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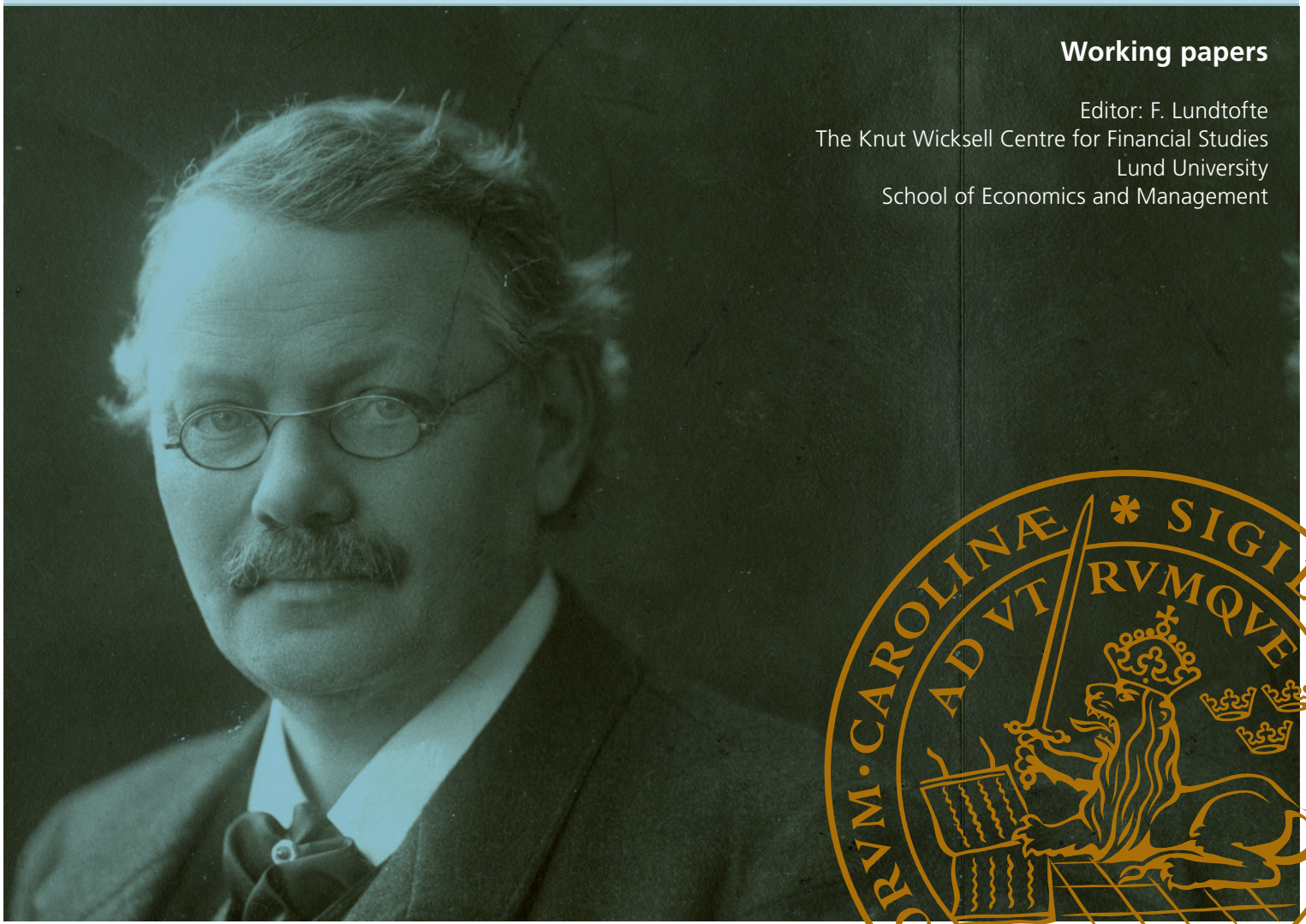

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Foreign Institutional Investors and Stock Market Liquidity in China: State Ownership, Trading Activity and Information Asymmetry

Mingfa Ding[⊕], Birger Nilsson and Sandy Suardi

Abstract

The Chinese government has implemented the Qualified Foreign Institutional Investor (QFII) system in order to promote stock market liquidity by participation of foreign institutional investors. This paper is the first to explicitly identify the channels through which foreign institutional investors influence the liquidity on the Chinese stock markets. Firstly, we find that market participation by foreign institutional investors promotes liquidity both for state-owned enterprises (SOEs) and non-SOEs. Secondly, foreign institutions influence liquidity through the informational frictions channel, but not through the real frictions channel. Thirdly, as implied by these two results, foreign institutions are not informationally disadvantaged when investing in SOEs. Finally, the link between foreign institutional participation and liquidity remains strong before, during, and after the recent financial crisis.

Keywords: liquidity; emerging markets; foreign institutional investors; real frictions; informational frictions

JEL codes: G12; G18; G32; C23

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1. Introduction

China is the by far the largest emerging market in the world. In addition, it has a unique institutional and corporate governance environment that differs from other emerging economies. Unlike many other emerging markets, most listed firms are only partially privatized and corporate ownership is often highly concentrated in the hands of a single investor associated with the central or local government, or a government controlled so called state-owned enterprise (SOE). There is a well-established literature indicating that SOEs are characterized by lower governance transparency and by less effective corporate governance mechanisms (Shleifer and Vishny, 1997; La Porta et al., 1999; Johnson et al. 2000) and lower financial transparency (Bushman et al. 2004; Wang et al. 2008; Chaney et al. 2008), which may create information asymmetries between domestic and foreign investors. The qualified foreign institutional investor (QFII) program is a policy measure that allows stock market quota to foreign institutional investors.[1] This system permits overseas institutional investors to buy domestically listed stocks in the A-share market. Prior to the QFII system, foreign investors could only invest in the B-share market.[2] Even though it sensible to assume that financial liberalization in general improves liquidity, there are no attempts in the literature to evaluate the effects of the QFII system on market liquidity.

The literature suggests two primary mechanisms through which foreign institutional investors can affect market liquidity: (1) by changing the level of trading activity on the market and (2) by altering the information environment on the market. Stoll (2000) refers to the former mechanism as a real frictions effect and to the latter as an informational frictions effect. The presence of foreign institutional investors can affect the real friction component of liquidity by changing the level of trading activity in the market. In particular, if participation by foreign institutional investors elicits more trade, the increase in trading activity will reduce real friction costs by spreading fixed real costs over more trades. With regard to the informational friction component of liquidity, a common argument is that foreign institutional investors are better informed and therefore are regarded as informed traders. Market makers are concerned about the potential losses of trading against informed traders thus leading them to increase spreads (an adverse selection effect). In this context, Stulz (1999a,b) argues that liquidity in local financial market is likely to improve as a result of better information disclosure and higher trading activity engendered by participation of international financial institutions. When better and more relevant information is reflected in prices, market makers decrease spreads due to the lower price uncertainty (a price discovery effect).

This paper offers three distinct contributions. Firstly, it is the first study to investigate the influence of foreign institutional investors on the liquidity on the stock

[1] QFII refers to "overseas fund management institutions, insurance companies, securities companies and other assets management institutions which have been approved by the China Securities Regulatory Commission (CSRC) to invest in China's securities market and granted investment quota by SAFE". Term 18 of the Provisional Measure states that QFIIs can invest in A-shares, treasuries, convertible bonds and corporate bonds listed in China's stock exchanges and other financial instruments as approved by CSRC.

[2] A-shares are denominated in renminbi. B-shares are denominated in foreign currency (US dollars in Shanghai and Hong Kong dollars in Shenzhen).

markets in China (Shanghai and Shenzhen). Secondly, we disentangle the influence on liquidity provided by foreign investors into the effects on real frictions and on informational frictions. Thirdly, our sample from April 2004 to March 2012 covers the financial crisis, which allows us to look into the question of the role played by foreign institutional investors as liquidity providers before and after the onset of the crisis.

Our understanding of how foreign institutional investors improve (or impede) market liquidity has direct implications for asset pricing, corporate governance and regulation. With respect to asset pricing, in the face of real frictions, traders need to offset the real costs of trading thus leading to lower prices and higher expected returns (Stoll, 2000; Amihud, 2002). More generally, there is a growing literature suggesting that both the level of liquidity and the risk (uncertainty) in liquidity influence asset prices (Amihud and Mendelson, 1986; Pástor and Stambaugh, 2003; Acharya and Pedersen, 2005; Lee, 2011). In addition, informational frictions have a distributional effect on the wealth of informed and uninformed traders (Stoll, 2000). Should foreign institutional investors actively trade on superior information to the detriment of uniformed traders, there is scope for stricter corporate governance regulations to reduce information asymmetries between domestic and foreign investors. Very few studies directly address the issue of how participation of foreign institutions affects liquidity on emerging markets. Rhee & Wang (2009) study this question on the Indonesian stock market, and conclude that market participation by foreign institutional investors actually contributes negatively to liquidity even though market liberalization in general has improved liquidity. They attribute this finding mainly to information asymmetries between domestic and foreign investors (an adverse selection effect). Earlier work by Levine and Zervos (1998) and Bekaert, Harvey and Lumsdaine (2002) emphasize the role of financial liberalization for market quality in general, and argue that liquidity improves as markets become financially more liberal. Bekaert, Harvey and Lundblad (2007) study the implications of financial liberalization (openness) on the relation between stock market liquidity and asset prices on emerging markets. They find that there is a remaining effect of liquidity on asset prices even after financial deregulation.

