stocks from the ESM to the TSE or the GTSM. These cases of exchange switching provide us with opportunities to evaluate the effect of trading mechanism on the liquidity of thinly traded stocks.

In this research project the effects of trading mechanism on the liquidity of thinly traded stocks are examined in two ways. First, we employ several liquidity measures to determine if there is any liquidity improvement after the emerging stocks switch to the TSE or the GTSM. The liquidity measures include the liquidity premium, percentage liquidity premium, dollar spread, and percentage spread. Second, we further decompose the liquidity measures into two bid-ask spread components according to the models of Huang and Stoll (1997) and Lin, Sanger, and Booth (1995). These components reflect the total trading cost of market makers that contains order processing cost, inventory cost, and information asymmetry cost. By studying the bid-ask spread components individually, we can understand the efficiency of different trading mechanisms in terms of resolving information asymmetry and enhancing liquidity provision. Therefore, this project contributes to the literature of market microstructure by evaluating through exchange switching stocks how different market trading mechanisms can affect the market liquidity. We hope that our results can provide valuable information for investors to construct their optimal investment strategies and for government regulation bodies

to design efficient market structures in the future.

Using the event study method of Christie and Huang (1994), we find that based on four liquidity measures, thinly-traded stocks are able to significantly improve their liquidities by switching from a quote-driven market to an order-driven market. In particular, the average liquidity premium drops from NTD1.66 in the ESM to NTD0.16 in the TSE or the GTSM; the average percentage liquidity premium decreases to 0.34% in the TSE or the GTSM from 3.64% in the ESM. The average dollar spread narrows to be NTD0.422 in the TSE or the GTSM whereas it is as high as NTD5.38 in the ESM. Moreover, the average percentage dollar spread improves from 11.33% in the ESM to 0.83% in the TSE or the GTSM. Note that all these improvements are significant under the traditional significant levels.

In addition to the improvement in the liquidity, we would like further understand the underlying causes of such improvement. To achieve this purpose, we employ the spread decomposition models of Lin, Sanger, and Booth (1995) and Huang and Stoll (1997) to separate the bid-ask spread into different components: information asymmetry component, inventory component, and order-processing component. We find that according to the results of these two decomposition models, the information asymmetry cost, measured as the percentage of the dollar spread, in the TSE or the GTSM is significant higher that that in the ESM. In other words, liquidity traders of thinly-traded stocks face much higher risk in trading with informed traders in an order-driven environment.

Keywords: trading mechanism, liquidity, bid-ask spread components, exchange switching

I. Introduction

The relationship between trading mechanism and market liquidity has attracted academic attention in decades. In general, there are three popular types of trading mechanisms in worldwide capital markets. They are quote-driven market, order-driven market, and hybrid market. The quote-driven market is also called the continuous dealer market. The ESM belongs to this type of trading mechanism. In this type of market, dealers are responsible for posting firm quotes before actual transactions. In other words, investors are able to obtain firm price quotations from market makers prior to order submission, so that they can trades immediately with a market maker without waiting for order execution. In contrast, in an order-driven market, investors submit their orders for execution through either a continuous auction process or a periodic auction process. In the former, investors submit orders for immediate execution by dealers on an exchange floor or against existing limit orders submitted by public investors or dealers. Yet, in the latter, orders of investors are aggregated for a certain period of time and then matched at a single market clearing price at predetermined points of time during a trading day. Both the TSE and the GTSM belong to this type of trading mechanism. Nevertheless, most capital markets are operating as complex hybrids of these three types of trading mechanisms.

