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ABSTRACT

In this paper, we examine four specific hypotheses relating to commonality in liquidity on the Chinese stock markets. These hypotheses are: (a) that market-wide liquidity determines liquidity of individual stocks; (b) that liquidity varies with firm size; (c) that sectoral-based liquidity affects individual stock liquidities differently; and (d) that commonality in liquidity has an asymmetric effect. Based on a two-year dataset on the Shanghai and Shenzhen stock exchanges comprising of over 34 and 48 million transactions respectively, we find strong support for commonality in liquidity and a greater influence of industry-wide liquidity in explaining liquidity of individual stocks. Moreover, our results suggest that of the three main sectors – financial, industrial, and resources – industrial sector's liquidity is most important in explaining individual stock liquidities. Finally, we do not find any evidence of size effects, and document an asymmetric effect of market-wide liquidity on liquidity of individual stocks.

Keywords: Commonality in Liquidity; Asymmetric Information; Size Effects; Chinese Stock Exchange.

JEL classification: G10; G15.

1. Introduction

The concept of 'commonality in liquidity' has been popularized by Chordia *et al*. (2000) and pertains to the phenomenon of time-series movements in liquidity due to common underlying determinants across securities. Commonality refers to the proposition that an individual firm's liquidity is at least partly determined by market-wide liquidity. Its empirical manifestation is the co-movement between variations in individual stock liquidity and variations in market and industry-wide liquidity, as found by Chordia *et al*. (2000).

Understanding commonality in liquidity is crucial for a number of reasons. First, a strand of the literature has documented the existence of a strong relationship between ownership structure and individual firm liquidity (Sarinet *al*., 2000 and Lipson, 2003; among others). Furthermore, the relationship between commonality in liquidity and ownership structure is more important because Chinese firms tend not to fully disclose material changes in their business conditions, and published statements do not always meet international accounting standards (Chan *et al*., 2008). Most of Chinese listed companies are state-owned enterprises controlled by local governments which prefer employing small auditors (Wang *et al*. 2008). Lack of quality auditing can potentially have adverse effects on ownership structure, which can result in loss of credibility particularly to outside investors (see Fan and Wong, 2002). As a result, a system change of liquidity will induce significant changes of ownership structure which can be reflected by the changes in a firm's prices and the changes in a firm's liquidity, such as bid-ask spread, depth and turnover rate.

Second, given that liquidity is a determinant of asset prices, commonality in liquidity will have an impact on asset prices. However, this is largely ignored by conventional asset pricing models. Fundamental changes are, therefore, required for these models to incorporate this effect. Future models will not only have to explain the impact of individual liquidity on an asset's price, but must also consider common determinants of liquidity; for studies that have considered commonality in liquidity in asset pricing models, see, *inter alia*, Pastor and Stambaugh (2003), Acharya and Pedersen (2005), and Korajczyk and Sadka (2008). For practical investment, a better understanding of the dynamics of liquidity, both within and across markets, could help investors design improved trading strategies. Findings about the properties of common determinants will also help investors to decide on their liquidity exposures. With an improved knowledge of factors that influence liquidity, investor confidence will increase, leading to more efficient corporate resource allocation (Chordia et *al*., 2003).

Third, for market participants, one of the issues is whether market liquidity is priced on the stock market, or whether a liquidity risk factor enters the stochastic discount factor. Given that individual stock liquidity is at least partly driven by common determinants, shocks to these common factors tend to generate market-wide effects. If asset returns and market liquidity are correlated, the source of common liquidity effects could constitute a non-diversifiable risk factor. In other words, systematic liquidity variation is non-diversifiable, and so is a priced risk factor. Thus, investors holding such assets will demand a systematic liquidity premium to bear the risk (Fujimoto, 2003). As such,

commonality in liquidity also poses a problem to diversification strategies that rely on picking stocks that do not correlate with returns (Domowitz and Wang, 2002).

Fourth, commonality in liquidity is also important to central bankers and regulators. As a market risk factor that is non-diversifiable, it is naturally a policy concern. By its very nature, shocks to commonality will have market-wide effects and hence affect the functioning of the financial market as a whole. In more serious cases, a financial crisis can be triggered by shocks to liquidity commonality. Fernando and Herring (2003) show that common liquidity shocks may precipitate a shift in investors' beliefs about the market, which in turn could lead to a market collapse. In fact, the simultaneous decline in liquidity across several markets was a major factor in the Asian financial crisis in 1997-1998.

Fifth, empirical evidence for common liquidity movements will assist regulators in improving market design (Coughenour and Saad, 2004). As a result, exchange organisations regulation and investment management could all be improved (Chordia *et al*., 2003). Knowledge of what drives liquidity, and the characterisation of its effects, will prove to be critical in preventing market crashes due to sudden evaporation of liquidity (BIS, 1999). The findings of the study on commonality should also shed light on how aggregate liquidity shocks are propagated across different types of assets, and may thereby help formulate better monetary policy responses.

The aim of this paper is to study commonality in liquidity on the Chinese stock market;

section 2 is specifically devoted to explaining the motivations for our paper and the specific hypotheses that we set out to test. We organize the balance of the paper as follows. In section 2, we discuss the motivation and the key hypotheses of this study. In section 3, we discuss the trading system and liquidity provision in China. In section 4, we discuss the data. In section 5, we discuss the results, and in the final section we provide some concluding remarks.

2. Motivation and hypotheses

In the previous section, we discussed the main reasons for studying commonality in liquidity. Given that commonality in liquidity, its determinants, and its effects on market returns have serious implications for market performance and indeed survival, a number of studies (see, *inter alia*, Chordia *et al*., 2000; Brockman and Chung, 2002) have considered the issue of commonality in liquidity.

Most of the extant literature has confirmed the presence of commonality in liquidity. We, however, notice that although a major motivation for the commonality research has been the concern about shocks to commonality in emerging markets that contributed to the 1997/1998 crises, most of the current literature considers only developed North American and European economies. The absence of sufficient attention to the case of emerging markets leaves a critical void in our knowledge of commonality. In this regard, we draw motivation from the fact that China is a leading emerging market. The performance of the Chinese market not only has relevance for market performance in the region but it has a global significance. Hence, it follows that understanding evidence relating to

commonality in liquidity will shed fresh light on an emerging stock market with global ramifications.

Our second motivation relates to trading systems. The Chinese stock market is structurally different from developed country stock markets. The main difference is that the Chinese market is an order-driven market system, while developed markets are quote-driven markets. An order-driven market structure can provide an ideal case for studying commonality in liquidity. In such a market, due to low barriers to entry, more liquid suppliers are attracted relatively easily, thus fostering competition. Brockman and Chung (2002) argue that such a market system generates liquidity demand and supply schedules that are consistent with equilibrium under perfect competition. The role of commonality in liquidity maybe different in the two markets given different market structures. Whether or not this is the case is a purely empirical issue, and in this paper we deal with this accordingly.

Our novelty is that we develop a suite of research questions and hypotheses that we aim to answer and test in this paper (see hypotheses below). Importantly, these issues have not been considered for any order-driven market with this level of detail to the best of our knowledge. In terms of studies on emerging markets, perhaps the only studies that come closest to our work are Pukthuanthong-Le and Visaltanachotis (2009) and Brockman and Chung (2002)[1]. However, one key manner in which our study is different from these studies, and the earlier pioneering work of Chordia *et al*. (2000), is that we examine

[1] Some recent studies on commonality in liquidity on emerging markets are Qin (2007), Karolyi *et al*. (2008), and Brockman *et al*. (2009).

whether individual stock liquidities respond differently to liquidity of different sectors, namely industrial, resources, and financial sectors, on the Chinese stock market. There is a strong reason to believe that the impact of sector specific liquidity will be heterogeneous given that different sectors have different market structures; as a result, the dynamic response of individual stocks to sector-specific liquidity is likely to be different.

It follows that our aim in this paper is to examine commonality in liquidity on the Chinese stock exchanges; that is, on both the Shanghai stock exchange (SHSE) and the Shenzhen stock exchange (SZSE). To achieve this aim, we develop four specific hypotheses, as follows, that:

(a) market-wide liquidity determines liquidity of individual stocks;

(b) liquidity varies with firm size;

(c) sector-specific (financial, industrial, and resources sectors) liquidity affects individual stock liquidities differently; and

(d) commonality in liquidity has an asymmetric effect on liquidity of individual stocks.

The extant literature on commonality in liquidity has a number of common features. We first briefly highlight this here before considering those studies that have covered some of the hypotheses proposed in our study. First, the literature began by considering developed country markets and found evidence of commonality in liquidity. Recently, when studies explored developing country markets, such as Thailand (Pukthuanthong-Le and Visaltanachotis, 2009) and Hong Kong (Brockman and Chung, 2002), evidence of commonality in liquidity have also been documented. Second, some studies, such as

Chordia *et al*. (2000) and Brockman and Chung (2002), consider whether commonality in liquidity is size dependent and generally find evidence that commonality in liquidity increases with size.

Our first hypothesis on the existence of commonality in liquidity is not new but is novel in the Chinese stock market context, in that we provide an empirical test of whether or not commonality in liquidity exists on the Chinese stock market. Our second hypothesis that commonality in liquidity varies with size is also not new but is novel for the simple reason that we examine this hypothesis in a very different and dynamic stock market, China (see section 3 for a discussion of why and how the Chinese market is structurally different, hence justifying the need for testing whether liquidity varies with firm size). Our third hypothesis of testing whether commonality in liquidity is sector/industry specific is new and our approach to dealing with this issue is different from the literature in that we categorise stocks according to three main sectors (industrial, financial, and resources). Essentially, we examine whether commonality in liquidity is present in all these three sectors or it is sector specific. The advantage of this type of disaggregated analysis is that it will tell us which sectors will most affect the liquidity of individual stocks. It follows that ours is the first study that provides empirical evidence on this. Our fourth hypothesis regarding the asymmetry (or otherwise) of commonality in liquidity is not entirely new. While asymmetry of liquidity has been considered in the past, in our proposal we consider asymmetry of liquidity in an order-driven market.