Our first main result is that market participation by foreign institutional investors promotes liquidity both for SOEs and non-SOEs. This finding contrasts the result in Rhee & Wang (2009) for the Indonesian stock market. Secondly, these improvements of liquidity by foreign institutional investors act through the informational frictions channel. This result implies that price discovery effects dominate adverse selection effects, which may explain the contrasting results for China and Indonesia. Interestingly, it also suggests that foreign institutional investors are not informationally disadvantaged with respect to SOEs. Furthermore, there are no effects on liquidity through the real frictions channel. Finally, we compare the liquidity provision of foreign institutional investors before, during and after the financial crises and find no differences. This result suggests a strong link between market participation of foreign institutional investors and liquidity; during crises liquidity is adversely affected because participation of foreign institutional investors decreases, and conversely liquidity is improved during periods when participation increases. While our purpose is not primarily to evaluate the QFII program as such, taken together our evidence is indicative of that the QFII system successfully promotes liquidity on the Chinese stock market.

The rest of the paper is structured as follows. Section 2 develops our research hypotheses related to the real and informational friction channels. Section 3 explains the measurement of real and informational frictions for individual stocks in the context of the Chinese market. We use high frequency data from the Shanghai and Shenzhen exchanges to calculate the spread measures and daily data to calculate the ILLIQ measure by Amihud (2002). The informed trading components are estimated using the methods of Lin, Sanger and Booth (1995) and Huang and Stoll (1997). Section 4 describes the data sources and provides descriptive statistics for liquidity measures, firm characteristics and foreign participation variables. Section 5 reports the results of our main panel data regressions. Section 6 contains results of various robustness checks with respect to the Shanghai and Shenzhen exchanges, foreign ownership and the types of domestic institutions considered. The final section summarizes and provides some concluding remarks.

2. Related literature and hypothesis development

2.1 Real frictions channel

The liquidity of a stock is usually associated with greater market capitalization of the firm since a larger market capitalization would make a stock more attractive to a larger number of investors who have limitations of the size of companies in which they invest. Furthermore, stocks with larger market capitalization tend to have a larger number of shares outstanding which may increase trading volume. The liquidity of a stock is also related to the average transaction costs which depend on the number of shareholders participating in trade. With greater foreign institutional participation, the level of trading activity increases, thus reducing the average transaction cost and promoting liquidity. However, the effect on liquidity from participation of foreign institutional investors is not as clear cut in China. Given the dominant presence of SOEs with highly concentrated ownership, it is less apparent that participation of foreign institutional investors leads to greater trade. When firm ownership is concentrated, there is a limited free float and consequently there are fewer trades, leading to a fall in liquidity (Demsetz, 1968). In addition, the ownership structure may affect liquidity through the production of information. When ownership is concentrated, it reduces the benefits of monitoring the firm, thus reducing the amount of public information available about the firm (Holmstrom and Tirole, 1993). Furthermore, the number of market participants willing to invest in information acquisition in a firm is directly related to the anticipated gains from trade, which in turn is related to the firm's free float.

Past studies have investigated the liquidity effects of foreign institution's involvement in the stock market, but none has explicitly identified the channels through which this influence has occurred. We follow Stoll (2000) who suggests that total friction (such as quoted or effective spread) can be decomposed into real friction and informational friction. We disentangle real and informational effects by examining the impact of foreign institutional investors' participation on the real costs of trading. These real friction effects are directly associated with the level of the trading activity, such as the stock's average turnover, number of trades and trade size. We then examine the impact of foreign institutional participation on market liquidity

through the informational frictions channel, while controlling for the real friction effects.

2.2 Informational frictions channel

Many studies show that institutional trading is driven by information (Ali et al. 2004; Ke and Petroni, 2004 and Bushee and Goodman, 2007). To the extent that large institutional ownership increases the degree of information asymmetry (Dennis and Weston, 2001; Agarwal, 2007; Rubin, 2007; Brockman and Yan, 2009), foreign institutions are less likely to have a positive impact on liquidity. This is due to the fact that foreign institutional investors are perceived to be better traders given that they are better informed (Grinblatt and Keloharju, 2004 and Seasholes, 2004); they monitor corporate management better than local institutions (Khanna and Palepu, 1999); and they produce more timely and accurate forecasts than local analysts (Bachmann and Bolliger, 2001). Another possible reason for a negative impact of foreign institutional investors' participation is that a shift in the majority ownership to foreign institutions may weaken the informal information channels that exist between local government and industries in emerging markets, thus resulting in the company appearing "foreign" to local investors and reducing liquidity (Rhee and Wang, 2009).

Liquidity is potentially negatively related to the concentration of institutional ownership (Rubin, 2007). Concentrated ownership is regarded as costly because blockholders may have private information about firm value.[3] Naturally, in response to a higher probability of informed trading, liquidity providers widen spreads (Glosten and Milgrom, 1985). In this study, where our sample largely reflects firms that are SOEs with highly concentrated ownership, it is of interest to investigate if foreign institutional investors influence market liquidity, and if the prediction of Rubin (2007) about the negative association between concentration of ownership and liquidity is supported by the Chinese data.

While a number of empirical studies find evidence of a negative impact of institutional trading on liquidity via information asymmetry, there are a number of theoretical works that point in the opposite direction. These works predict that as a result of the presence of more informed traders, there will be greater information efficiency which results in higher trading liquidity. Kyle (1985) develops a theoretical model to study the effect of informed traders and their information advantage on liquidity and price efficiency. Using an augmented version of Kyle's model, Mendelson and Tunca (2004) demonstrate that as prices reflect more information about the security's value, there is a reduction in the risk of trading the security which leads to greater liquidity trading. The process by which information is disseminated through increased trading is known as information efficiency. A number of papers

[3] A blockholder is a shareholder who owns a large amount of stock, and generally the shareholder is an institutional investor. There is no specific measurement of a "block" of shares, but typically if a shareholder has more than 10,000 shares or the shares are valued at more than $200,000 - they would be considered a blockholder.

show that information efficiency is improved by competition amongst informed investors (Subrahmanyam, 1991; Holden and Subrahmanyam, 1992, and Spiegel and Subrahmanyam, 1992). Subrahmanyam (1991) develops a model which predicts that as the number of informed traders increase, the stock price becomes less sensitive to the order flow. Spiegel and Subrahmanyam (1992) generalizes the model of Subrahmanyam (1991) by endogenizing liquidity trades based on hedging needs and demonstrate that the greater competition amongst traders/investors results in higher liquidity. Holden and Subrahmanyam (1992), Foster and Viswanathan (1996), and Back, Cao, and Willard (2000) further investigate the effect of multiple informed traders acting strategically on liquidity. These studies share the common finding of faster incorporation of information into prices caused by increased competition amongst investors, particularly when there are a large number of informed investors with perfectly correlated signals.

2.3 The role of state-owned enterprises

The relationship between state ownership and the impact of foreign institutional investors on market liquidity is never examined before. We predict that foreign institutional investors would exert a different impact on state-owned enterprises (SOEs) and non-SOEs. Specifically, we hypothesize that foreign institutional investors have a more pronounced impact on liquidity of non-SOEs than SOEs. This differential effect on liquidity across the two types of firms can be explained by the unique characteristics of SOEs. Given the dominant presence of SOEs in China, the impact of foreign institutional investors on market liquidity in China may differ from other emerging markets.

SOEs in China are characterized by frequent government interventions and foreign institutional investors from market-oriented economies sometimes struggle to understand some of the corporate practices of these firms. For example, involvements of the government include the appointment of CEOs of SOEs with former or current government bureaucrats (Fan, Wong and Zhang, 2007). In some cases counter-productive practices of the SOEs have resulted in lower operating performance even though there has been privatization of the SOEs in China (Sun and Tong, 2003), an outcome that contrasts the rest of the world (Dewenter and Malatesta, 2001; Boubakri, Cosset and Guedhami, 2005).