Pagano and Röell (1992) consider a model in which market prices are set by risk neutral competitive market makers, so that the order flow exerts price pressure entirely due to its informational content. Based on the model, they find that the bid-ask spread is lower in the periodic auction market than on the continuous dealer market and intermediate in the continuous auction market. In a similar framework, Pagano and Röell (1996) find that due to its greater market transparency, a periodic auction market has lower expected trading costs for liquidity traders than a dealer market. These results suggest that the total transaction cost measured by the bid-ask spread is lower in a periodic auction market than that in a continuous dealer market. They also imply that public firms can lower the transaction cost and improve the liquidity of their stocks by switching from the ESM to either the TSE or the GTSM. However, these models do not tell us about the relative magnitudes of various components of the bid-ask spread under different trading mechanisms although Pagano and Röell (1996) do suggest liquidity investors trade their stocks in a call auction market instead of a dealer market due to its lower information asymmetry cost. Therefore, we need to empirically determine the component structures of the bid-ask spread in both the ESM, a dealer market, and the TSE and the GTSM, periodic auction markets.

There exists an extensive literature on how exchange switch affects the liquidity measured by various liquidity measures. Basically, these studies evaluate the change in liquidity under different trading mechanisms. Cowan, Carter, Dark, and Singh (1992), Christie and Huang (1994), Huang and Stoll (1996), Clyde, Schultz, and Zaman (1997), and Elyasiani, Hauser, and Lauterbach (2000) examine the change in liquidity for firms that move from NASDAQ, a dealer market, to the NYSE (AMEX), a specialist market or vice versus. All of these studies report a significant improvement in liquidity for those firms switching from NASDAQ to the NYSE or the AMEX based on various market liquidity measures. De Jong, Nijman, and Röell (1995) compare the cost of trading French stocks on the Paris Bourse, an electronic continuous auction market, and on SEAQ International in London, a continuous dealer market. They find that for small transactions, the former has lower implicit trading costs, i.e. higher liquidity, than the latter measured by both the effective and quoted bid-ask spread. Blemmerhassett and Bowman (1998) study the impact on transaction costs of the switch from open outcry or oral auction market, a type of order-driven markets, to electronic continuous auction market. They find that the bid-ask spread declines and, therefore, liquidity improves after the switch.

Degryse (1999) studies liquidity improvement resulting from competition between the Brussels CATS market, an electronic continuous auction market, and London's SEAQ-I, a dealer market. He finds that both effective and quoted bid-ask spreads are smaller in the Brussels CATS market. Based on a sample of stocks traded on the London Stock Exchange, a dealer market, and also traded as ADRs on the NYSE, an auction market, Huang and Stoll (2001) show that the London dealer market exhibits higher bid-ask spreads than the NYSE auction market. Kehr, Krahnen, and Theissen (2001) compare execution costs in two parallel trading mechanisms in the Frankfurt Stock Exchange: the specialist market and the electronic continuous auction market. They find that order execution costs for small trades in the specialist market are lower than the quoted spread in the continuous market, while order execution costs for large transactions in the specialist market are higher than the spread in the continuous market. In addition, Theissen (2002) analyzes the trading costs in floor and computerized trading systems that exist in parallel in the German stock market. He finds that bid-ask spreads are not generally lower in one trading mechanism, but the electronic trading mechanism is less attractive for less liquid stocks since it is more vulnerable to information trading. Nimalendran and Petrella (2003) compare the performance of a pure order driven market with limit order book with that of a hybrid order driven market with specialist and limit order book in order to determine the optimal trading mechanism for "thinly-traded" stocks. They show that the specialist-based system offers lower execution costs and lower adverse selection costs for "thinly-traded" stocks. De Winne and Platten (2003) empirically investigate market makers' behavior on Nasdaq Europe, a rather thin dealer market. They find that the information asymmetry component estimated based on the models of Lin et al. (1995) and Huang and Stoll (1997) is small on this thin market.

From the above literature review, we can see that previous studies focus on the comparison of liquidity in a quote-driven market and an order-driven market, especially a dealer market versus a continuous auction market. None of them compares the liquidity in quote-driven markets and pure call auction markets. In addition, although employing various measures to evaluate the quality, the previous studies have never attempted to investigate the components of the bid-ask spread. Understanding the component structure of the bid-ask spread is important in evaluating the performance of trading mechanisms. For example, the total transaction cost under a trading mechanism can be lower than that under another trading mechanism whereas the information asymmetry cost is higher in the former than in the latter. The contribution of this research project is to examine the liquidity effect for those thinly-traded stocks that switch from the ESM, a pure quote-driven market, to the TSE or the GTSM, pure call auction markets based on various liquidity measures. Furthermore, we also use two bid-ask spread decomposition models, Lin et al. (1995) and Huang and Stoll (1999), to investigate the sizes of different components of the bid-ask spread in these two types of trading mechanisms. Based on the sizes of different components, we can study which type of trading mechanisms has better efficiency in resolving information asymmetry for thinly-traded stocks.