3. The Trading System and Liquidity Provision in China

In response to the need for economic transition, China reopened the Shanghai Stock Exchange (SHSE) in December 1990, and established the Shenzhen Stock Exchange (SZSE) in July 1991 (Liu and Green, 2003). Since then, the Chinese stock market has experienced extraordinary growth, in the process becoming the second largest market in Asia, second only to Japan in terms of market capitalisation.

There are two types of shares in China: A-shares and B-shares. A-shares are domestic common stocks issued by Chinese companies listed on the Shanghai and Shenzhen stock exchanges. Since 1991, the two exchanges have been permitted to trade these shares, which are only available to, and can be traded by, Chinese citizens and institutions. Under the Securities Law, Chinese companies wishing to issue or list their A-shares must gain approval from the CSRC. The 'B' shares issued by Chinese companies since 1992 are shares denominated in foreign currency. Between 1992 and 2001, they were exclusively available to overseas investors. As a result, while A-shares and B-shares of the same company would be listed on the same stock exchange, local and overseas investors were separated in the Chinese market because of this system. The main reason for this segmentation was the existence of China's capital controls. The A-shares are denominated in the Chinese currency, i.e. the RMB, which foreign individuals or institutions were not allowed to directly trade. Domestic investors were not able to purchase B-shares because these shares were denominated and traded in foreign currency. The denomination currency for the B-shares on the Shanghai Exchange is the US dollar,

but on the Shenzhen Exchange the Hong Kong dollar is the main currency. Moreover, B-share holders receive the same dividends as the owners of 'A' shares, but they have no voting rights. The total market capitalisation of B-shares has been much smaller than that of A-shares. In February 2001 China lifted the restrictions that allowed only foreign investors to trade B-shares. Chinese domestic investors can now trade in these shares with foreign currency. In 2002, China launched a program of Qualified Foreign Institutional Investors (QFII) under which overseas investors may invest in and trade Chinese A-shares through qualified institutional investors (Chan *et al*., 2008). Our research will focus on the A-share market because the size of the A-share market is much bigger than the B-share market, which is relatively more suitable for studying commonality in liquidity.

The Chinese trading system has a modern infrastructure that includes an automated trading regime, a high-speed nationwide satellite communications system backed by digital data networks, a paperless depository, and an efficient clearing and settlement system (Wong, 2005). With the exception of public holidays, the exchanges are open 5 days a week, from 9:30 A.M. until 3:00 P.M., with a lunch break from 11:30 A.M. and 1:00 P.M. There is also a 30 minute pre-trading session, during which the morning opening prices are generated (Yang *et al*., 2002).

The system operates two trading sessions: a call auction and a continuous auction (Xu, 2000). The periodic call auction takes place when trading opens, while the continuous auction occurs later in the trading day (Su, 2003). In the continuous auction session

throughout the trading day, buy and sell orders are submitted and auctioned. Matching of orders is automated through a computer system, which executes the matching transactions according to a time and price priority scheme. The SHSE runs a time-price priority scheme that prioritises the matching, first by price and then by time. The SZSE has a price-time order priority (Sun and Shi, 2002). Transactions are continuous and transparent. All trading goes through the computer systems in each exchange's trading hall and terminals at the members' offices.

In contrast to the US, the Chinese market does not have market makers to stabilize stock prices by trading on their own accounts. Individual investors wishing to trade A-shares are required to act through a broker. The broker provides the investor with an account number to be quoted on all exchange settlements. Brokers are forbidden to engage in floor trading or short selling. To be legally recognised, transactions must take place through the automated order matching system and trading must be in units of at least 100 shares (Xu, 2000).

The Chinese regulation allows only market orders and limit orders, both of which remain valid for one day. The Chinese trading process begins when investors place a buy or a sell limit order with the broker. Any limit order must specify the bid (ask) price and the number of shares to be purchased or sold. The broker then sends the orders to one of the exchanges' main frameworks via terminals, either on the floor or from member firms. Once arrived, these orders can be executed immediately through the computerised trading system with matching priority schemes. Currently, the Chinese system continuously

publishes details of the five latest orders including their bid/ask prices and the number of shares to be traded on the screens. For SHSE, the broker sends orders to his member broker on the floor of the exchange, who then records the order in the centralised order matching system (Yang *et al*., 2002). The trading process at the SZSE uses a dual clearing system, whereby stocks are registered locally but are centrally cleared (Jiang, 2005).

Transaction prices are generated according to the bid/ask prices and time of order submissions. A broker in the SZSE and the SHSE has the responsibility not only for the buyers but also for the sellers. As Yang *et al*. (2003) explain, the biggest difference for brokers between the Chinese stock market and the dealership market is that unlike the dealership market, the spread does not constitute part of the profits in the Chinese stock market. Rather, two exogenous variables, namely the order processing costs and the costs of adverse selection, caused by asymmetric information, are the determinants of the bid-ask spread.

A special factor that affects the bid-ask spread in China is the existence of illiquid shares. About two-thirds of outstanding Chinese shares are state owned shares and legal person shares, which are neither negotiable nor trade-able in the market (Yang *et al*., 2002). As a consequence, the illiquid shares often overvalue the stock price because the liquidity premium inherent in the stock prices is too high.

These illiquid shares can also enhance the level of asymmetric information among

investors. Owners of illiquid shares play more important roles in corporate governance than do investors in secondary markets, because they control insider information and market prices of their stocks, whilst common traders receive little information. These mechanisms essentially enlarge the bid-ask spread and increase adverse selection costs. As a result, market liquidity tends to decrease with an increase in the proportion of illiquid shares (Yang *et al*., 2002).

4. Data

China publishes a range of value-weighted stock indices – aggregate and sectoral indices – of which the most widely cited are the SHSE Shanghai Composite Index (SHCI), the Shanghai B Share Index, the SZSE Shenzhen Component Index (SZCI), and the Shenzhen B Share Component Index (see Gao, 2002).

We use the China Stock Market and Accounting Research (CSMAR) database to obtain transactions and quote data from July 2000 to June 2002 for 'A' shares traded on SHSE and SZSE. The CSMAR covers details of every transaction and related information. We use a two year sample period. This is likely to provide more robust results compared with most existing studies which have used one year of data. The period between July 2000 and June 2002 is suitable because of the wide variations in market trends. We intentionally select this time period because over this period the market is characterized by both bull and bear phases. For example, between July 2000 and June 2001, the market was bullish, whereas between July 2001 and June 2002, the market was bearish.

We applied the same method as Chordia *et al*. (2000) in order to set up the sample selection filter, taking consideration of trading mechanisms on the Chinese stock exchanges. In other words, we only included stocks listed on the SHSE or the SZSE, which traded constantly throughout the 24 months in the sample period. To avoid possible bias due to trading units, stocks which had paid dividends or were split during the sample period were not selected. To focus on normal trading activity during the continuous trading session, opening trades were deleted from the study. In addition, we deleted trades and transactions with special treatment (ST) and particular treatment (PT) conditions[2] to avoid eruptive movement of stock prices.

The selection finally leads to a sample of A-shares on the SHSE whose transactions totaled 34,484,632. In the sample, 259 stocks are initially chosen over 468 trading days, which are reduced to 130,960 stock-trading days due to the filtering process. The average, median, and minimum number of trading days per stock is 440, 463, and 59, respectively. For A-shares on the SZSE, our filtering produces a sample of 48,789,363 transactions. Our sample for this group of shares initially comprises 293 stocks over 468 trading days. After filtering, the sample is reduced to 130,092 stock-trading days. The average, median, and minimum number of trading days per stock on the SZSE is 444, 458, and 146, respectively.

Following Chordia *et al*. (2000), we calculate three different liquidity measures for every

[2] Since 1996, firms that suffered losses for two consecutive years were placed under ST. Since 1998, firms that suffered losses for three consecutive years were put under PT. The shares with PT can only be traded on Friday with a price limit of 5 per cent fluctuation per day. The shares with PT were to be deleted from trading on the market if their losses cannot be reversed in a year (Lee and Xue, 2002).

transaction. They are the quoted spread, the percentage quoted spread, and depth. No effective spread and proportional effective spread are calculated because Chinese stock exchanges have adopted an electronic trading system that allows the possibility for price improvement, leading to an identical quoted and effective bid-ask spread; this feature is similar to the Australian market, as discussed in Fabre and Frino (2004) and Sujoto *et al.* (2005). In addition, we construct liquidity measures suggested by Fabre and Frino (2004) and Sujoto *et al*. (2005). These measures include depth, bi-dimensional liquidity, and the turnover rate. To smooth out intraday effects in order to achieve greater synchronicity, the transaction data for each daily liquidity measure is averaged across all trades for each daily stock, as suggested by Chordia *et al*. (2000). The definition of each liquidity measure is given in Tables 1 and 2.

INSERT TABLES 1-2

Upon examining the mean and standard deviation of the data series, the coefficient of variation implies that the spread variables have the lowest volatility compared with the depth variables. The turnover rate has the lowest volatility of all variables. These trends are similar on both the SHSE and the SZSE.

The correlations between depth and spread measures are marginally negative. On the SHSE, the lowest of the correlations between the two measures is -0.0086, while the highest is 0.1934. On the SZSE, the lowest correlation between the two measures is -0.0130, and the highest is 0.3825. These results are largely consistent with studies for other markets, such as Fabre and Frino (2004), where the correlation range is between

-0.095 and 0.004, and Sujoto *et al*. (2005), where the correlation range is from -0.0159 to -0.1469.

The absolute daily variations of liquidity measures are presented in Table 3. All the measures, except for the turnover rate and the measure of bi-dimensional liquidity, are consistently higher than the counterpart measures documented in similar studies of other markets, such as Australia (see Sujoto *et al*., 2005; Fabre and Frino, 2004) and the USA (Chordia *et al*., 2000). This implies that liquidity on the Chinese stock market is relatively high, reflecting the institutional features of the Chinese stock market that are dominated by small but numerous investors.

INSERT TABLE 3

Finally, our findings also show that the variation of depth is almost twice (in the case of SHSE) and sevenfold (in the case of SZSE stocks) that of spread measures (except for the variation in PQSPR). The variation of the turnover rate and bi-dimensional liquidity are substantially smaller compared with other liquidity measures. This suggests that the turnover rate and the bi-dimensional liquidity measures may reflect different aspects of liquidity.