SOEs are also characterized by lower information transparency and higher information asymmetries. There is little incentives for SOEs to provide high quality accounting reports to outside shareholders because SOEs are not obliged to disclose information to the public. Furthermore they are closely connected with the central or local governments and receive preferential treatment by the government and state banks in the form of lower bank loan rates, generous financial support and ultimately government bailout in times of financial crises. According to Chaney, Faccio and Parsley (2011), politically connected firms with poor quality of information are not penalized by a higher cost of debt, thus market pressure fails to discipline politically connected firms by forcing them to increase the quality of financial disclosure. In an environment of poor disclosure policy, this would worsen the information asymmetry problem. Coupled with the problem of expropriation, minority shareholders may refuse to buy shares leading to poor market liquidity. The literature clearly suggests

that a good investor protection environment is closely associated with narrower spreads (Brockman and Chung, 2003).

3. Measurement of variables and model specification

3.1 Measurement of the dependent variable

(a) Measuring liquidity

Due to the latent nature of liquidity and its multiple dimensions, it is difficult for a single measure to capture all aspects of liquidity. We apply three measures of liquidity to ensure the robustness of our results. The measures include the relative quoted bid-ask spread, the relative effective bid-ask spread and the Amihud (2002) $ILLIQ$ measure. The spread is a measure of tightness in the market for a stock as it reflects the cost of an immediate round-trip trade. It is also a measure of the total friction, as it summarizes the costs of a market maker (inventory risk, adverse selection risk, and operating fees). The relative quoted bid-ask spread is defined as the difference between ask and bid, scaled by the midpoint of the prevailing quote. The weakness of the quoted spread is that often trades are executed within the spread. A possible remedy is to instead use the effective spread. The relative effective bid-ask spread is defined as twice the absolute value of the difference between a transaction price and the midpoint of the bid and ask quotes (scaled by the midpoint). We calculate both the daily quoted spread and effective spread for each firm using intra daily data (see Section 4 for a description of the data). The $ILLIQ$ measure proxies market depth by relating daily absolute returns to daily trading volumes measured in monetary units (excluding days with zero volume). Given that deep markets are able to absorb large trading volumes without large price changes, this ratio intuitively measures market depth. Daily measures are then averaged over days to obtain quarterly liquidity observations for each firm.

(b) Measuring trading activity

We compute three straightforward measures of trading activity: number of shares per transaction (share trading volume divided by the number of trades), average number of daily transactions and average daily turnover (trading volume divided by the number of shares outstanding). Daily measures are then averaged over days to obtain quarterly measures of trading activity for each firm.

(c) Decomposing the spread

We use two methods to estimate the adverse selection component of the bid-ask spread in order to isolate the informed trading component of the spread. The two methods are by Lin, Sanger and Booth (1995) and Huang and Stoll (1997), which we hereafter denote LSB and HS, respectively.

Huang and Stoll (1997) propose to estimate the following regression for each firm using ordinary least squares:

$$\Delta P_{i,t} = \beta_{1,i} Q_{i,t} + \beta_{2,i} Q_{i,t-1} + \beta_{3,i} Q_{A,t-1} + \varepsilon_{i,t}, \quad (1)$$

where $\Delta P_{i,t} = P_{i,t} - P_{i,t-1}$ is the change in transaction price of firm i between time $t-1$ and time t, and $Q_{i,t}$ is an indicator for trade type at time t that takes the value of $+1$ if the trade is a buyer-initiated transaction and -1 if the trade is a seller-initiated transaction.[4] The aggregate buy/sell indicator $Q_{A,t-1}$ equals $+1$ $(-1, 0)$ if the sum of $Q_{i,t-1}$ across all sample stocks is positive (negative, zero) and is therefore a proxy for the market-wide pressure on the market maker's inventory levels. Following Huang and Stoll (1997) the estimated adverse selection component equals $2(\beta_{1,i} + \beta_{2,i})$.

The Lin, Sanger and Booth (1995) adverse selection spread component is estimated by the following firm-specific regression using ordinary least squares:

$$\Delta M_{i,t+1} = \delta\left(P_{i,t} - M_{i,t}\right) + \varepsilon_{i,t+1}, \quad (2)$$

where $\Delta M_{i,t} = M_{i,t} - M_{i,t-1}$, and $M_{i,t}$ is the change in the spread midpoint between time $t-1$ and time t for firm i, and $P_{i,t}$ is the transaction price at time t. The estimate of the adverse selection component is the regression coefficient δ.

3.2 Measurement of independent variables

Many prior studies find that stock volatility, firm size, share price and turnover are associated with liquidity (Benston and Hagerman, 1974; Stoll and Whaley, 1983; Agarwal (2009), Brockman, Dennis and Yan, 2009). We therefore control for stock return volatility (VOL) which is estimated by the standard deviation of the daily stock returns, firm size which is measured by market capitalization ($MCAP$), share price (P) and turnover (TO).[5] Volatility increases the market makers inventory risk and the risk of engaging in short-term speculative trades (Chordia, Roll and Subrahmanyam, 2001). Stoll and Whaley (1983) suggest that it is more expensive to trade smaller stocks as there is less relevant information available about these firms. Following Agarwal (2009), turnover captures different effects, for example may high turnover be a result of dispersion in beliefs induced by information differences among investors. To reduce skewness we logarithmically transform

[4] Using high frequency data, we classify trades at prices above the prevailing quote midpoint as buyer-initiated trades ($Q_{i,t} = 1$) and trades at prices below the prevailing quote midpoint as seller-initiated trades ($Q_{i,t} = -1$). In addition, we employ a tick test (Lee and Ready, 1991) if the trade's price is equal to the prevailing quote midpoint. A tick test involves assigning $Q_{i,t} = 1$ ($Q_{i,t} = -1$) for trades that occur at a price greater (lower) than the price at $t-1$.

[5] In addition, we follow Heflin and Shaw (2000) and Brockman, Chung and Yan (2009) and instead of turnover use the number of trades or trade size. All results are unaffected.

$MCAP$ and TO, while we use the reciprocal of P.[6] We also include a group of financial control variables, degree of leverage (LEV), book to market (BM) and earnings per share (EPS). It is important to control for the degree of leverage as the security design literature has recognized that the capital structure of a firm can affect the degree of information disclosure (Diamond and Verrecchia, 1991) and thus the firms' capital structure can be associated with market liquidity through the informational channel. In addition, Agarwal (2009) argues that lower book to market ratio (growth firms) and higher earnings per share are associated with higher liquidity as these types of firms are more likely to attract both media and investors. Finally, Dahlquist and Robertsson (2000) find that foreign institutions' preference for stocks is governed by financial characteristics.

3.3 Specifications of panel regressions

We first specify the model to examine the effects of participation of foreign institutions on stock market liquidity. Three measures of liquidity are employed for the dependent variable in the panel regression: the relative quoted spread (QS), the relative effective spread (ES) and the Amihud (2002) price impact measure ($ILLIQ$). The panel regression is:

$$LIQ_{i,t} = \alpha_0 + \alpha_1 FI_{i,t-1} + \alpha_2 DI_{i,t-1} + \alpha_3 MCAP_{i,t-1} + \alpha_4 VOL_{i,t} + \alpha_5 / P_{i,t} + \alpha_6 TO_{i,t} + \alpha_7 BM_{i,t-1} + \alpha_8 EPS_{i,t-1} + \alpha_9 LEV_{i,t-1} + \sum_k \beta_k D_k + \varepsilon_{i,t}, \quad (3)$$

where LIQ denotes the various liquidity measures, FI (DI) the number of foreign (domestic) institutional investors participating in the stock and D is a time dummy. We normalize the number of foreign institutional investors being top 10 outstanding shareholders of a firm by their respective cross-sectional standard deviations in each quarter. This allows us to make meaningful comparisons across the coefficients. If the participation of foreign institutional investors promote liquidity by reducing real frictions (i.e. increasing trading activity) and/or informational frictions (i.e. improving the informational environment by enhancing competition amongst informed traders), the coefficient on the number of foreign institutions α_1 in regression (3) should have a negative sign. To circumvent the problem of endogeneity, it is common practice to use the lagged value of the number of foreign (FI) and domestic institutions (DI). For each dependent variable, we run two panel data regressions: one with firm characteristics control variables and one without. This is to ensure that our results are robust to firm characteristics. The quarterly time dummy capture the common shock and also take into account the time trend of the variables to circumvent any potential problem of spurious regressions. One of the hypotheses in this paper is to identify potential differences in the impact of foreign institutional investors' participation on market liquidity between state-owned and privately owned companies. The regression is therefore, in addition, estimated for separate samples categorized as SOEs and non-SOEs.

[6] In addition, we run the regression with (i) the natural logarithm of P and (ii) both the natural logarithm and the reciprocal of P. All results remain qualitatively unchanged.