Using the event study method of Christie and Huang (1994), we find that based on four liquidity measures, thinly-traded stocks are able to significantly improve their liquidities by switching from a quote-driven market to an order-driven market. In particular, the average liquidity premium drops from NTD1.66 in the ESM to NTD0.16 in the TSE or the GTSM; the average percentage liquidity premium decreases to 0.34% in the TSE or the GTSM from 3.64% in the ESM. The average dollar spread narrows to be NTD0.422 in the TSE or the GTSM whereas it is as high as NTD5.38 in the ESM. Moreover, the average percentage dollar spread improves from 11.33% in the ESM to 0.83% in the TSE or the GTSM. Note that all these improvements are significant under the traditional significant levels.

In addition to the improvement in the liquidity, we would like further understand the underlying causes of such improvement. To achieve this purpose, we employ the spread decomposition models of Lin, Sanger, and Booth (1995) and Huang and Stoll (1997) to separate the bid-ask spread into different components: information asymmetry component, inventory component, and order-processing component. We find that according to the results of these two decomposition models, the information asymmetry cost, measured as the percentage of the dollar spread, in the TSE or the GTSM is significant higher that that in the ESM. In other words, liquidity traders of thinly-traded stocks face much higher risk in trading with informed traders in an order-driven environment.

II. Empirical Methods

Following Christie and Huang (1994), we adopt the following four liquidity measures to evaluate the change in liquidity before and after the exchange switch. These measures are defined as follows:

(i) Liquidity Premium (LP): LP is defined as the difference between the transaction price and the midpoint of the most recent bid-ask quotes. Specifically, LP is defined as follows.

$$LP_{i,t} = \left| P_{i,t} - \left(\frac{A_{i,t} + B_{i,t}}{2} \right) \right|$$

where $A_{i,t}$, $B_{i,t}$, and $P_{i,t}$ are the quoted ask price, the quoted bid price, and the transaction price for stock i at time t, respectively. Since the ESM is a relatively illiquid market, the actual quoted ask and bid prices are not updated very frequently. In order to calculate $LP_{i,t}$ based on viable ask and bid prices, we decide to take $A_{i,t}$ and $B_{i,t}$ as the ask price and bid price for stock i that are quoted within the most recent 60 seconds, i.e., (t, t-60 seconds), respectively. We believe that the $A_{i,t}$ and $B_{i,t}$ as defined above are able to reasonably reflect the information prevailing in the market.

(ii) Percentage Liquidity Premium ($\%LP_{i,t}$): To avoid the problem that liquidity premium may vary with the level of stock price, we decide to calculate $\%LP_{i,t}$ by standardizing the liquidity premium by the mid-point of the quoted ask and bid price. Accordingly, the percentage liquidity premium is defined as follows.

$$\%LP_{i,t} = \frac{\left| P_{i,t} - \left(\frac{A_{i,t} + B_{i,t}}{2} \right) \right|}{\left(\frac{A_{i,t} + B_{i,t}}{2} \right)}$$

(iii) Dollar Spread $\left(DS_{i,t} \right)$: Dollar spread is a traditional liquidity measure defined as the difference between the quoted ask and bid prices. It accounts for trading costs related to a round-trip transaction executed at posted quotes. The dollar spread is defined as

$$DS_{i,t} = A_{i,t} - B_{i,t}$$

(iv) Percentage Dollar Spread $\left(\%DS_{i,t} \right)$: We standardize the dollar spread by the mid-point of the quoted bid-ask prices to mitigate the problem that the dollar spread may conditional on the level of stock price. This standardized dollar spread is called the percentage dollar spread that is defined as follows.