5. Empirical Findings

In this section, we present the empirical results relating to the four hypotheses we identified earlier. The methodology is based on the work of Chordia *et al*. (2000). We begin with the following regression model to examine hypothesis 1: that market-wide

liquidity explains liquidity of individual stocks:

$$DL_{j,t} = \alpha_j + \beta_j DL_{M,t} + \varepsilon_{j,t} \qquad (1)$$

where D stands for percentage change (or the growth rate), so $DL_{j,t}$ is the percentage change in the liquidity measure (L) for stock j from day t -1 to t, and $DL_{M,t}$ is the contemporaneous growth of the market liquidity calculated by taking the average of the same liquidity measure across stocks. When taking the cross-sectional average to derive the market liquidity measure, stock j is excluded from the computation.

In examining the association between the individual stock's liquidity measure and the market liquidity, contemporaneous changes in market liquidity as well as one lead and one lag of the market liquidity variable are included as the regressors. Following Chordia *et al*. (2000), we also include market return to control for possible spurious dependence between returns and bid-ask spread measures. In addition, the concurrent daily percentage change in the individual stock's squared return is employed as a proxy for price volatility. However, we do not report the coefficients on the market returns and squared stock returns because both are nuisance variables, as explained by Chordia *et al*. (2000). It follows that the final estimable model is of the following form:

$$DL_{j,t} = \alpha_j + \beta_1 DL_{M,t} + \beta_2 DL_{M,t-1} + \beta_3 DL_{M,t+1} + \varepsilon_{j,t} \qquad (2)$$

In Tables 4 and 5, we present results based on Equation (2). In the tables, the percentage of positive coefficients are shown in the 'Percentage+' row, while the 'Percentage+significant' row shows the percentage of variables that have a t-statistic greater than + 1.645, the 5% critical level in a one-tailed test.

INSERT TABLES 4-5

Both value-weighted and equal-weighted market liquidity variables are employed when conducting the regressions. Comparing the results in Tables 4 and 5, it is interesting to note that when the market liquidity measure is value weighted, the concurrent slope coefficients on the variable are greater than when the measure is equal weighted. This is markedly different from what is reported in Chordia *et al*. (2000)[3].

On the SHSE, the lowest cross-sectional mean of liquidity beta is -80 for BLM based on equal weighted market liquidity (see Table 5), and is 7 for DPQSPR when the market liquidity measure is value-weighted. Based on equal weighted measure, the highest cross-sectional mean of liquidity beta is 86 when we use the DQSPR proxy, and 120 when we use the DTR proxy based on value weighted market liquidity. The lowest proportion of stocks with positive β is for BLM at 76%, while for the rest of the liquidity measures β is positive and statistically significant for 96% of the cases.

Moreover, of the 259 stocks on the SHSE, 2% of stocks for BLM and 89% of stocks for DDEP and DVDEP have a statistically significant and positive β at the 5% level, which is true for both equal- and value-weighted market liquidity measures. Based on the DPQSPR measure of liquidity, only in 37% of cases β is statistically significant and positive, followed by the DTR measure (78%).

On the SZSE, the lowest cross-sectional mean of liquidity beta is 6 for DTR (see Table 5)

[3] This outcome is likely to be due to the fact that although the Chinese stock market is dominated by individual investors in number, big cap shares of the monopolistic state-owned firms could have a potentially stronger influence on the market value.

and 54.29 for BLM with value-weighted market liquidity measure (see Table 4). Using this measure, the highest cross-sectional mean of liquidity beta is 79 for DPQSPR and 94 for DTR. The lowest proportion of stocks with positive β is 37% in the case of BLM and the highest proportion of stocks with positive β is 99% when liquidity is proxied by DDEP and DVDEP.

Of the total 291 stocks listed on the SZSE, for 7% of stocks based on BLM, for 92% of stocks based on DQSPR, and for 93% of stocks based on DQSPR, β is positive and statistically significant at the 5% level for both value weighted and equal weighted market liquidity cases.

When compared with previous findings, our study provides much stronger evidence of the existence of liquidity commonality on the Chinese stock market (except for the liquidity measure based on DPQSPR and BLM). The proportion of stocks that have positive and significant β coefficients for the spread and the depth measures in Tables 4 and 5 are almost three times that of comparable measures in Chordia *et al*. (2000). Furthermore, we also find a much higher proportion of Chinese stocks with positive and significant β: 89% in SHSE based on DDEP and VDEP, and 93% on the SZSE based on DQSPR compared with the less than 3% reported by Fabre and Frino (2004), 30% reported by Chordia *et al*. (2000), and slightly more than 50% reported by Sujoto *et al*. (2005). So the message emerging here is that commonality in liquidity in the Chinese order-driven market is higher than both quote-driven markets, such as the US stock market, and other order-driven markets, such as Hong Kong and the Australian stock markets. One plausible reason for this is likely to be that the Chinese stock market is

dominated by institutional investors and both the best bid-ask spread and best depth are provided by them. However, normally these prices cannot reflect the real information in the market because many of the traders on the market are retail investors who only pursue short term profits. As a result, compared with other order-driven markets, the Chinese stock market with a high commonality in liquidity cannot attract more liquidity suppliers to enter the market (Song and Tan, 2005).

Moreover, our lead and lagged terms are not positive and significant. Most of the cross-sectional means of the liquidity beta (β) on these terms are negative. Most results are quite small (in terms of magnitude) and quite a few are even zero. This implies that the lead and lag effects of commonality are less significant and less pervasive on the Chinese stock market, which perhaps suggests that there are no significant lead-and-lag structure in commonality in liquidity on the Chinese stock market.

Following Chordia *et al*. (2000), when calculating the cross-sectional t-statistic for the average liquidity β, it is assumed that the estimation errors in β are independent across regressions. The 'SUM' rows in the table present the combined effects of contemporaneous, lead, and lag coefficients. The result shows that in many cases the t-statistic is highly significant in the Chinese stock exchange. On the other hand, the average adjusted R^2 is less than two percent and the individual regression does not carry much explanatory power. These results suggest that there must be other significant influences, such as noise, that influence individual stock's liquidity; an observation also made by Chordia *et al*. (2000).

Overall, our results from traditional liquidity measures provide strong evidence for the existence of commonality in liquidity in Chinese stocks. However, regarding the claim in previous research on the subject of trading behaviour (Chordia *et al*., 2000; Sujoto *et al*., 2005), our evidence suggests that, in response to common variations in liquidity, Chinese stock market participants tend to revise both their price and the quantity of shares in their orders.

Using the turnover rate as an alternative liquidity proxy, as suggested by Sujoto *et al*. (2005), we find stronger evidence of commonality in liquidity than them. However, when employing another alternative liquidity measure, the bi-dimensional liquidity, the cross-sectional mean of β is found to be statistically insignificant and the proportion of stocks with significant and positive β is only 2% on the SHSE and 7% on the SZSE. These results suggest an absence of co-movements in this dimension of liquidity in our data sample. Given the evidence of the commonality in liquidity on the Chinese stock market in terms of many other liquidity proxies, it is likely that the bi-dimensional liquidity measure is not a suitable variable to be employed in investigating commonality in liquidity on the Chinese stock market.

5.1. Further Evidence

In order to examine the potential size effects of systematic liquidity, we divide the sample into five quintiles, based on market capitalisation at the beginning of the sample period and re-estimate equation (2) for each quintile. Before analyzing the size effects, we attempt to ascertain that our data filtering process has not led to a homogenous set of

firms. If this is the case then conducting an analysis of size effects will be meaningless. We compute the mean returns and standard deviation of returns for the five different sizes of firms in both the SHSE and SZSE. We find that on both exchanges returns and its volatility vary with size. This confirms that on the basis of size we have a heterogeneous set of firms. To conserve space, we do not report the full results on returns and standard deviation here, but these results are available from the authors upon request.

The results are reported in Tables 6 and 7. Previous studies have tested this hypothesis, but have found mixed results. Chordia *et al*. (2000), for instance, found that while depth has little relation to size, the cross-sectional mean of "SUM" of the liquidity β on market liquidity proxied by spread measures (DQSPR and DPQSPR) generally increases with size, implying a size effect in this dimension of liquidity. Brockman and Chung (2002) found that when liquidity is measured in terms of spreads, there are size effects in that the percentage of stocks with positively significant liquidity betas increases with firm size. Fabre and Frino (2004) do not report any significant size effects. Sujoto *et al*. (2005) found that although in their sample the proportion of significant and positive stocks increases with size quintile, no such size effect existed in the cross-sectional means of the liquidity beta. Our study shows a somewhat different pattern on the Chinese stock market (see Tables 6 and 7).

INSERT TABLES 6-7

From tables 6-7, we do not find evidence of size effects. On both the SHSE and SZSE, three of the six measures of liquidity (namely, DQSPR, DDEP, and VDEP) suggest that the

concurrent slope coefficient on the market liquidity variable increases but only slightly with size quintiles.

A second feature of the results is that the beta coefficient is large on the SZSE: in the range of 91-98% in the case of DQSPR, and 95-98% in the case of DDEP and VDEP. A similar pattern is noticed on the SHSE: the beta coefficient ranges between 90-99% in the case of DQSPR, and between 94-98% in the case of DDEP and VDEP.

A third feature of the results is that based on the DPQSPR, DTR, and BLM, the proportion of time beta is positive and statistically significant is relatively (relative to the extant literature) high. For example, in the case of the SHSE, the percentage of times beta is positive and statistically significant is in the range of 41-69 and 66-86 in the case of DTR and BLM, respectively. Meanwhile on the SZSE, the percentage of time beta is positive and statistically significant based on the DTR measure is in the range of 51-71.

From the discussion of results so far, it has become clear that co-movement of liquidity exists for most of the quintiles. This means that, on the Chinese stock market, commonality in liquidity is driven by both small and large stocks. For liquidity measures of DQSPR, DDEP and VDEP on both markets, more than 90% of the stocks in every quintile have positive and statistically significant β. On the whole, the result provides evidence of no size effects in the liquidity commonality. It follows that an important finding we document is that for small sized stocks, the beta coefficient (which is positive and statistically significant) is in the range of 91-95% on the SZSE and 90-94% in the case of the SHSE. Hence, liquidity of small firms is also highly correlated with market

liquidity. The implication, contrary to findings elsewhere, is that market-wide liquidity shocks will not only affect large stocks, but given the magnitudes documented in our work, the impact on small stocks is likely to be almost equally serious.