We next examine whether the impact of the presence of foreign institutions on liquidity is due to real friction effects, informational friction effect, or both in a panel setting while controlling for firm characteristics. Our real friction measured by trading activity variables includes turnover (TO), the number of trades (TRA) and trade size (TS). The adverse selection component of the bid-ask spread which captures the informational friction effect is obtained using the methods of HS and LSB described in Section 3.1. The panel regression is:

$$X_{i,t} = \alpha_0 + \alpha_1 FI_{i,t-1} + \alpha_2 DI_{i,t-1} + \alpha_3 MCAP_{i,t-1} + \alpha_4 VOL_{i,t} + \alpha_5 / P_{i,t} + \alpha_6 BM_{i,t-1} + \alpha_7 EPS_{i,t-1} + \alpha_8 LEV_{i,t-1} + \sum_k \beta_k D_k + \varepsilon_{i,t}, \quad (4)$$

where $X_{i,t} = TO_{i,t}, TRA_{i,t}$ or $TS_{i,t}$ for the trading activity measures and $X_{i,t} = HS_{i,t}$ or $LSB_{i,t}$ for the adverse selection measures. All of the dependent variables are transformed by taking the natural logarithm. When adverse selection is the dependent variable, turnover is included as an additional control variable. Should foreign institutions give rise to higher trading activity, the coefficient α_1 in the corresponding regression should have a positive sign. Should foreign institutions' participation improve the informational environment, the coefficient α_1 in the regression should have a positive sign.

The panel regressions (3) and (4) are fitted to the quarterly unbalanced panel data with time period varying from 4 to 33 quarters. A specific feature of our data is that it has a large number of firms with relatively few time-series observations. Consequently, it is important to recognize the effects of cross-sectional correlation among firms and serial correlation across time, which can result in biased standard errors if not addressed properly. The standard approaches to adjust standard errors includes the use of (1) White's standard errors to correct for heteroskedastic residuals, (2) Rogers' standard errors or clustered standard errors to correct for residuals which are correlated within firms but are uncorrelated between firms, and (3) Newey-West's standard errors for serially correlated residuals. Unfortunately, these adjusted standard errors fail to allow for the contemporaneous correlation among firms, let alone non-contemporaneous cross dependence in the residuals. Furthermore, restricting the forms of cross sectional dependence does not give reliable standard errors if the true spatial correlation is not contemporaneous. In our estimation, we use the Driscoll-Kraay standard error (1998), whereby a nonparametric covariance matrix estimator is employed that is robust to different forms of spatial and temporal dependence.[7] More specifically, Driscoll-Kraay standard errors are robust to correlation across residuals both within a firm over time and across firms in the same year and between different years.[8]

[7] See Hoechle (2007) for the use of Driscoll-Kraay standard errors in unbalanced panel data. The Driscoll-Kraay standard errors are also applied to fixed-effect regressions. In addition, following Rhee and Wang (2009), we apply the Fama-MacBeth estimation. The results from both of these regressions are qualitatively unchanged. For brevity the results are not reported but are available from the authors upon request.

[8] We specify the maximum lag of 4 to be considered in the autocorrelation structure to control for the persistence in the measures of liquidity for a firm over time.

4. Data and sample description

4.1 Data

The trade and quote data are collected from Thomson Reuters. To ensure the integrity of the database, the analysis is confined to transactions coded as regular trades and quotes that are best bid or offer (BBO) eligible. We restrict the dataset to 5 seconds interval and the last trade from each 5 seconds interval is used in the sample. The last quote from the previous interval is used to match the last trade from the present interval and it goes further back if there is no quote in the previous interval.[9] The sample includes all stocks listed on the Shanghai (SHSE) and Shenzhen (SZSE) stock exchanges from the beginning of April 2004 to the end of March 2012**.** The two stock exchanges open with a call market and operate as a continuous market for the remainder of the trading day. To avoid contaminating the data with different trading structures, we do not use the trade and quote data before the exchanges open or after they close. The quote data are used to construct various liquidity measures while the trade data proxy for trading activity.

We exclude stocks listed less than 100 days. In addition, a firm's outstanding shares in China include A-shares, B-shares, H-shares and other negotiable overseas shares. It is important that we adjust the sample by taking into consideration firms which are listed only in the A-share market. The reasons for focusing on the A-share market are that (1) the scale of the A-share market is much bigger than the other markets and it dominates the Chinese stock market, (2) the trading data for the listed firms correspond to the A-share market, and (3) by focusing on a single A-share market, we can mitigate the problem of cross market effect of institutional holdings arising from market microstructure differences. These exclusions leave a sample of 2413 firms.

The CCER provides daily data on closing price, trading volume, share turnover, earning per share, number of total shares, number of tradable shares, number of A shares, and quarterly data on ownership structure, total liability, total asset, long-term debt, intangible assets, profit and industry classification. To remove the effect of outliers, we undertake winsorization of the data at the 99% level for leverage, earning per share, and book to market ratio.[10]

The top 10 firm-level outstanding shares held by foreign institutions and the three big domestic institutions (security, insurance and trust companies) are obtained from two websites.[11] The data are widely used and closely monitored by the press, investors, and the general public. Institutional investment strategies are of significant

[9] Trades and quotes from the Thomson Reuters are time-stamped to the second, but the sequence of quotes and transactions can be misaligned due to delays in the reporting of transactions. Lee and Ready (1991) suggest identifying a quote as prevailing at the time of the transaction if it was the latest quote for the stock and was at least five seconds old. Blume and Goldstein (1992) suggest a 16 second lag may be more appropriate, and we adopt their procedure to determine the time of quotes. In addition, all the results are qualitatively unchanged when we use both the last trade and last quote from the present interval, or the last quote from previous intervals when the last quote from the present interval is not available.

[10] Since the variables analyzed have uncontroversial minimum values, we do not winsorize at 1% level.

[11] The data with respect to foreign institutions are also available from CCER database. The URLs for the source of primary data are: http:// data.eastmoney.com/ and http://data.10jqka.com.cn/

interest to the public and so are data on total holding shares, purchases and sales by large institutions (i.e. the top 10 outstanding shareholders). These data are released quarterly to the public since every listed company has an obligation to report their top 10 outstanding shareholders to the China Securities Regulatory Commission (CSRC). Foreign institutions in China have two channels of obtaining A-shares, namely through the QFII and FSI.[12] The former channel has a shareholding ceiling of 20% (10%) for all (a single) QFIIs in any listed company in China's A-share market. The latter channel is less restrictive in terms of the shareholding ceiling compared to QFIIs. Our data on large foreign institutional investors' holdings mainly come from QFIIs as the data only has 80 observations with a single foreign holding exceeding 10% and 96 observations with total foreign holding exceeding 10%, of which there are only 4 observations with total foreign holding exceeding 20%. We keep these observations since there are no data to verify whether their holding is after or before lock-up expiration.[13]

4.2 Descriptive statistics

Table 1 presents the summary statistics of the variables used in this study. We see that, on average, 1.456 foreign institutions hold 2.766% of a firm's outstanding shares. Categorizing domestic institutions in subtypes, we find that, of the three types of companies (insurance, trust and securities companies), securities firms command the highest company ownership, with on average 1.197 securities firms holding 3.262% of a firm's outstanding shares. As for the liquidity measures, the values of these variables are of magnitudes comparable to previous studies.[14] Both the average relative effective spread and the average quoted spread are about 0.22%, indicating that most trades occur at the bid or ask. Referring to Amihud's price impact measure, the mean is 0.385.[15] The median adverse selection spreads based on the LSB measure is 0.288 yuan per share while the median adverse selection component of the spreads from HS is 0.003 yuan per share. These figures are also comparable to related studies.[16] As for trading activity, Table 1 shows that the average turnover rate per quarter is 1.881%, the average daily number of trades is 3074 while the average daily trade size is 3226 shares. Furthermore, the average market capitalization is about 3.604 billion yuan, the average of return volatility is 1.259% per day, and the average share price is 11.792 yuan. Finally, for the financial control variables, the average book-to-market ratio is 0.530, the mean earnings per share is 0.499 yuan, while, on average, the leverage ratio is 0.498. All three liquidity measures and the two adverse selection component estimates indicate large positive skewness and kurtosis. So do the three measures of trading activity, market capitalization and volatility. In view of

[12] As of January 30, 2006, foreign investors can invest in Chinese publicly listed companies under the new regulation called "Measures for Strategic Investment by Foreign Investors upon Listed Companies". A foreign strategic investor (FSI) is defined as a foreign entity that has an equity interest of at least 10 percent at initial investment with a holding period of more than three years in an existing Chinese publicly listed company (PLC) in the A-share market which has completed the non-tradable shares reform.

[13] As a robustness analysis we exclude these observations from the sample. The results are unchanged.

[14] See, for example, Lin, Sanger, Heflin and Shaw (2000), Booth (1995), and Rhee and Wang (2009).

[15] The figure displays the Amihud measure scaled up by 10^8.

[16] See, for example, Heflin and Shaw (2000), and Brockman, Chung and Yan (2009).

these extreme values, we apply the natural logarithm transformation on variables that display extreme skewness.