$$\%DS_{i,t} = \frac{\left(A_{i,t} - B_{i,t} \right)}{\left(\frac{A_{i,t} - B_{i,t}}{2} \right)}$$

After examining the change in liquidity due to exchange switch based on the above liquidity measure, we would like to employ the bid-ask spread decomposition models to study the efficiency of different trading mechanisms in resolving the information asymmetry commonly existing in financial markets. Several models have been proposed for estimating information asymmetry cost or adverse selection cost by decomposing quoted bid-ask spread, e.g., Glosten and Harris (1988), Stoll (1989), George, Kaul, and Nimalendran (1991), Lin, Sanger, and Booth (1995), Madhavan, Richardson, and Roomans (1997), and Huang and Stoll (1997). All these models decompose the spread into two or three components to reflect total trading cost of market maker that includes order processing cost, inventory cost, and information asymmetry cost. Consider the fact that there is no designated market maker in both the TSE and the GTSM and the empirical results of Menyah and Paudyal (2000) and Van Ness, Van Ness, and Warr (2001) about the performance of these spread decomposition models in capturing information asymmetry cost, we decide to use the model of Lin, Sanger, and Booth (1995) and the two-way decomposition model of Huang and Stoll (1997) to extract adverse selection component of the quoted bid-ask spread. Assuming zero inventory cost, Lin, Sanger, and Booth (1995) model quote revision as follows:

$$q_{t+1} - q_t = \lambda z_t + \varepsilon_{t+1},$$

$$z_{t+1} = \theta z_t + \eta_{t+1},$$

where q_t is the spread midpoint, z_t is the signed effective half-spread defined as the transaction price at time t, p_t, minus the spread midpoint, q_t, i.e., $z_t = p_t - q_t$, the disturbance terms ε_{t+1} and η_{t+1} are assumed to be uncorrelated. In this model, λ is the proportion of spread due to adverse information and is bounded between zero and one; θ

reflects the extent of order persistence; and, therefore, $\gamma = 1-\lambda-\theta$ is the dealer's gross profit as a fraction of the effective spread.

To obtain the estimate of the adverse selection component λ, we need to perform OLS for each futures contract in sample:

$$\Delta q_{t+1} = \lambda z_t + \zeta_t .$$

The regression model estimated in Huang and Stoll (1997) is as follows:

$$\Delta p_t = \frac{s}{2}\Delta q_t + (\alpha+\beta)\frac{s}{2} q_{t-1} + \upsilon_t ,$$

where s is the bid-ask spread and υ_t is a disturbance term. This regression provides estimates for the spread s and for the sum of the adverse selection and the inventory holding components, $(\alpha+\beta)$. Hence, the order processing cost γ is equal to $1-\alpha-\beta$.

If we set the inventory holding cost β to be zero, then we can have the two-way decomposition model of Huang and Stoll (1997) as following:

$$\Delta p_t = \frac{s}{2}\Delta q_t + \alpha \frac{s}{2} q_{t-1} + \upsilon_t ,$$

Now the adverse selection cost is still equal to α, but the order processing cost γ is then equal to $1-\alpha$.

After collecting intraday data for those emerging stocks that switch from the ESM to the TSE or the GTSM, we will be able to estimate these measures to evaluate whether there is any change in the information asymmetry cost due to the switch of trading mechanism.

III. Data and Empirical Results

Our sample consists of 99 firms that switched from the ESM to the TSE or GTSM during the period July, 2002 – August, 2003. The intraday data for these firms are extraced from the database compiled by the GTSM and TEJ. This data set contains 25,151 trades on the ESM. There are approximately 2.79 trades for each sample stock in a trading day. This suggests that most of the listing firms on the ESM suffer from infrequent trading. Since our sample stocks are quite similar to those of De Winne and Platten (2003) and Majois and De Winne (2003), we apply their sample selection criteria to further screen our sample stocks. Firstly, we exclude any stock for which the intraday data were unavailable for the 64 trading days surrounding the date of exchange listing. Secondly, we omit those thinly traded stocks whose number of trades or traded volume do not account for at least 1% of the total market activity during the sample period. At the end, our final sample is composed of 24 firms. Of these 24 firms, 8 firms switched from the ESM to the TSE and 16 firms switched to the GTSM.