It is possible that in systematic liquidity, there are both industry and market components (Chordia *et al*., 2000, Brockman and Chung, 2002). To investigate the possibility of whether individual stock liquidity co-moves with liquidity of the industry to which a stock belongs and with liquidity of the market as a whole, we follow Sujoto *et al*. (2005) to classify the sample firms into three categories based on Global Industry Classification Standard (GICS) code. These are: industrial (128 stocks for SHSE, 160 stocks for SZSE), resources (39 stocks for SHSE, 27 stocks for SZSE), and financial (84 stocks for SHSE, 79 stocks for SZSE). We then add an industry liquidity variable to Equation (3), which leads to the following regression model (lead and lagged variables are not shown for simplicity):

$$DL_{j,t} = \alpha_j + \beta_{1,j} DL_{M,t} + \beta_{2,j} DL_{I,t} + \varepsilon_{j,t}, \quad (3)$$

where $DL_{I,t}$ is the concurrent change in a cross-sectional mean of the liquidity measure of the industry to which stock j belong. When taking the average for all stocks in this industry, stock j is excluded.

Tables 8 and 9 consist of results based on Equation (3). We find evidence of the existence of both market and industrial level commonality in terms of cross-sectional significance of liquidity coefficients, confirming that individual stock liquidity on the Chinese market is influenced by both market and industry-wide common factors, which is consistent with

Chordia *et al*. (2000). Also, like Chordia *et al*. (2000), we find that, of all the liquidity measures, the cross-sectional mean of the concurrent beta on market liquidity (β_1) is generally smaller than the industry liquidity beta (β_2) on the Chinese market. This is also true for "SUM" coefficients of all liquidity measures. This implies that on the Chinese stock exchanges, industry-wide liquidity is relatively more important in explaining individual stock liquidity. This finding is contrary to Brockman and Chung (2002) and Sujoto *et al*. (2005).

INSERT TABLES 8-9

We now further consider the industry-wide liquidity beta (β_2), which is our main interest here. We find that in three out of six proxies for liquidity (DQSPR, DDEP, and VDEP) on both the SHSE and the SZSE, industry liquidity beta is greater than the market liquidity beta. However, after controlling for the industry effect, the proportion of positively significant beta on market liquidity becomes smaller for most of the liquidity measures than in the estimation where market liquidity is the only regressor. This potentially reflects the greater industry effects

Moreover, of the six liquidity proxies used in estimating SHSE, the spread-based proxy, i.e. DQSPR has the highest percentage of significantly positive industry liquidity beta (90.48%), while DTR and BLM have the lowest (both are 10.9%). For SZSE, again the spread based liquidity proxy, DQSPR (91.45%) has the highest percentage, and DTR (10.57%) has the lowest.

So far, we have ascertained that industry-wide liquidity beta is larger than market

liquidity beta and we have found a diminishing role of market liquidity beta when modelled together with industry-wide liquidity beta, leading us to conclude that industry-wide liquidity is crucial for the Chinese stock market. It is of interest also to examine whether sector-specific liquidity, namely industrial, resources, and financial sectors have different effects on liquidity of individual stocks. In other words, we test whether sector-specific liquidity is homogenous or heterogeneous in terms of explaining the liquidity of individual stocks. We conduct this exercise on both the SHSE and the SZSE. The results are reported in Tables 10-12 for industrial, resources, and financial sectors, respectively. The regression model used for this purpose has the following form, where essentially individual stock liquidity is modelled as a function of sector-specific liquidity:

$$DL_{j,t} = \alpha_j + \beta_j DL_{I,t} + \varepsilon_{j,t}, \quad (4)$$

Our main findings are as follows. First, four of the six liquidity proxies (DQSPR, DPQSPR, DDEP, and VDEP) generally reveal the highest proportion of times beta is positive and statistically significant. Second, for the industrial sector, these four measures reveal that beta is positive and statistically significant on the SHSE around 81-87% of the time, while on the SZSE the corresponding figure is 75-84%. Third, by comparison, financial and resources sector liquidities explain less of the liquidity of individual stocks: the resources sector explains 38-55% in the case of the SHSE and 41-49% in the case of SZSE, while the financial sector explains 41-48% in the case of the SHSE and 41-47% in the case of the SZSE.

INSERT TABLES 10-12

Commonality in liquidity may also vary on up and down markets. When examining this asymmetric effect, we define an up or down market based on the size of excess returns above or below the market, calculated by subtracting from the average of daily stock returns in the sample the risk free rate proxied by the 10-year Bank Accepted Bill (BAB) rate in China; a similar approach has been used by Sujoto *et al*. (2005). On the SHSE, an up market day is when the day's return is greater than –0.022995581 while a down market day is when it is less than -0.027055032. When it lies between -0.027055032 and –0.022995581, we call it a neutral market day. On the SZSE, the cut-off point for an up market is when the day's excess return is greater than –0.022929265 while a down market day appears when the excess return is less than -0.027070515. Between -0.027070515 and –0.022929265, it is a neutral market day. After splitting the sample among up, down, and neutral markets, based on this approach, we estimate the asymmetric effect by employing the following equation:

$$DL_{j,t} = \propto_j^n D_n + \propto_j^u D_u + \propto_j^d D_d + \beta_j^n D_n DL_{M,t} + \beta_j^u D_u DL_{M,t} + \beta_j^d D_d DL_{M,t} + \gamma_j DL_{j,t-1} + \epsilon_{j,t} \quad (5)$$

where Ds are (1, 0) dummy variables with subscripts d, u and n indicating down, up and neutral market periods, respectively. The dummies are applied to both intercept and slope coefficients.

As suggested by Sujoto *et al*. (2005), we include the lagged variable $DL_{j,t-1}$ so as to improve the model's goodness of fit. The results are presented in panel A of Table 13.

INSERT TABLE 13

The results show that the cross-sectional average of the slope dummy for up market, $\beta_{u,}$ is

positive and statistically significant only based on the DQSPR and the DTR liquidity measure. On the SHSE, the lowest cross-sectional mean of the coefficient β_u is -17.68 (for DDEP) and the highest is 15.46 (based on DTR). On the SZSE, the lowest cross-sectional mean coefficient of β_u is -14.92 (based on VDEP) and the highest is 15.81 (based on DTR). For DQSPR and DTR measures, over 10% of stocks have a positive and statistically significant β_u.

On the down market, β_d is significant and positive only for DDEP and DTR. On the SHSE, β_d ranges from -35.96 (DQSPR) to 245.93 (DTR), while on the SZSE it lies between -31.43 (DQSPR) and 289.74 (DTR). Up to 18.19% of stocks for DDEP and up to 12.13% for DTR have a positive and statistically significant β_d. Comparing the slope dummy coefficient on the DTR measure on respective up and down markets, it seems that commonality in liquidity during the down market period is stronger (245.93) than that on the up market (15.46). This is likely to be due to the fact that when market conditions decline, Chinese investors would become more concerned with macro news rather than the performance of individual firms. This phenomenon on the one hand implies that during down markets Chinese investors are prone to contagion and herd behaviour, and on the other hand reflects the dominant influence of the government which is usually the source of macro news.

Panel B of Table 13 reports the results of the Wald test, which examines the null hypothesis: $\beta_u = \beta_d$; this is a formal test for whether liquidity commonality varies between up and down markets. At the 10% level, depth related liquidity measures have the highest

percentage of stocks that reject the null. For example, 35% of stocks for DDEP and 26% for VDEP on the SHSE reject the null. On the SZSE, the corresponding figures are 47% and 33% for DDEP and VDEP, respectively. At the 5% significance level, the null can be rejected for 17% and 13% of the stocks in terms of their association with depth related liquidity measures (DDEP and VDEP) on the SHSE, while on the SZSE the proportions are 10% and 15%.These findings provide some evidence that commonality in liquidity varies in China between up and down markets.

6. Conclusion

In this paper, we examined four hypotheses relating to commonality in liquidity on the Chinese stock exchanges. These hypotheses were: (a) that market-wide liquidity determines liquidity of individual stocks; (b) that liquidity varies with firm size; (c) that sector-specific (namely, resources, financial, and industrial) liquidity affects liquidities of individual stocks differently; and (d) that commonality in liquidity has an asymmetric effect on liquidity of individual stocks. To test these hypotheses, we used a two-year dataset of the Shanghai and Shenzhen stock exchanges comprising of over 34 and 48 million transactions, respectively. We found consistent results for both stock exchanges.

Our main findings were as follows. First, we found strong evidence of commonality in liquidity. Over 96% of cases on each exchange revealed evidence of a positive and statistically significant beta. The magnitude of liquidity beta in many cases is more than three times that of comparable measures in previous research. This implies that commonality in liquidity is likely to be more significant and more pervasive in China.

Second, at best, we found no evidence of size effects. We notice that commonality in liquidity is persistent regardless of the size of firms: for small sized firms, the proportion of times beta is positive and statistically significant is at most 94%, while for large firms it is at most 98%. This is inconsistent with the extant literature, which has found significant evidence of size effects in other markets. The implication of this is that liquidity shocks will affect firms (regardless of their size) equally.

Third, we found that industry-wide liquidity is relatively more important than market-wide liquidity in explaining liquidity of individual stocks. Most significantly, when we divided stocks by three different sectors, namely industrial, resources, and financial, and examined the impact of liquidity of stocks from each of these sectors separately on liquidity of individual stocks. We found that industrial sector liquidity is most highly correlated with individual stock liquidity; the correlation of financial and resources sectors liquidity with individual stock liquidity is almost half that of the industrial sector liquidity. The implication of this finding is that liquidity emanating from the industrial sector stocks is relative more important in influencing individual stock liquidity. It follows that shocks on the Chinese industrial sector will matter most for individual stocks on the Chinese stock market. This is not surprising given that in the post-reform period, China's economic growth success has been achieved through impressive export performance, which increased from around 1% of world export share in 1980 to over 7% in 2007, second only to the US; for an excellent recent discussion on China's export performance, see Greenaway *et al*. (2008).

Finally, our results reveal that commonality in liquidity has asymmetric effects on individual stock liquidity: in other words, commonality in liquidity varies in up versus down markets.