- Table 1 about here -

- Figure 1 about here -

To provide a visual impression of the dynamic relationship between liquidity and foreign institutional investors' participation over time, we plot the total number of foreign institutions which are among the top 10 outstanding shareholders of firms and the three measures of liquidity which are computed as daily averages over the quarters spanning the period 2004Q2 and 2012Q1.[17] Referring to the plot in Figure 1 on the number of foreign institutional investors, the total number of foreign institutions reaches the peak at 2007Q1 with 326 foreign institutional investors, but it decreases and reaches the lowest with 139 investors in 2008Q4. Referring to the three panels, our evidence suggests that a negative relationship exists between the participation of foreign institutional investors and market liquidity over time.

- Table 2 about here –

We perform preliminary univariate tests on the different liquidity measures, adverse selection components and trading activity measures for two samples of firms, one with foreign institutional investors (FI) and the other without foreign institutional investors (non-FI). The rationale is that if participation of foreign institutional investors were to promote information efficiency and reduce information friction, we should expect the different measures of liquidity to be statistically significantly higher for non-FI than FI firms. Referring to Table 2, we find that the average relative spread for firms with non-FI is 0.22%, which is larger than the spread for firms with FI (0.17% on average). The average quoted spread ($ILLIQ$ measure) is also higher for non-FI firms; about 0.22% (0.42) for non-FI firms compared to approximately 0.17% (0.09) for FI firms. The two adverse selection components exhibit the same pattern; the LSB (HS) measure is 40.86% (0.62%) for firms with non-FI compared to 39.80% (0.50%) for firms with FI. As for the measure of real friction which is proxied by trading activity, all three measures of trading activity indicate that the level of trading activity is lower for non-FI compared to FI firms. The p-values in column four of Table 2 indicate that the difference in the mean of all the variables between non-FI and FI firms is statistically significant at the 5% level.

[17] We aggregate all foreign institutions across the firms for each quarter.

5. Empirical results

5.1 Do foreign institutions' participation promote liquidity?

Table 3 presents the regression results from model (3) for effective spread in the first two columns (first column is without financial control variables, second column is with financial control variables included in the regression), for quoted spread in columns three and four, and for the Amihud $ILLIQ$ measure in the last two columns. The number of foreign institutions in is negatively related to the effective spread and the negative coefficient of -0.009, implies that a one-standard-deviation increase in foreign institutional investors (FI) results in 0.9 basis points reduction in relative spread. The coefficient on domestic institutions is also negative but it is much smaller in magnitude and is not statistically significant. As for the other control variables such as market capitalization, volatility and inverse of share price, they are mostly consistent with previous studies of liquidity determinants. Greater size, lower volatility and higher share price are negatively and significantly associated with a lower effective spread. The level of order processing and inventory costs is highly dependent on trading activity, while the bid-ask spread is expected to be inversely related to trading activity.[18] The coefficient on turnover (TO) which is -0.116 is economically and statistically significant.

- Table 3 about here -

The same pattern holds for the coefficient on the number of foreign institutions in the regressions with quoted spread and Amihud's price impact measure as the dependent variable. Both of the coefficient estimates on foreign institutions are consistently negative. More specifically, the estimate in the effective spread regression (-0.009) is approximately the same as that of the quoted spread regression (-0.008) while the coefficient estimate in Amihud's price impact is -0.015. For the DI coefficient, the effective spread and Amihud's illiquidity regressions yield a negative sign similar to the sign of the coefficient on FI while the quoted spread regression yields a positive sign. In addition, the coefficients on both of spread are not statistically significant though it is statistically significant for $ILLIQ$. Taken together, the existing findings on effect of participation of domestic institutions on liquidity are mixed and the effect of DI on liquidity is inconclusive.

Upon inclusion of the firm's financial characteristic variables in the panel regressions (see columns two, four and six), we notice that the relationship between foreign institutions participation and liquidity remains unchanged with respect to statistical significance. In terms of magnitude, the coefficient of FI has changed marginally for the effective and quoted spread regressions, while the change in magnitude of the coefficient is somewhat larger for the $ILLIQ$ regression. As for the coefficients on domestic institutions the results are again mixed and inconclusive. Both estimates for spreads are positive but it is only statistically significant for the effective spread regression. The coefficient of domestic institutions on Amihud's ILLIQ, in contrast, is negative and statistically significant. The sign of the coefficients

[18] See Benston and Hagerman (1974) and Stoll (2000).

for financial characteristic variables are again by and large consistent with our expectations. Higher book-to-market ratio, higher earnings per share and lower leverage ratio are related to lower spread and lower illiquidity. Despite the adjusted R^2 being only slightly higher in the regressions when financial characteristics are controlled for, most of the coefficients on financial characteristic variables are statistically significant in the regressions. In addition, the effects of FI and DI on liquidity also show up differently in the regressions that control for financial characteristics. The evidence point to the importance of including these variables in the regression to avoid potential model misspecification and omitted variable bias.

5.2 Do foreign institutions' participation promote liquidity through real effect channel or information channel?

Table 4 presents the regression results from model (4) for three measures of trading activity in the first three columns and for the two measures of the adverse selection components of spread in the last two columns.

Referring to the first three columns in Table 4, it is interesting that none of the coefficients for foreign institutions (FI) on trading activity is statistically significant at any conventional significance level. The sign of the coefficient for FI also displays mixed results. Although the results from the univariate test suggest evidence that the participation of foreign institutions is positively associated with trading activity, this evidence is only tentative as it fails to control for a firm's financial characteristics. Taken together, the results imply that the presence of foreign institutions is not significantly associated with trading activity. In other words, foreign institutional investors' participation does not appear to reduce real transaction costs and improve liquidity. As for the coefficient of domestic institutions (DI), it can be seen that it is consistently positive for the three measures of trading activity although it is only statistically significant in the regression with the number of trades (TRA) as the dependent variable. These results suggest that domestic institutions improve the level of trading activity via increasing the number of trades. In fact, a one standard deviation increase in the number of domestic institutional investors (DI) leads to around 3 basis points increase in the number of trades. The expected signs of the coefficients on control variables such as size, price and volatility are consistent with those from Brockman, Chung and Yan (2009). More specifically, small, high-priced, volatile firms are associated with high turnover while big, low-priced firms are associated with high number of trades and trade size.

- Table 4 about here –

Turning to the adverse selection component results in the last two columns, a one standard deviation increase in the participation of foreign institutions significantly decreases the adverse selection component by about 1.3% (1.5%) for the LSB (HS) regression. These results are consistent with our finding in the univariate tests reported in Table 2 and imply that foreign institutions' positive impact on liquidity operates through reducing information friction costs and not through real friction cost. Referring to the coefficient on domestic institutions, it is negative for both LSB and

HS measures although it is only statistically significant at 10% level for the HS regression. The results for control variables such as size, share price, volatility and turnover are largely consistent with the results in Table 3. As for variables of financial characteristics, in general, firms with high book to market value ratio are negatively associated with the adverse selection components of spread. Referring to earnings per share and leverage, the results are opposite from Table 3 and show that a firm with higher earnings per share and lower leverage ratio tends to result in greater adverse selections costs.

5.3 Are foreign institutional investors informationally disadvantaged when investing in SOEs?

To test our third hypothesis on the differential impact of foreign institutional investors on market liquidity across SOE and non-SOE firms, we turn to the results in Table 5. For reasons highlighted in Section 2.3 there is a greater propensity for SOE firms to exhibit higher degree of information asymmetry relative to non-SOE firms. Under this circumstance, one would expect foreign institutional investors are informationally disadvantaged in SOEs relative to non-SOE firms. An interesting result emerged from Table 5. When we differentiate the firms sample into SOE and non-SOE we observe that participation of foreign institutions continues to exert a positive effect on liquidity for both SOEs and non-SOEs. The finding shows that the participation of foreign institutional investors is not only significantly associated with liquidity for non-SOEs but also for SOEs. The results, to some degree, fail to support our hypothesis that foreign institutional investors are disadvantageous in accessing private information on SOEs.

- Table 5 about here –

- Figure 2 about here –

Another interesting finding is that the coefficient of foreign institutions on effective spread is -0.7% for SOEs but -0.84% for non-SOEs, the coefficient for quoted spread is -0.5% for SOEs but -0.93% for private firms while the coefficient for $ILLIQ$ is -0.94% for SOEs but -1.36% for private firms. This result is interesting given that a large portion of foreign holdings is in SOEs (72% see Figure 2) compared to non-SOEs or private companies (20% see Figure 2), yet we observe the liquidity enhancing effect is more apparent in non-SOEs. This could be attributed to the high degree of information asymmetry arising from poor transparency in financial reporting and corporate governance, coupled with ideological motivation, which could have hampered or limit the positive impact of foreign institutional participation on liquidity. However, this observed discrepancy in the effect on liquidity by foreign institutions is not statistically significant.