In order to measure the market liquidity of the stocks switching from the ESM to the TSE or the GTSM, we calculate four liquidity measures: liquidity premium, percentage liquidity premium, dollar spread and percentage dollar spread. These liquidity measures are also used by Christie and Huang (1994) to study the liquidity effect of switching exchanges. We find that all four liquidity measures decline significantly for the stocks that move from the ESM to either the TSE or the GTSM. Specifically, the mean percentage LP (LP) is 3.64% (NT$1.655) prior to the switch and 0.34% (NT$0.172) after the switch. The mean percentage dollar spread (dollar spread) is 11.33% (NT$5.38) prior to the switch and 0.83% (NT$0.422) after the switch. The standard deviations for the four liquidity measures also decline significantly. Besides, we show that the stocks switching to the TSE have lower trading costs when they are traded on the ESM than those switching to the GTSM. The LP, the percentage LP, the dollar spread, and the percentage spread before exchange listing are NT$1.42, 2.5%, NT$5.446, 9.14%, respectively, while they are NT$1.773, 4.21%, NT$5.348, 12.42% after the switching. Although these four liquidity measures before exchange listing are quite different, they show little dissimilarity after exchange listing.

According to these results, we find that thinly traded stocks on dealer markets can significantly improve their liquidity after switching to order driven markets. This result is consistent with the findings of Christie and Huang (1994), Barclay (1997), and Bessembinder (1998). However, our results are different from these studies whose evidence show that the markets with dealer or specialist intervention would offer better liquidity performance than pure order driven markets for thinly traded stocks. Furthermore, dealer markets are more volatile in the LP, the percentage LP, the dollar spread, and the percentage dollar spread than order driven markets. Finally, the less liquid firms on the ESM have higher transaction costs measured in the LP, the percentage LP, the dollar spread, and the percentage spread than the liquid firms on the ESM. In contrast, all these firms have little difference in transaction costs after switching to the TSE or the GTSM.

We apply Huang and Stoll's (1997) three-way decomposition model and Lin, Sanger and Booth's (1995) model to estimate the bid-ask spread components. The before exchange listing estimation period is (-64, 11 days), and the after exchange listing estimation period is (11, 64 days). The estimated components are stated as a portion of the dollar spread and the dollar value of each component. The dollar value of each component is calculated by multiplying its median proportion of the spread by mean dollar spread. Based on Huang and Stoll's model, for stocks switching from the ESM to the TSE, the median information asymmetry cost is 2.5% of the dollar spread (NT$0.135) on the ESM and 15.7% of the dollar spread (NT$0.066) on the TSE. The median inventory holding cost is 7.1% of the dollar spread (NT$0.338) on the ESM and 24% of the dollar spread (NT$0.101) on the TSE. The median order processing cost is 95% of the dollar spread (NT$5.171) on the ESM and 58.8% of the dollar spread (NT$0.247) on the TSE. Regarding the results for the stocks moving from the ESM to the GTSM, the median adverse selection cost is 3.5% of the dollar spread (NT$0.188) on the ESM and 16.9% of the dollar spread (NT$0.071) on the TSE. The median inventory holding cost is 3.5% of the dollar spread (NT$0.187) on the ESM and 32% of the dollar spread (NT$0.135) on the TSE. The median order processing cost is 93.1% of the dollar spread (NT$4.978) on the ESM and 53.1% of the dollar spread (NT$0.225) on the TSE.