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Table 1 Summary Statistics of Liquidity Measures for Shanghai Stocks

Panel A: Definitions

Liquidity Measures	Definition	Units
Quoted Spread (QSPR)	$P_A - P_B$	Yuan
Proportional Quoted Spread (PQSPR)	$(P_A - P_B)/P_M$	None
Depth (DEP)	$(Q_A + Q_B)/2$	Shares
Dollar Depth (VDEP)	$(P_A Q_A + P_B Q_B)/2$	Yuan
Turnover Rate (TR)	$Shares_{traded} / Shares_{outstanding}$	None
Bi-dimensional Liquidity Measure (BLM)	$BLM_t = \frac{\Delta D_t}{D_{t-1}} - \frac{\Delta I C_t}{I C_{t-1}}$	None

Panel B: Cross-sectional statistics for time series means

	Mean	Median	Standard Deviation
Quoted Spread (QSPR)	0.0320	0.0210	0.1673
Proportional Quoted Spread (PQSPR)	0.0104	0.0017	0.6514
Depth (DEP)	434.6500	36.2670	2181.396
Dollar Depth (VDEP)	6335.921	474.2194	35489.10
Turnover Rate (TR)	1.2278	0.7002	1.7770
Bi-dimensional Liquidity Measure (BLM)	-0.1400	-1.69e-08	33.5416

Panel C: Cross-sectional means of time-series correlations between liquidity variable pairs for an individual stock

	Quoted Spread (QSPR)	Proportional Quoted Spread (PQSPR)	Depth (DEP)	Dollar Depth (VDEP)	Turnover Rate (TR)
Proportional Quoted Spread (PQSPR)	0.0502				
Depth (DEP)	0.1810	-0.0086			
Dollar Depth (VDEP)	0.1934	-0.0044	0.9397		
Turnover Rate (TR)	0.1669	-0.0065	0.2928	0.2803	
Bi-dimensional Liquidity Measure (BLM)	-0.0002	-0.0006	0.0001	-0.0005	0.0004

Notes: This table presents the descriptive statistics of the stock liquidity measures on the Shanghai Stock Exchange (SHSE) between July 2000 and June 2002. Panel A gives the explanations of the liquidity measures. Panel B shows the cross-sectional statistics for the means of these liquidity measures on the time series basis. Panel C shows the cross-sectional means of correlations between liquidity variable pairs on the time series basis of individual firm. P_A is the quoted ask price, P_B being the bid price, P_M is the mid-quoted price. Q stands for quoted share quantity for the trading, subscripts A=ask and B=bid. When calculating the bi-dimensional liquidity measure, depth (D) is computed as

and IC is the immediacy cost according to Pascual, Escribano and Tapia (2004), defined as: $D_t = Log\{(\sum_{j=1}^{t}[DEP_j T_j])\sum_{j=1}^{t} T_j\}$. There were 468 trading days and 113,960 stock-days in SHSE from July 2000 to June 2002. The $IC_t = Log\{(\sum_{j=1}^{t}[PQSPR_j T_j])\sum_{j=1}^{t} T_j\}$ proxies for each liquidity measure are averaged across all trades for each daily stock.

Table 2 Summary Statistics of Liquidity Measures for Shenzhen Stocks

Panel A: Definitions

Liquidity Measures	Definition	Units
Quoted Spread (QSPR)	$P_A - P_B$	Yuan
Proportional Quoted Spread (PQSPR)	$(P_A - P_B)/P_M$	None
Depth (DEP)	$(Q_A + Q_B)/2$	Shares
Dollar Depth (VDEP)	$(P_A Q_A + P_B Q_B)/2$	Yuan
Turnover Rate (TR)	$Shares_{traded} / Shares_{outstanding}$	None
Bi-dimensional Liquidity Measure (BLM)	$BLM_t = \frac{\Delta D_t}{D_{t-1}} - \frac{\Delta IC_t}{IC_{t-1}}$	None

Panel B: Cross-sectional statistics for time series means

	Mean	Median	Standard Deviation
Quoted Spread (QSPR)	0.0313	0.0200	0.1095
Proportional Quoted Spread (PQSPR)	0.0424	0.0281	3.8589
Depth (DEP)	401.4336	40.0890	2088.976
Dollar Depth (VDEP)	5686.052	488.4150	33515.82
Turnover Rate (TR)	1.2278	0.7002	1.7770
Bi-dimensional Liquidity Measure (BLM)	-0.0007	-1.91e-08	0.1488

Panel C: Cross-sectional means of time-series correlations between liquidity variable pairs for an individual stock

	Quoted Spread (QSPR)	Proportional Quoted Spread (PQSPR)	Depth (DEP)	Dollar Depth (VDEP)	Turnover Rate (TR)
Proportional Quoted Spread (PQSPR)	0.0087				
Depth (DEP)	0.3623	-0.0130			
Dollar Depth (VDEP)	0.3825	-0.0100	0.9185		
Turnover Rate (TR)	0.2512	-0.0330	0.4469	0.4376	
Bi-dimensional Liquidity Measure (BLM)	-0.0008	-0.0006	0.0001	-0.0003	0.0004

Notes: This table presents the descriptive statistics of the stock liquidity measures on the Shenzhen Stock Exchange (SZSE) between July 2000 and June 2002. Panel A gives the explanations of the liquidity measures. Panel B shows the cross-sectional statistics for the means of these liquidity measures on the time series basis. Panel C shows the cross-sectional means of correlations between liquidity variable pairs on the time series basis of individual firm. P_A is the quoted ask price, P_B being the bid price, P_M is the mid-quoted price. Q stands for quoted share quantity for the trading, subscripts A=ask and B=bid. When calculating the bi-dimensional liquidity measure, depth (D) is computed as and IC is the immediacy cost according to Pascual, Escribano and Tapia (2004), defined as: $D_t = Log\{(\sum_{j=1}^{t}[DEP_j T_j])\sum_{j=1}^{t} T_j\}$. There were 468 trading days and 113,960 stock-days in SHSE from July 2000 to June 2002. The $IC_t = Log\{(\sum_{j=1}^{t}[PQSPR_j T_j])\sum_{j=1}^{t} T_j\}$ proxies for each liquidity measure are averaged across all trades for each daily stock.

Table 3 Absolute Daily Percentage Changes in Liquidity Variables

Cross-sectional statistics for time series means (*SHSE*)	**Mean**	**Median**	**Standard Deviation**
Quoted Spread (|QSPR|)	5.1190	0.2594	48.3468
Percentage Quoted Spread (|PQSPR|)	13.8823	0.1864	592.1499
Depth (|DEP|)	8.3590	0.3361	64.0229
Dollar Depth (|VDEP|)	8.3241	0.3376	63.3598
Turnover Rate (|TR|)	0.5934	0.3535	1.2081
Bi-dimensional Liquidity Measure (|BLM|)	0.1354	1.21e-08	32.9917
Cross-sectional statistics for time series means (*SZSE*)	**Mean**	**Median**	**Standard Deviation**
Quoted Spread (|QSPR|)	0.8972	0.1765	5.9155
Percentage Quoted Spread (|PQSPR|)	43.7911	0.1771	3108.138
Depth (|DEP|)	7.3756	0.3269	59.8885
Dollar Depth (|VDEP|)	7.3575	0.3286	59.5470
Turnover Rate (|TR|)	0.5943	0.3503	1.5826
Bi-dimensional Liquidity Measure (|BLM|)	0.0007	2.82e-08	0.1488

Notes: This table presents the descriptive statistics of the absolute daily percentage change in that variable for each liquidity variable on the Chinese Stock Exchange between July 2000 and June 2002. The Chinese Stock Exchange includes the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE). QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the Bi-dimensional Liquidity Measure.

Table 4 Commonality in Liquidity (Value-weighted Market Liquidity)

SHSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	97.98 （20.38）	7.11 (5.97)	73.97 (12.35)	77.29 (15.84)	119.72 (3.00)	17.04 (0.25)
Median	78.72	1.28	75.51	74.92	14.27	1.54E-08
Percentage+	98.46	96.53	99.23	99.23	98.07	75.68
Percentage+significant	88.07	37.45	88.84	88.84	78.38	1.93
Lag	-41.60 (-0.29)	10.52 (1.04)	-40.37 (-0.36)	-32.00 (-0.25)	-96.21 (-1.56)	7.12 (0.12)
Median	-34.16	-0.45	-32.29	-23.46	-92.76	5.97E-09
Percentage+	23.94	9.27	3.86	6.56	3.86	67.57
Percentage+significant	1.16	3.86	0.39	0.39	0	0.77
Lead	-15.29 (-0.05)	4.66 (0.34)	-28.02 (-0.24)	-19.05 (-0.14)	-58.39 (-1.01)	-40.08 (-0.20)
Median	-0.65	-0.40	-25.78	-19.04	-66.71	6.287E-09
Percentage+	49.03	17.76	8.11	14.67	13.51	58.69
Percentage+significant	1.54	6.95	0.39	0.39	1.93	4.25
SUM	41.09 (6.68)	22.29 (1.53)	5.58 (3.92)	26.24 (5.15)	-34.88 (-0.14)	-15.92 (-0.19)
Adj R^2 Mean	0.32	0.13	0.26	0.36	0.17	0.01
Median	0.25	0.008	0.24	0.358	0.16	-0.005
SZSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	90.48 （8.01）	93.33 (6.31)	65.95 (5.47)	93.17 (5.75)	93.62 (2.98)	54.29 (0.71)
Median	87.75	3.98	16.03	36.87	68.63	-0.0006
Percentage+	94.14	92.76	98.97	98.97	98.28	37.59
Percentage+significant	93.10	11.38	47.93	63.45	82.41	6.90
Lag	-91.38 (-0.04)	-93.16 (-0.31)	-6.89 (-0.51)	-71.85 (-0.61)	-40.74 (-1.41)	80.11 (0.78)
Median	5.62	1.85	-12.54	-31.28	-44.37	0.0007
Percentage+	51.03	80.00	12.76	5.17	5.17	75.52
Percentage+significant	2.41	0.69	0	0	1.38	9.31
Lead	60.27 (0.37)	77.34 (0.29)	-11.62 (-0.02)	-11.62 (-0.90)	-43.27 (-0.32)	90.79 (0.66)
Median	11.83	1.20	-7.41	-17.26	-89.09	0.001
Percentage+	77.93	80	34.83	27.59	28.28	79.31
Percentage+significant	4.14	2.76	3.10	2.76	3.45	21.72
SUM	59.37 (2.78)	77.51 (2.31)	47.44 (1.66)	9.7 (1.41)	9.61 (0.42)	225.19 (0.25)
Adj R^2 Mean	0.18	0.12	0.13	0.13	0.13	0.08
Median	0.14	0.005	0.04	0.04	0.12	0.02