5.4 Do foreign institutional investors destabilize the Chinese stock market during the crisis period?

Like many developing countries, China has enjoyed a stock market boom, increasing fivefold between 2005 and 2007 (see Figure 3). However, the Chinese stock market is not immune to the global financial crisis (GFC) of 2007-2008. Figure 3 shows that from October 2007, the stock market in China crashed and more than two-third of the value was wiped out during the period between October 2007 and December 2008 as judged by the CSI 300 index. It can also be seen that the total holding value of large foreign institutions dropped from the beginning of 2008 until the end of 2008, before it increased to the pre-crisis level. Given the regime shift experienced by the Chinese stock market caused by the GFC, we perform a sub-period analysis using panel regression (4) to determine whether the effect of foreign institutions on liquidity has remained robust during the crisis period. We divide the sample into three sub-samples: sample 1 is for the period 2004Q2-2007Q4 (pre-crisis), sample 2 is for the period 2008Q1-2012Q1 (post-crisis)[19], and sample 3 is for the period 2007Q4-2008Q4 (during crisis). The results are reported in Table 6.

- Figure 3 about here -

- Table 6 about here -

The negative association between participation of foreign institutions and spreads (and illiquidity) is qualitatively unchanged before, after and during the crisis albeit statistically insignificant when Amihud's illiquidity is used as dependent variable during crisis. Besides, the coefficient of FI in all regressions is statistically significant at conventional levels of significance. However, referring to DI, we find that the signs of coefficient for DI during period of crisis are all positive and are statistically significant for the quoted spread. In addition, the plots from figure 1 indicate that the number of foreign institutions decreases dramatically during the crisis period from 2007Q1 to 2008Q4. Therefore, the negative association between presence of foreign institutions and liquidity during crisis period implies that liquidity is adversely affected due to reduced participation of foreign institutional investors. However, liquidity is improved during periods when participation increases.

6. Robustness checks

6.1 Shenzhen versus Shanghai Stock Exchange

We investigate whether the liquidity promoting effect of foreign institutional participation is prevalent in both the Shanghai (SHSE) and Shenzhen Stock Exchange (SZSE). Panel regression analysis of model (3) is performed by splitting the total sample into samples of the two stock exchanges. Table 7 shows that the coefficient

[19] For the second sample, the data for the number of pension funds that are in the top 10 shareholder of a firm are available. For this reason, they are included in our second period panel regression.

on foreign institution is always negative independent of the stock exchange. By and large, the coefficient of FI is also statistically significant except for the case of SZSE in the quoted spread regression. The result of the $ILLIQ$ regression indicates that foreign institutions tend to exert a smaller impact on the Amihud's illiquidity measure relative to their domestic counterparts. One possible reason for this observed differential effect is that there could be distinct inherent factors such as transaction costs in the two markets that could govern the manner by which foreign institutions affect liquidity in the two markets.[20]

- Table 7 about here -

6.2 Foreign Ownership

Throughout the analysis we have relied on the number of foreign institutions that are in the top 10 outstanding shareholders of a firm. We have not used foreign ownership data because the data are censored such that data for foreign institutional investor not in the top 10 outstanding shareholders of a firm are not reported. To verify that our results are indeed robust to foreign ownership data we re-estimate the model (3) using ownership data. The coefficient on FI is of the order that is similar to the results based on the number of foreign institutions and it carries a statistically significant negative sign. To conserve space, the results are not reported here but they are available from the authors upon request.

6.3 Types of domestic institutions

We examine if the nature of business of the domestic institution has a varying effect on liquidity. This is done by classifying the domestic institutions into trust, insurance and securities companies. The coefficient on foreign institutions continues to have a statistically significant negative value, concurring with previously reported results. However, for the three domestic institutions the coefficient has different sign. Insurance companies, like foreign institutions, promote liquidity. For the trust and securities companies, the coefficient is positive for the regressions with effective and quoted spreads, but it is negative for the Amihud's illiquidity regression. Again, to conserve space, the results are not reported here but they are available from the authors upon request.

6.4 Endogeneity of foreign institutions

We test whether our results are subject to the problem of endogeneity arising from foreign and domestic institutions. Specifically, both foreign and domestic institutional investors' decision to become the top 10 outstanding shareholders of a firm could be influenced by the stock's liquidity. To determine whether there is an endogeneity problem in the model specifications (3) and (4), we perform a two-stage

[20] SHSE attracts more big or state-owned firms while SZSE attract more firms with small or median size.

regression based on the approach described by Wu (1973) and Hausman (1978). In the first stage, the dependent variable of foreign institutions or domestic institutions is regressed on liquidity, firm size, volatility, book-to-market, earning per share, leverage, industry classifications and time dummies.[21] The resulting residuals from these two regressions are saved and incorporated as regressors in the second stage for which models (3) and (4) are regressed. The test for endogeneity amounts to testing the significance of the coefficients associated with the two residuals in the second stage regression. The absence of statistical significance in the coefficients of the residuals suggests there is no problem of endogeneity associated with foreign and domestic institutions variables. Results from the first stage regression show that financial characteristics can explain foreign investors' preference for stocks, which are consistent with the results reported in Tables 3 and 4. The results of the second-stage regression suggest no evidence of endogeneity problem in regressions (3) and (4). Results of the endogeneity tests are not reported here to conserve space but they are available from the authors upon request.

7. Summary and concluding remarks

This study investigates the role of the QFII system for promoting liquidity on the Chinese stock market. Our results reveal that with greater participation of foreign institutions stock market liquidity improves on both the Shanghai and Shenzhen exchanges. Specifically, our evidence show that the improvement in liquidity is through the informational frictions channel and not through the real frictions channel, indicating that foreign participation decreases information asymmetries on the market. Furthermore, our results are consistent across different measures of liquidity; relative quoted spread, relative effective spread and the Amihud price impact measure. We find that the positive effect of foreign institution's participation on liquidity is slightly smaller for SOEs compared to non-SOEs. Interestingly, the difference is however not statistically significant, suggesting perhaps surprisingly that foreign institutional investors are not informationally disadvantaged investing in state-owned enterprises. From a policy perspective, our results are indicative of a higher market quality in terms of lower costs of trading costs in general, and in particular of decreased informational asymmetries, since the inception of the QFII system.

[21] Following Shastri (1999), and Heflin and Shaw (2000), we normalize the number of foreign institutions and domestic institutions.

Table 1. Summary Statistics for Foreign Institutions, Trading Activity, Liquidity and Control Variables.

The data for the top 10 foreign outstanding institutional shareholder are from CCER while the data for the domestic outstanding institutional shareholders are obtained from http://data.eastmoney.com/ and http://data.10jqka.com.cn/. Intraday data from Thomson Reuters are used to compute three liquidity measures, namely the relative effective spread (ES), relative quoted spread (QS), and the Amihud's (2002) price impact measure (ILL). In addition, we also use the intraday data to compute two adverse selection components based on Lin, Sanger and Booth (LSB) (1995) and Huang and Stoll (HS) (1997), as well as three trading activity measures, namely the turnover rate, number of trade and trade size. Market capitalization, share price, stock return and the other financial characteristics data are from CCER database. The Amihud's (2002) price impact measure (ILLIQ) is also calculated using daily data from CCER database. Volatility is calculated as standard deviation of daily stock returns. The book to market ratio is measured as the book value of a firm divided by the market value of a firm, leverage ratio is measured as long-term debt divided by market value of total assets, while earning per share is measured as a firm's profit divided by outstanding shares. The data period is from the start of April 2004 to the end of March 2012.

Variable	Obs.	Mean	Standard Deviation	Max	75th Percentile	Median	25th Percentile	Skewness	Kurtosis
Number of foreign institutions(FI)	4108	1.456	0.947	8.000	2.000	1.000	1.000	2.669	11.028
Foreign ownership(%)	4108	2.766%	3.837%	83.374%	3.285%	1.662%	0.808%	7.260	114.433
Number of insurance companies(INS)	6387	1.328	0.590	5.000	2.000	1.000	1.000	1.864	6.664
Insurance ownership(%)	6387	2.505%	2.595%	24.409%	3.233%	1.706%	0.901%	3.159	18.699
Number of trust companies(TRU)	5714	1.267	0.634	9.000	1.000	1.000	1.000	3.298	18.353
Trust ownership(%)	5714	2.366%	3.985%	122.787%	2.473%	1.123%	0.564%	8.177	167.637
Number of securities companies(SC)	6923	1.197	0.563	10.000	1.000	1.000	1.000	5.389	55.150
Securiteis ownership(%)	6922	3.262%	7.234%	93.333%	3.254%	1.613%	0.812%	8.645	92.987
Relative effective spread(%)(ES)	42278	0.216%	0.140%	2.875%	0.273%	0.179%	0.123%	2.888	24.275