From these results, we can see that the three spread components (adverse selection cost (α), inventory holding cost (β), order processing cost (γ)) vary similarly for the stocks moving from the ESM to the TSE or the GTSM. The median proportional α and median proportional β increase after switching exchanges, while the median proportional γ decreases after switching exchanges. Although the median proportional information asymmetry component and median proportional inventory component on the TSE and the GTSM are higher than those on the ESM, taking cost per NT$ of price into consideration, the information asymmetry cost and the inventory cost are much higher on the ESM than on the TSE and the GTSM. In addition, the order processing component is the most important part of the dollar spread on the ESM, the TSE and the GTSM

According to the model of Lin et al., the mean information asymmetry cost (λ) is 27.5% on the ESM, and increases to 44% on the TSE/GTSM. The mean order processing cost is 25.9% on the ESM, and 26.1% on the TSE/GTSM. The difference between these two components due to exchange switch is, in fact, not significant. Furthermore, the mean trade reversal probability is 26.5% before exchange listing, and increases to 35% after exchange listing.

In summary, the results from both the Huang and Stoll's (1997) and Lin et al.'s (1995) models suggest that the information asymmetry cost is significantly lower on the ESM than on the TSE or the GTSM. This result may attribute to two reasons. First, the market makers on the ESM shall meet one the following requirements: 1. Assist firms in the TSE listing or the GTSM listing and have been so for at least three full months; 2. After an issuer's stock has been traded on the ESM for one full month, a securities firm that wants to become a market maker for the issuer shall hold not less than 30,000 shares of the issuer's stocks. It implies that the market makers on the ESM often enjoy an information advantage compared to the public traders, and the potential informed traders may face difficulties to gain an advantage over the market makers. Second, the ESM is a very thinly traded market. Therefore, informed traders are not easy to execute their orders in specific quantity requirement.

IV. Conclusions

In this paper, we examine the improvement in liquidity based on the method of Christie and Huang (1994) for a sample of 24 stocks that switch from a dealer market (the ESM) to a pure-order driven market (the TSE or the GTSM). In addition, we use Huang and Stoll's (1997) three-way spread decomposition model and Lin et al.'s (1995) model to estimate the spread components: inventory holding cost, information asymmetry cost, and order processing cost on the ESM, the TSE and the GTSM.

The ESM is a really thin market with low mean daily share volume, mean daily dollar volume, mean daily number of trades, and mean daily turnover, compared to the TSE and the GTSM. According to our results, all four liquidity measures: LP, percentage LP, dollar spread, and percentage dollar spread decline significantly when stocks move from the ESM to the TSE or the GTSM. It suggests that thinly traded stocks enjoy liquidity improvement when they switch from a dealer market to a pure order driven market. This result is also in agreement with earlier studies (Christie and Huang (1994), Barclay (1997), and Bessembinder (1998)), which document that stocks should switch from dealer markets to order driven markets in order to improve liquidity, but is in contradiction with Glosten and Milgrom (1985), Benveniste, Marcus, and Wilhelm (1992), and Nimalendran (2002), which suggest that smaller and less liquid stocks would have better liquidity performance on the markets with dealer or specialist intervention than on pure order driven markets.

Furthermore, we estimate the spread components based on both Huang and Stoll’s (1997) and Lin et al.’s (1995) model. We apply Huang and Stoll’s (1997) model to estimate the spread components at the beginning. As evidenced by Clarke and Shastri (2000), Krishnan (2000), Van Ness et al. (2001), and De Winne and Platten (2003), we find that the estimates of Huang and Stoll’s (1997) could cause implausible empirical results. Thus, we turn to apply Lin et al.’s (1995) model to estimate the spread components. The main finding from both Huang and Stoll’s (1997) and Lin et al.’s (1995) model is that the information asymmetry cost is lower in a thinly dealer market (the ESM) than order driven markets (the TSE or the GTSM). This result could be explained by the information advantage of dealers, who are often underwriters or securities firms holding not less than 30,000 shares of the firms traded on the ESM. In addition, informed traders may not be easy to execute their orders in quantity side due to the very thinly traded market. According to the results of Huang and Stoll’s (1997) model, we show that the inventory holding cost is lower on the ESM than on the TSE or the GTSM. Although the estimated order processing cost and trade reversal probability based on Huang and Stoll’s (1997) model are not similar to those of Lin et al.’s (1995) model, the trade reversal probability is lower than 50% on the TSE and the GTSM based on both models. This result may be contributed to the order splitting strategic behaviors of the traders.

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