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Chinese Stock Exchange between July 2000 and June 2002. The Chinese Stock Exchange includes the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE). QSPR is the quoted

spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 5 Commonality in Liquidity (Equal-weighted Market Liquidity)

SHSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	86.23 （16.00）	77.01 (5.94)	63.96 (12.45)	51.07 (10.30)	6.78 (2.61)	-80.30 (-0.25)
Median	87.95	1.32	53.73	41.84	6.50	1.10E-08
Percentage+	98.46	96.91	99.23	99.23	95.75	77.22
Percentage+significant	88.07	45.95	88.84	88.84	73.75	1.54
Lag	-1.96 (-0.33)	9.74 (1.07)	-1.27 (-0.27)	-0.77 (-0.18)	-4.01 (-1.37)	22.87 (0.11)
Median	-1.54	-0.48	-0.99	-0.61	-3.01	3.65E-09
Percentage+	11.20	9.65	4.25	13.51	6.95	65.64
Percentage+significant	1.54	4.25	0	0	0.39	0.39
Lead	-1.78 (-0.20)	4.73 (0.35)	-1.46 (-0.27)	-0.18 (-0.02)	-1.98 (-0.68)	-50.50 (-0.19)
Median	-0.79	-0.41	-1.34	-0.25	-2.03	3.62E-09
Percentage+	27.03	14.29	6.56	32.82	22.01	57.92
Percentage+significant	0.39	6.95	0.39	0.39	2.32	3.47
SUM	82.49 (5.16)	91.48 (1.50)	61.23 (3.97)	50.12 (3.37)	0.79 (0.19)	-107.93 (-0.18)
Adj R^2 Mean	0.38	0.11	0.26	0.20	0.15	0.006
Median	0.39	-0.001	0.24	0.18	0.14	-0.01
SZSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	30.61 （7.94）	78.45 (6.31)	18.00 (5.06)	19.88 (5.72)	5.66 (2.96)	29.31 (0.71)
Median	25.19	0.06	0.49	2.04	4.88	-9.66E-06
Percentage+	94.14	91.38	99.31	99.31	97.59	37.24
Percentage+significant	92.41	11.38	35.86	77.59	83.10	7.24
Lag	-1.68 (-0.18)	-0.88 (-0.26)	-2.06 (-0.47)	-2.86 (-0.85)	-2.54 (-1.57)	14.21 (0.77)
Median	-0.35	0.02	-0.08	-0.59	-2.55	1.06E-05
Percentage+	42.07	75.86	11.38	2.41	4.83	76.55
Percentage+significant	1.72	0.69	0	0.34	0.69	9.31
Lead	5.82 (3.06)	3.57 (0.22)	-0.67 (-0.13)	-2.41 (-1.85)	-1.70 (-0.86)	24.02 (0.62)
Median	5.92	0.01	-0.08	-0.74	-1.51	2.19E-05
Percentage+	90.34	72.41	27.59	10.69	12.76	77.59
Percentage+significant	45.17	2.07	2.41	1.72	1.72	19.31
SUM	34.75 (5.16)	81.14 (2.26)	15.27 (1.49)	14.61 (1.01)	1.42 (0.18)	67.54 (0.23)
Adj R^2 Mean	0.16	0.11	0.10	0.11	0.13	0.08
Median	0.12	-0.008	-0.0002	0.007	0.12	0.08

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of an equal-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Chinese Stock Exchange between July 2000 and June 2002. The Chinese Stock Exchange includes the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE). QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that

variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. ‘Percentage+’ is the percentage of positive coefficients. ‘Percentage+significant’ is the percentage of positive and significant coefficients. Both ‘Percentage+’ and ‘Percentage+significant’ are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 6 Commonality in Liquidity by Size Quintile (SHSE)

		Smallest N=51	2 N=52	3 N=52	4 N=52	Largest N=52
Quoted Spread (DQSPR)	Concurrent	30.49 (9.56)	89.61 (26.29)	68.28 (3.52)	114.92 (18.63)	165.40 (25.14)
	Median	30.43	90.51	66.80	116.29	164.46
	Percentage+	94.12	96.15	97.01	98.08	98.58
	Percentage+significant	90.20	96.15	97.01	98.08	98.58
	Adj R^2 Mean	0.25	0.62	0.15	0.44	0.59
Percentage Quoted Spread (DPQSPR)	Concurrent	1.99 (2.35)	112.21 (1.98)	114.93 (21.71)	14.96 (0.73)	5.93 (2.49)
	Median	1.8	49.22	113.26	7.20	5.22
	Percentage+	97.78	92.31	96.15	92.31	98.08
	Percentage+significant	86.67	19.23	63.46	21.15	26.92
	Adj R^2 Mean	0.03	0.01	0.55	0.04	0.03
Depth (DDEP)	Concurrent	32.88 (18.81)	69.69 (23.48)	99.26 (15.37)	88.23 (15.89)	22.56 (20.26)
	Median	28.77	67.82	101.17	85.53	22.89
	Percentage+	96.08	98.08	98.08	98.08	98.08
	Percentage+significant	94.12	97.08	97.15	98.02	98.08
	Adj R^2 Mean	0.54	0.56	0.33	0.35	0.47
Dollar Depth (VDEP)	Concurrent	22.75 (18.33)	69.10 (23.16)	101.24 (15.39)	22.52 (15.98)	22.78 (20.16)
	Median	28.65	67.31	103.50	21.89	23.15
	Percentage+	96.08	98.08	98.08	98.08	98.08
	Percentage+significant	94.12	97.08	97.15	98.02	98.08
	Adj R^2 Mean	0.52	0.56	0.34	0.35	0.47
Turnover Rate (DTR)	Concurrent	251.28 (1.22)	236.31 (0.90)	602.87 (2.22)	232.22 (0.79)	98.65 (1.61)
	Median	138.57	156.37	590.45	187.07	88.04
	Percentage+	86.27	96.15	98.08	96.15	96.15
	Percentage+significant	41.18	51.92	69.23	65.38	59.62
	Adj R^2 Mean	0.31	0.30	0.05	0.24	0.09
Bi-dimensional Liquidity Measure (BLM)	Concurrent	17.56 (4.54)	496.50 (1.83)	464.05 (1.29)	510.57 (0.58)	709 (-0.08)
	Median	15.80	271.13	153.90	34.04	-2.02E-07
	Percentage+	98.04	92.31	92.31	90.38	69.23
	Percentage+significant	86.27	69.23	76.92	76.92	66.53
	Adj R^2 Mean	0.06	-0.002	0.12	0.02	-0.006

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Shanghai Stock Exchange (SHSE) by size quintile between July 2000 and June 2002. Column 3-7 are five quintiles, based on market capitalisation at the beginning of the sample period. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables.

Table 7 Commonality in Liquidity by Size Quintiles (SZSE)

		Smallest N=58	2 N=58	3 N=58	4 N=58	Largest N=59
Quoted Spread (DQSPR)	Concurrent	49.42 (12.41)	162.32 (13.35)	68.46 (11.72)	125.43 (60.67)	111.09 (22.93)
	Median	46.34	172.02	66.03	128.92	109.08
	Percentage+	94.83	98.28	98.21	98.28	98.31
	Percentage+significant	91.38	98.08	98.11	96.55	98.31
	Adj R^2 Mean	0.45	0.37	0.39	0.88	0.57
Percentage Quoted Spread (DPQSPR)	Concurrent	55.22 (0.08)	136.24 (9.16)	579.89 (0.46)	646.74 (22.82)	718.28 (6.45)
	Median	-0.010	148.56	3.20	1.26	1.22
	Percentage+	91.38	84.48	86.21	93.10	91.53
	Percentage+significant	8.62	10.34	8.62	32.76	18.64
	Adj R^2 Mean	0.03	0.30	-0.003	0.03	0.12
Depth (DDEP)	Concurrent	52.27 (18.29)	80.36 (12.06)	94.93 (42.60)	148.73 (21.31)	128.77 (17.16)
	Median	47.68	904.46	158.08	156.05	131.85
	Percentage+	98.28	98.28	96.55	98.28	98.31
	Percentage+significant	94.83	98.08	96.55	98.08	98.31
	Adj R^2 Mean	0.43	0.33	0.80	0.51	0.42
Dollar Depth (VDEP)	Concurrent	52.42 (18.62)	770.10 (11.92)	147.92 (41.79)	146.69 (21.23)	129.16 (17.11)
	Median	48.09	866.24	156.54	153.75	132.46
	Percentage+	96.55	98.28	96.55	98.28	98.31
	Percentage+significant	94.83	98.08	96.55	98.08	98.31
	Adj R^2 Mean	0.44	0.32	0.79	0.51	0.42
Turnover Rate (DTR)	Concurrent	496.84 (1.51)	163.17 (12.77)	85.81 (2.45)	89.74 (3.77)	29.05 (1.58)
	Median	357.18	185.05	78.86	91.19	12.62
	Percentage+	96.55	94.83	98.28	91.38	98.31
	Percentage+significant	51.72	70.69	62.07	51.72	55.93
	Adj R^2 Mean	0.08	0.50	0.08	0.17	0.15
Bi-dimensional Liquidity Measure (BLM)	Concurrent	483.96 (2.29)	-67.05 (0.44)	11.28 (-5.33)	13.02 (0.08)	13.14 (-0.22)
	Median	529.91	0.004	-0.02	0.11	-0.004
	Percentage+	84.48	51.72	41.38	58.62	25.42
	Percentage+significant	51.72	10.34	6.90	5.17	5.08
	Adj R^2 Mean	0.13	0.02	0.10	0.01	0.22

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Shenzhen Stock Exchange (SZSE) by size quintile between July 2000 and June 2002. Column 3-7 are five quintiles, based on market capitalisation at the beginning of the sample period. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables.