Relative quoted spread(%)(QS)	42309	0.217%	0.125%	3.037%	0.273%	0.183%	0.132%	2.506	22.274
Amihud's illiquidity(ILLIQ)	42931	0.385	0.094	1573.001	0.233	0.081	0.035	130.207	19633.0
LSB	40120	0.319	0.183	0.999	0.412	0.288	0.190	0.956	3.916
HS(x100)	38537	0.534	0.754	40.395	0.637	0.320	0.159	9.405	279.775
Turnover rate(per quarter)	44700	1.881	15.257	1506	2.152	1.235	0.672	70.637	5586.311
Number of trades (’000 per day)	42325	3.074	5.860	209.716	3.046	1.258	0.579	8.014	127.009
Average trade size (’000 per day)	42325	3.226	3.037	115.808	4.046	2.269	1.478	6.722	136.851
Market capitalization(billion)	44700	3.604	9.213	269.800	3.294	1.476	0.649	10.620	163.070
Volatility	44683	1.259	1.779	56.102	1.436	0.795	0.417	7.010	95.513
Share price	44700	11.792	10.721	196.960	14.300	8.540	5.400	3.675	29.652
Book-to-market ratio	42606	0.530	0.254	1.130	0.726	0.519	0.322	0.154	2.142
Earnings per share	38459	0.499	0.670	4.514	0.621	0.249	0.087	2.584	10.918
Leverage ratio	44474	0.498	0.245	2.219	0.642	0.501	0.336	1.098	8.118
Number of foreign institutions(FI)	4108	1.456	0.947	8.000	2.000	1.000	1.000	2.669	11.028
Foreign ownership(%)	4108	2.766%	3.837%	83.374%	3.285%	1.662%	0.808%	7.260	114.433

Table 2. Univariate Analysis of Foreign institutions and Market liquidity.

This table presents the relationship between the number of foreign institutions, liquidity, the adverse selection component of spread and trading activity for firms listed in the Shanghai and Shenzhen Stock Exchanges during the sample period 2004Q2-2012Q1. FI denotes the number of foreign institutional investors which are the top 10 outstanding shareholder of a firm at each quarter. Data for FI and quarterly turnover are from CCER database. The Amihud's (2002) price impact is computed based on daily data from CCER database. The two spread and adverse selection component measures, and the other two trading activity measures are computed using intraday data provided by Thomson Reuters. The two spread measures are the relative effective spread (ES), the relative quoted spread (QS). The two adverse selection components are derived based on the method of Lin, Sanger and Booth (1995) (LSB) and Huang and Stoll (1997) (HS). The other two measures of trading activity are the number of trade and trade size.

Variable	Mean for non-FI firms N=2076	Mean for FI firms N=921	p-value for two-tailed t-test of difference in columns (2) and (3)
Relative effective spread(%)(ES)	0.221%	0.000	0.170%
Relative quoted spread(%)(QS)	0.223%	0.000	0.168%
Amihud's illiquidity (ILLIQ)	0.416	0.038	0.093
LSB(%)	40.859%	0.016	39.797%
HS(%)	0.621%	0.000	0.499%
Turnover rate(per quarter)	1.542	0.014	1.589
Number of trades ('000 per day)	2940.091	0.000	4330.395
Trade size ('000 per day)	3194.746	0.000	3518.672

Table 3. Foreign Institutional Investors, Liquidity Measures.

Table 3 presents the regression results of information friction using three measures of liquidity on lagged total number of foreign institutions which are the top 10 outstanding shareholder for a firm listed on SHSE and SZSE. The three measures of liquidity are the effective spread (ES), the quoted spread (QS) and the Amihud's (2002) price of impact measure or illiquidity measure (ILL). FI (DI) denotes lagged value of the number of foreign (domestic) institutions. Firm's characteristics are controlled for by book-to-market ratio (BTM), earnings per share (EPS), debt leverage (LEV), the log of the turnover rate of shares traded (TO), firms size measured by the log of market capitalization (MCAP), the volatility of stock returns (LogV), and the inverse of share price (PINV). The period of study is from 2004Q2 to 2012Q1. Pooled regression is run using year fixed effect due to the unbalanced panel. We normalize number of foreign and domestic institutions variables each quarter by their respective cross-sectional standard deviations. Driscoll-Kraay standard errors are reported in parenthesis and they are robust to correlation across residuals within a firm over time and across firms in the same year and different year. ***, ** and * denote that the result is significant at 1%, 5% and 10%, respectively. The significance is reported based on two tailed tests.

	Dependent Variables					
Independent Variables	(1) Log (ES)	(2) Log (ES)	(3) Log (QS)	(4) Log(QS)	(5) Log(ILL)	(6) Log(ILL)
FI	-0.009***	-0.008***	-0.008***	-0.007***	-0.015***	-0.011***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.004)	(0.003)
DI	-0.003	-0.000	0.002	0.005***	-0.035***	-0.028***
	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
MCAP	-0.186***	-0.183***	-0.213***	-0.210***	-0.921***	-0.923***
	(0.016)	(0.017)	(0.012)	(0.013)	(0.022)	(0.019)
VOL	0.050*	0.030	0.012	-0.011	0.181***	0.130***
	(0.029)	(0.030)	(0.028)	(0.030)	(0.030)	(0.030)
PINV	1.981***	1.932***	1.878***	1.826***	0.748***	0.586***
	(0.324)	(0.334)	(0.241)	(0.233)	(0.160)	(0.153)
TO	-0.116***	-0.110***	-0.150***	-0.149***	-0.467***	-0.459***
	(0.013)	(0.013)	(0.012)	(0.012)	(0.029)	(0.032)
BTM		-0.013		-0.051		-0.311***
		(0.037)		(0.040)		(0.057)
EPS		-0.027*		-0.0255**		-0.066***
		(0.014)		(0.010)		(0.019)
LEV		0.044*		0.033**		0.015
		(0.023)		(0.016)		(0.022)
Constant		-2.372***	-1.608***	-1.735***		-0.068
		(0.389)	(0.268)	(0.303)		(0.475)
Observations	40,358	34,725	40,442	34,775	41,006	35,183
Adjusted R^2	0.71	0.72	0.76	0.77	0.89	0.91
# of groups	2,033	2,017	2,033	2,017	2,080	2,049
Time dummy	YES	YES	YES	YES	YES	YES

Table 4. Foreign Institutional Investors, trading activity and the adverse selection components of spread.

Table 4 presents the regression results of real friction using three measures of trading activity on lagged total number of foreign institutions which are the top 10 outstanding shareholder for a firm listed on SHSE and SZSE. The three measures of trading activity are the shares turnover (TO), the number of trades (TRA) and trade size (TS). The two measures of the adverse selection components of spread are based on Lin, Sanger and Booth (1995) (LSB) and Huang and Stoll (1997) (HS). FI (DI) denotes lagged value of the number of foreign (domestic) institutions. Firm's characteristics are controlled for by book-to-market ratio (BTM), earnings per share (EPS), debt leverage (LEV), firms size measured by the log of market capitalization (MCAP), the volatility of stock returns (VOL), and the inverse of share price (P). The period of study is from 2004Q2 to 2012Q1. Pooled regression is run using year fixed effect due to the unbalanced panel. We normalize number of foreign and domestic institutions variables each quarter by their respective cross-sectional standard deviations. Driscoll-Kraay standard errors are reported in parenthesis and they are robust to correlation across residuals within a firm over time and across firms in the same year and different year. ***, ** and * denote that the result is significant at 1%, 5% and 10%, respectively. The significance is reported based on two tailed tests.

	Dependent Variable				
Independent Variables	(1) Log(TO)	(2) Log(TRA)	(3) Log(TS)	(4) Log(LSB)	(5) Log(HS)
FI	-0.006	0.002	0.004	-0.013**	-0.015**
	(0.009)	(0.005)	(0.003)	(0.006)	(0.006)
DI	0.010	0.0304***	0.005	-0.003	-0.014*
	(0.008)	(0.007)	(0.008)	(0.006)	(0.007)
MCAP	-0.323***	0.562***	0.146***	-0.008	-0.065***
	(0.038)	(0.018)	(0.034)	(0.026)	(0.021)
VOL	0.996***	0.726***	0.174***	0.289***	0.387***
	(0.099)	(0.075)	(0.024)	(0.053)	(0.056)
PINV	-1.213***	1.447***	2.812***	1.523***	-6.061***
	(0.324)	(0.413)	(0.247)	(0.323)	(0.825)
TO				0.029**	-0.029
				(0.014)	(0.020)
BTM	0.319***	0.485***	0.229***	-0.066	-0.543***
	(0.099)	(0.092)	(0.019)	(0.067)	(0.059)
EPS	0.036	-0.114***	-0.071***	0.073***	0.242***
	(0.030)	(0.035)	(0.019)	(0.020)	(0.023)
LEV	-0.044	0.273***	0.005	-0.074	-0.165**
	0.068	(0.060)	(0.020)	(0.053)	(0.066)
Constant	11.36***				-1.627***
	(0.926)				(0.496)
R^2	0.53	0.68	0.31	0.14	0.38
# of groups	2,049	2,017	2,017	2,006	2,014
Time dummy	YES	YES	YES	YES	YES

Table 5. Effects of Foreign and Domestic Institutions on Liquidity in SOEs and non-SOEs.