Table 8 Market and Industry Commonality (SHSE)

	Market	Industry	Market	Industry	Market	Industry	Market	Industry	Market	Industry	Market	Industry
	Quoted Spread (DQSPR)		**Percentage Quoted Spread (DPQSPR)**		**Depth (DDEP)**		**Dollar Depth (VDEP)**		**Turnover Rate (DTR)**		**Bi-dimensional Liquidity Measure (BLM)**	
Concurrent	49.05 (3.19)	127.91 (18.31)	41.92 (4.01)	263.26 (6.20)	20.40 (3.41)	748.62 (11.71)	36.85 (4.22)	67.62 (8.58)	15.56 (2.39)	24.96 (0.65)	9.54E-06 (0.50)	0.01 (0.16)
Median	35.44	127.13	31.16	237.45	12.12	548.04	18.58	447.61	16.51	351.88	3.06E-06	5.92645E-05
Percentage +	73.80	92.86	92.21	60.58	80.55	98.48	86.09	86.09	91.54	70.24	75.13	75.13
Percentage +significant	61.90	90.48	80.09	53.10	60.55	90.12	70.34	86.02	82.09	10.90	13.65	10.90
Lag	27.18 (0.13)	-185.8 (-0.14)	98.10 (1.78)	64.15 (0.1)	-5.07 (-0.10)	33.43 (0.01)	-13.07 (-0.15)	71.11 (0.07)	-94.57 (-1.76)	220.12 (0.62)	-2.40E-06 (-0.21)	-2.60E-05 (-0.009)
Median	8.84	-99.07	150.35	-1547.26	-7.77	17.56	-13.26	42.56	-104.18	157.12	3.16E-07	7.21E-06
Percentage +	57.14	33.33	80.09	20.28	30.38	64.90	20.28	73.50	11.91	93.14	50.32	50.60
Percentage +significant	8.62	1.05	50.69	20.28	5.02	8.33	1.88	1.32	0.50	10.28	0.11	0.26
Lead	71.74 (0.35)	36.04 (0.14)	311.56 (2.65)	-268.77 (-2.55)	-5.11 (-0.10)	83.16 (0.12)	-11.29 (-0.14)	116.33 (0.17)	-82.43 (-1.35)	-0.38 (-0.006)	9.69E-06 (0.71)	-6.52898E-05 (-0.01)
Median	30.67	128.90	248.61	-985.21	-3.39	26.21	-8.96	37.57	-79.94	26.04	4.03E-06	4.07954E-05
Percentage +	73.81	59.52	60.14	42.14	42.14	80.09	40.03	80	7.05	65.66	72.59	65.66
Percentage +significant	4.76	2.38	50.08	40.05	2.32	0.96	2.20	1.94	0.04	10.28	27.20	1.52
SUM	147.97 (1.22)	-21.88 (-6.10)	451.58 (2.81)	58.64 (1.18)	10.22 (1.07)	865.21 (3.94)	12.49 (1.31)	255.06 (2.94)	-161.44 (-0.24)	244.7 (0.42)	1.68E-05 (0.47)	0.00022 (0.06)
Median	34.10	156.82	304.10	-14.60	0.46	99.11	-2.81	132.31	-72.86	137.50	1.70E-06	2.31403E-05
Adj R^2 Mean	0.70		0.70		0.41		0.42		0.18		0.04	
Median	0.75		0.98		0.46		0.49		0.15		0.03	

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Shanghai Stock Exchange (SHSE) and on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for stock from special industries between July 2000 and June 2002. Market firms include all stocks we select on the SHSE. Industry firms include industrial stocks, resources stocks and financial stocks from Global Industry Classification Standard (GICS) code. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 9 Market and Industry Commonality (SZSE)

	Market	Industry	Market	Industry	Market	Industry	Market	Industry	Market	Industry	Market	Industry
	Quoted Spread (DQSPR)		**Percentage Quoted Spread (DPQSPR)**		**Depth (DDEP)**		**Dollar Depth (VDEP)**		**Turnover Rate (DTR)**		**Bi-dimensional Liquidity Measure (BLM)**	
Concurrent	58.64 (4.72)	139.24 (20.14)	56.28 (6.63)	276.42 (7.61)	32.72 (6.94)	780.65 (12.62)	50.33 (5.73)	77.15 (11.83)	36.56 (2.51)	53.71 (0.76)	0.00045 (0.62)	2.01 (1.06)
Median	37.03	126.29	42.01	268.65	16.87	604.76	22.09	657.35	35.18	270.05	2.81E-02	0.91
Percentage +	78.83	94.37	92.42	61.32	82.21	98.16	88.06	87.98	93.77	72.78	78.85	70.93
Percentage +significant	61.28	91.45	82.02	56.09	67.92	90.90	70.82	80.74	81.59	10.57	14.61	10.61
Lag	22.23 (0.35)	-121.9 (-0.14)	98.89 (1.84)	64.74 (1.82)	-4.97 (-0.60)	58.75 (1.31)	-9.83 (-0.03)	104.79 (0.23)	-83.74 (-1.59)	409.81 (0.85)	-2.50E-05 (-0.92)	-1.32E-03 (-0.29)
Median	8.28	-27.43	155.32	-147.39	-8.08	20.05	-13.26	54.75	-5.19	368.78	0.02	0.12
Percentage +	57.52	34.26	80.54	22.40	33.26	68.37	20.27	75.59	15.52	90.49	56.50	58.51
Percentage +significant	2.21	2.74	50.31	20.21	7.13	10.10	0.98	2.24	0.17	12.18	0.19	0.23
Lead	85.83 (0.67)	36.04 (0.14)	581.28 (4.54)	-171.75 (-0.35)	-4.77 (-0.16)	102.34 (1.31)	0.48 (0.25)	139.25 (0.81)	-20.05 (-1.08)	2.81 (1.23)	3.91E-06 (1.29)	2.064E-05 (0.33)
Median	52.96	128.90	252.35	-345.62	-3.39	44.18	0.39	62.57	-5.62	4.02	0.006	5.124E-05
Percentage +	73.83	59.65	61.47	40.42	40.41	80.41	43.30	82.16	5.28	67.14	70.42	61.32
Percentage +significant	4.96	3.02	50.19	40.17	1.17	0.17	4.07	3.96	1.04	13.91	20.09	1.02
SUM	166.7 (2.31)	53.38 (8.20)	736.45 (3.06)	169.41 (3.74)	22.98 (2.88)	941.74 (3.32)	40.98 (1.62)	321.19 (2.62)	-67.23 (0.83)	466.33 (1.19)	0.000429 (0.47)	0.000201 (0.06)
Median	45.20	167.49	775	-9.80	5.08	71.41	0.25	455.61	-20.55	106.22	2.64E-03	1.574E-05
Adj R^2 Mean	0.82		0.88		0.72		0.51		0.20		0.01	
Median	0.85		0.85		0.49		0.56		0.13		0.003	

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for all stocks on the Shenzhen Stock Exchange (SZSE) and on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for stock from special industries between July 2000 and June 2002. Market firms include all stocks we select on the SHSE. Industry firms include industrial stocks, resources stocks and financial stocks from Global Industry Classification Standard (GICS) code. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 10 Industry Commonality for Industrial

SHSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	65.78 （6.78）	79.89 (8.15)	74.32 (8.43)	69.56 (7.31)	4.24 (1.44)	0.0002 (0.16)
Median	56.67	65.32	63.64	58.30	3.10	2.10E-05
Percentage+	83.44	87.18	85.24	88.65	15.49	14.86
Percentage+significant	80.65	86.86	83.31	80.56	10.42	11.10
Lag	-2.52 (-0.13)	8.31 (2.87)	6.27 (1.06)	1.72 (-0.05)	3.28 (0.98)	12.65 (0.31)
Median	-2.31	7.64	6.11	0.62	3.06	11.11
Percentage+	21.44	15.28	13.52	9.05	33.41	52.67
Percentage+significant	2.02	6.15	1.06	3.14	1.12	0.64
Lead	-11.87 (-1.24)	6.73 (1.43)	1.55 (0.08)	0.31 (0.01)	9.42 (1.36)	40.05 (0.81)
Median	-10.79	5.41	1.34	0.27	9.03	39.89
Percentage+	27.03	10.29	8.46	12.28	20.14	60.13
Percentage+significant	1.93	4.95	0.83	0.39	0.32	1.28
SUM	51.39 (1.80)	94.93 (4.15)	82.14 (3.19)	71.59 (2.42)	16.94 (1.26)	52.70 (0.43)
Adj R^2 Mean	0.29	0.22	0.42	0.35	0.15	0.07
Median	0.27	0.20	0.40	0.33	0.13	0.05
SZSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	58.90 （5.49）	67.34 (5.13)	75.13 (6.06)	64.69 (6.27)	8.59 (2.09)	0.0013 (0.53)
Median	50.09	48.19	61.59	48.67	3.48	3.33E-03
Percentage+	86.93	85.34	81.31	81.86	10.59	12.48
Percentage+significant	82.58	83.92	75.28	81.45	8.22	5.32
Lag	-3.68 (-0.15)	-1.48 (-0.06)	-3.67 (-0.24)	-3.64 (-0.35)	-5.54 (-1.75)	13.12 (0.37)
Median	-3.35	-1.03	-2.98	-3.15	-4.75	10.05
Percentage+	29.07	15.86	10.38	9.41	4.55	73.45
Percentage+significant	0.72	0.69	1.40	0.43	0.96	4.13
Lead	3.82 (0.16)	1.67 (0.02)	-1.35 (-0.03)	-12.41 (-1.60)	-2.07 (-0.16)	19.02 (0.26)
Median	3.43	0.88	-1.28	-10.74	-2.01	18.05
Percentage+	30.43	22.14	17.95	20.59	42.67	50.59
Percentage+significant	0.17	0.07	1.14	1.37	8.37	10.13
SUM	59.04 (1.83)	67.53 (1.70)	70.11 (1.93)	48.64 (1.44)	0.98 (0.06)	32.14 (0.39)
Adj R^2 Mean	0.42	0.22	0.37	0.32	0.20	0.04
Median	0.40	0.20	0.35	0.30	0.18	0.02

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for industrial stocks between July 2000 and June 2002 on both SHSE and SZSE. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 11 Industry Commonality for Resources

SHSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	43.25 (4.58)	39.23 (6.44)	59.73 (6.09)	59.19 (6.28)	2.53 (0.54)	0.0001 (0.13)
Median	29.18	30.16	48.16	45.40	1.96	1.70E-05
Percentage+	58.17	60.35	58.45	57.84	15.02	15.90
Percentage+significant	45.66	55.15	43.44	38.43	3.61	1.06
Lag	4.63 (0.20)	6.68 (0.19)	-3.46 (-0.16)	-2.08 (-0.21)	5.64 (0.28)	20.76 (0.05)
Median	3.14	5.53	-3.21	-2.02	4.48	13.64
Percentage+	10.52	11.37	9.42	7.06	1.41	2.53
Percentage+significant	1.02	2.95	0	0	0.32	0
Lead	2.65 (0.24)	5.39 (0.60)	-2.74 (-0.10)	-2.06 (-0.26)	7.05 (0.70)	25.08 (0.64)
Median	1.81	4.43	-2.62	-1.82	6.43	24.17
Percentage+	11.90	9.54	8.61	9.71	2.05	1.35
Percentage+significant	1.35	1.89	0.29	0	0.11	0
SUM	50.53 (1.67)	51.30 (2.41)	53.53 (1.94)	55.05 (1.94)	15.22 (0.51)	45.84 (0.27)
Adj R^2 Mean	0.27	0.18	0.39	0.12	0.12	0.03
Median	0.25	0.16	0.37	0.10	0.10	0.01
SZSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	57.04 (5.18)	63.11 (4.74)	67.59 (5.44)	62.32 (5.58)	4.68 (1.34)	0.0009 (0.01)
Median	54.76	53.15	62.22	51.88	4.52	5.12E-04
Percentage+	56.27	54.62	54.35	52.17	12.33	13.47
Percentage+significant	44.50	48.90	41.41	48.46	9.56	1.64
Lag	6.83 (0.79)	3.56 (0.29)	-2.76 (-0.92)	-4.46 (-0.35)	2.23 (0.59)	25.40 (0.17)
Median	6.43	2.29	-2.29	-3.51	1.49	20.11
Percentage+	18.70	20.04	15.47	12.94	3.37	4.44
Percentage+significant	1.32	1.14	0.73	0.52	0.18	0.02
Lead	3.77 (0.72)	2.42 (0.23)	-1.97 (-0.80)	-2.14 (-0.36)	5.29 (0.53)	28.29 (0.13)
Median	3.19	1.56	-0.98	-1.74	4.01	25.62
Percentage+	19.54	13.21	12.12	21.06	4.23	5.53
Percentage+significant	1.16	1.33	0.34	0	0.05	0
SUM	67.64 (2.23)	69.06 (1.75)	62.86 (1.24)	55.72 (1.62)	12.20 (0.82)	53.69 (0.10)
Adj R^2 Mean	0.30	0.16	0.32	0.31	0.18	0.03
Median	0.28	0.14	0.30	0.29	0.16	0.01

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for resource stocks between July 2000 and June 2002 on both SHSE and SZSE. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 12 Industry Commonality for Financial

SHSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	40.11 (5.89)	40.00 (6.22)	54.79 (6.25)	59.82 (6.75)	1.82 (0.39)	3.28E-04 (1.07)
Median	36.63	31.05	49.78	48.71	1.76	3.13E-04
Percentage+	45.68	48.85	57.39	59.32	13.00	9.83
Percentage+significant	40.68	41.25	47.77	44.32	2.27	0.60
Lag	2.04 (0.35)	3.47 (0.52)	3.24 (0.60)	2.03 (0.34)	4.07 (0.16)	15.07 (0.29)
Median	1.98	3.03	3.21	2.01	3.52	12.44
Percentage+	9.46	10.47	11.54	7.49	1.54	1.35
Percentage+significant	0	0.10	0.21	0	0.12	0
Lead	2.07 (0.70)	3.09 (0.48)	2.18 (0.77)	2.05 (0.82)	1.13 (0.10)	10.01 (0.45)
Median	1.92	3.00	2.06	1.43	1.00	9.64
Percentage+	8.43	8.49	9.55	9.48	6.51	1.49
Percentage+significant	0	0	0.11	0	0.09	0.03
SUM	44.22 (2.31)	46.56 (2.41)	60.21 (2.54)	63.90 (7.91)	7.02 (0.22)	25.08 (0.60)
Adj R^2 Mean	0.23	0.25	0.23	0.23	0.25	0.22
Median	0.21	0.23	0.21	0.21	0.23	0.20
SZSE	**Quoted Spread (DQSPR)**	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
Concurrent	53.45 (5.08)	59.71 (7.37)	62.35 (6.03)	62.80 (6.93)	2.06 (1.63)	0.0010 (0.89)
Median	49.63	51.23	60.33	59.44	1.64	4.21E-04
Percentage+	52.89	52.92	51.82	52.90	14.98	10.60
Percentage+significant	40.50	45.38	45.30	47.30	3.83	0.70
Lag	3.13 (0.66)	3.16 (0.10)	-2.12 (-0.40)	-2.06 (-0.81)	1.50 (0.11)	12.22 (0.34)
Median	1.49	2.81	-2.09	-1.51	1.28	10.14
Percentage+	10.53	9.35	9.41	13.51	6.47	2.53
Percentage+significant	0	0	0	0	0.11	0.22
Lead	3.15 (0.17)	2.05 (0.28)	-3.05 (-0.88)	-2.02 (-0.36)	4.05 (0.20)	30.01 (0.47)
Median	3.04	1.55	-1.89	-1.94	4.01	29.26
Percentage+	12.47	11.46	13.46	19.46	8.48	10.51
Percentage+significant	0	0	0	0	0.13	0.04
SUM	59.73 (1.97)	64.92 (2.58)	57.18 (1.58)	58.72 (1.92)	7.61 (0.65)	42.23 (0.57)
Adj R^2 Mean	0.24	0.23	0.22	0.23	0.25	0.22
Median	0.22	0.21	0.20	0.21	0.23	0.20

Notes: This table presents daily percentage changes in individual stocks' liquidity variables are regressed on the percentage changes of a value-weighted cross-sectional average of the liquidity variable on the time series basis for financial stocks between July 2000 and June 2002 on both SHSE and SZSE. QSPR is the quoted spread, PQSPR is the percentage quoted spread, DEP is depth. VDEP is Dollar Depth. TR is the Turnover Rate. BLM is the bi-dimensional Liquidity Measure. D denotes the daily percentage changes in that variable for each liquidity variable. The dependent variable stock is not included in the market average liquidity variables. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. Both 'Percentage+' and 'Percentage+significant' are reported on concurrent liquidity variables as well as for the previous trading day (lag) and next trading day (lead).

Table 13 Asymmetric Commonality on Up and Down Markets

Panel A: Up and Down-market Commonality (SHSE)						
	Quoted Spread (DQSPR)	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
β_u	1.98 (1.03)	-0.74 (-0.03)	-17.68 (-0.64)	-16.70 (-0.63)	15.46 (0.72)	-0.002 (-0.58)
Percentage+	40.85	30.93	15.48	10.40	20.26	6.28
Percentage+significant	16.11	2.61	1.31	1.21	12.13	0.04
β_d	-35.96 (-0.29)	-0.22 (-0.07)	14.50 (0.79)	5.98 (0.12)	245.93 (0.60)	-0.0004 (-0.92)
Percentage+	23.7	60.27	51.59	53.52	73.49	5.5
Percentage+significant	1.1	1.52	20.24	1.17	10.18	0.19
Adj R^2 Mean	0.177	0.161	0.148	0.134	0.394	0.215
DW	2.02	2.01	1.96	1.96	1.93	1.95
Panel B: Wald Test Results (SHSE)						
	Quoted Spread (DQSPR)	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
χ^2	12.58	12.09	16.43	15.02	58.54	1.38
percentage_*	3.02	1.89	16.95	13.32	1.93	0.35
percentage_**	10	12.32	35	26.18	2.55	1.04
Panel C: Up and Down-market Commonality (SZSE)						
	Quoted Spread (DQSPR)	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
β_u	2.46 (1.72)	-0.89 (-0.42)	-9.93 (-0.60)	-14.92 (-0.79)	15.81 (0.85)	-0.0013 (-0.93)
Percentage+	50.52	54.96	15.51	18.42	22.38	7.42
Percentage+significant	18.17	1.18	1.23	1.18	15.10	0.017
β_d	-31.43 (-0.27)	-0.14 (-0.12)	15.73 (0.93)	6.69 (0.23)	289.74 (1.77)	-0.0002 (-0.81)
Percentage+	26.49	66.50	60.47	62.35	80.39	6.41
Percentage+significant	1.18	2.19	18.19	1.09	12.13	0.109
Adj R^2 Mean	0.191	0.187	0.148	0.179	0.54	0.10
DW	2.21	2.13	1.98	1.94	1.96	1.92
Panel D: Wald Test Results (SZSE)						
	Quoted Spread (DQSPR)	**Percentage Quoted Spread (DPQSPR)**	**Depth (DDEP)**	**Dollar Depth (VDEP)**	**Turnover Rate (DTR)**	**Bi-dimensional Liquidity Measure (BLM)**
χ^2	11.09	14.28	18.77	19.16	69.05	1.02
percentage_*	5	1.21	10.13	15.43	2.43	0.75
percentage_**	14.01	10.17	47	33.12	3	0.94

Notes: This table presents the regression results of commonality in liquidity on up and down markets of the Chinese Stock Exchange. Mean coefficients, the percentage of positive coefficients and positive and significant coefficients and DW statistic are reported in Panel A and Panel C on the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) respectively. 'Percentage+' is the percentage of positive coefficients. 'Percentage+significant' is the percentage of positive and significant coefficients. DW statistic is the cross-sectional average of the Durbin Watson test statistics. Panel B (Panel D) reports the results when using the Wald test. The null hypothesis is: H_0: $\beta_{u=}B_d$. χ^2 is the cross-sectional average of Chi-square statistics. The results that significantly reject the null hypothesis at the 5% level are reported in %_*. The results that significantly reject the null hypothesis at the 10% level are reported in %_**.