Table 5 presents the panel regression results of effective spread, quoted spread and Amihud's illiquidity measure on lagged total number of foreign institutions which are the top 10 outstanding shareholder for a firm listed on SHSE and SZSE. For each measure of liquidity, we run two regressions based on whether the sample of firms is SOE or non-SOE. FI (DI) denotes lagged value of the number of foreign (domestic) institutions. Firm's characteristics are controlled for by book-to-market ratio (BTM), earnings per share (EPS), debt leverage (LEV), the log of the turnover rate of shares traded (TO), firms size measured by the log of market capitalization (MCAP), the volatility of stock returns (VOL), and the inverse of share price (PINV). The period of study is from 2004Q2 to 2012Q1. Pooled regression is run using year fixed effect due to the unbalanced panel. We normalize number of foreign and domestic institutions variables each quarter by their respective cross-sectional standard deviations. Driscoll-Kraay standard errors are reported in parenthesis and they are robust to correlation across residuals within a firm over time and across firms in the same year and different year. ***, ** and * denote that the result is significant at 1%, 5% and 10%, respectively. The significance is reported based on two tailed tests.

	Dependent Variables					
	Log(ES)		Log(QS)		Log(ILL)	
Independent Variables	(1) SOE	(2) Non-SOE	(3) SOE	(4) Non-SOE	(5) SOE	(6) Non-SOE
FI	-0.0070***	-0.0084**	-0.0050***	-0.0093***	-0.0094***	-0.0136***
	(0.002)	(0.003)	(0.001)	(0.003)	(0.003)	(0.005)
DI	0.002	-0.004	0.007***	0.002	-0.025***	-0.031***
	(0.002)	(0.005)	(0.001)	(0.003)	(0.004)	(0.004)
MCAP	-0.173***	-0.191***	-0.200***	-0.218***	-0.938***	-0.899***
	(0.018)	(0.017)	(0.015)	(0.013)	(0.018)	(0.019)
VOL	0.019	0.048	-0.013	-0.006	0.147***	0.114***
	(0.035)	(0.031)	(0.033)	(0.035)	(0.039)	(0.039)
PINV	2.019***	1.793***	1.980***	1.609***	0.749***	0.280**
	(0.349)	(0.335)	(0.246)	(0.245)	(0.191)	(0.116)
TO	-0.101***	-0.121***	-0.143***	-0.156***	-0.487***	-0.428***
	(0.014)	(0.013)	(0.012)	(0.013)	(0.039)	(0.027)
BTM	0.030	-0.098**	-0.030	-0.111**	-0.314***	-0.313***
	(0.037)	(0.047)	(0.038)	(0.045)	(0.065)	(0.053)
EPS	-0.042***	-0.016	-0.037***	-0.021**	-0.062**	-0.071***
	(0.012)	(0.015)	(0.013)	(0.010)	(0.023)	(0.017)
LEV	0.095***	-0.001	0.091***	-0.016	0.028	-0.004
	(0.020)	(0.021)	(0.017)	(0.018)	(0.018)	(0.026)
Constant		-2.035***			0.383	
		(0.395)			(0.513)	
Observations	19,902	14,823	19,933	14,842	20,286	14,897
R^2	0.74	0.69	0.79	0.72	0.92	0.89
# of groups	1,041	1,292	1,041	1,292	1,069	1,297
Time dummy	YES	YES	YES	YES	YES	YES

Table 6 Effects of Foreign Institutions on Liquidity in Pre- and Post-Crisis Periods.

Table 6 presents the regression results of information friction using three measures of liquidity on lagged total number of foreign institutions which are the top 10 outstanding shareholder for a firm listed on SHSE and SZSE. The three measures of liquidity are the effective spread (ES), the quoted spread (QS) and the Amihud's (2002) price of impact measure or illiquidity measure (ILL). The two measures of the adverse selection components of spread are based on Lin, Sanger and Booth (1995) (LSB) and Huang and Stoll (1997) (HS). FI (DI) denotes lagged value of the number of foreign (domestic) institutions. Firm's characteristics are controlled for by book-to-market ratio (BTM), earnings per share (EPS), debt leverage (LEV), the log of the turnover rate of shares traded (TO), firms size measured by the log of market capitalization (MCAP), the volatility of stock returns (VOL), and the inverse of share price (PINV). The pre-crisis (post-crisis) period is 2004-2007 (2008-2012). Pooled regression is run using year fixed effect due to the unbalanced panel. We normalize number of foreign and domestic institutions variables each quarter by their respective cross-sectional standard deviations. Driscoll-Kraay standard errors are reported in parenthesis and they are robust to correlation across residuals within a firm over time and across firms in the same year and different year. ***, ** and * denote that the result is significant at 1%, 5% and 10%, respectively. The significance is reported based on two tailed tests.

	Dependent Variables								
	Log(ES)			Log(QS)			Log(ILL)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Independent Variables	2004-2007	2008-2012	2007.4-2008.4	2004-2007	2008-2012	2007.4-2008.4	2004-2007	2008-2012	2007.4-2008.4
FI	-0.009**	-0.007***	-0.010***	-0.006*	-0.007***	-0.009***	-0.019***	-0.004**	-0.001
	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.004)	(0.002)	(0.002)
DI	-0.000	-0.001	0.004	-0.003	-0.005***	0.007**	-0.026***	-0.024***	0.012
	(0.003)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.001)	(0.005)	-0.007
MCAP	-0.177***	-0.183***	-0.267***	-0.205***	-0.211***	-0.293***	-0.977***	-0.887***	-0.934***
	(0.033)	(0.019)	(0.021)	(0.030)	(0.013)	(0.017)	(0.020)	(0.013)	(0.006)
VOL	0.098**	-0.019	0.047	0.045	-0.050	-0.0341	0.154***	0.107**	0.0977
	(0.033)	(0.042)	(0.098)	(0.035)	(0.042)	(0.076)	(0.045)	-0.046	(0.126)
PINV	1.704***	2.206***	0.176	1.606***	2.153***	0.507	0.519	0.476***	0.560***
	(0.342)	(0.658)	(0.309)	(0.199)	(0.496)	(0.406)	(0.314)	(0.117)	(0.083)
TO	-0.121***	-0.104***	-0.163***	-0.163***	-0.141***	-0.206***	-0.516***	-0.429***	-0.481***
	(0.026)	(0.014)	(0.011)	(0.021)	(0.013)	(0.021)	(0.081)	(0.028)	(0.010)
BTM	-0.048	-0.010	-0.264**	-0.141***	-0.019	-0.352***	-0.338***	-0.302***	-0.633***
	(0.057)	(0.037)	(0.092)	(0.030)	(0.040)	(0.068)	(0.091)	(0.065)	(0.093)
EPS	-0.044***	-0.021	-0.0271*	-0.023**	-0.026**	0.00117	-0.133***	-0.048**	0.017
	(0.014)	(0.016)	(0.010)	(0.008)	(0.012)	(0.008)	(0.040)	(0.018)	(0.020)
LEV	0.071***	0.028	0.0727***	0.042***	0.020	0.0306	0.022	(0.000)	0.005
	(0.013)	(0.039)	(0.012)	(0.008)	(0.031)	(0.018)	(0.016)	(0.027)	(0.024)
Observations	13,032	21,693	5,282	13,047	21,728	5,299	13,315	21,868	5,375
R^2	0.639	0.662	0.709	0.733	0.678	0.681	0.901	0.878	0.86
# of groups	1,281	1,987	1,289	1,281	1,987	1,291	1,312	2,006	1,311
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 7 Effects of Foreign Institutions on Liquidity in Shanghai and Shenzhen Stock Exchanges.

Table 7 presents the regression results of information friction using three measures of liquidity on lagged total number of foreign institutions which are the top 10 outstanding shareholder for a firm listed on SHSE and SZSE. The three measures of liquidity are the effective spread (ES), the quoted spread (QS) and the Amihud's (2002) price of impact measure or illiquidity measure (ILL). The two measures of the adverse selection components of spread are based on Lin, Sanger and Booth (1995) (LSB) and Huang and Stoll (1997) (HS). FI (DI) denotes lagged value of the number of foreign (domestic) institutions. Firm's characteristics are controlled for by book-to-market ratio (BTM), earnings per share (EPS), debt leverage (LEV), the log of the turnover rate of shares traded (TO), firms size measured by the log of market capitalization (MCAP), the volatility of stock returns (VOL), and the inverse of share price (PINV). SHSE and SZSE denote the Shanghai and Shenzhen stock exchange, respectively. Pooled regression is run using year fixed effect due to the unbalanced panel. We normalize number of foreign and domestic institutions variables each quarter by their respective cross-sectional standard deviations. Driscoll-Kraay standard errors are reported in parenthesis and they are robust to correlation across residuals within a firm over time and across firms in the same year and different year. ***, ** and * denote that the result is significant at 1%, 5% and 10%, respectively. The significance is reported based on two tailed tests.

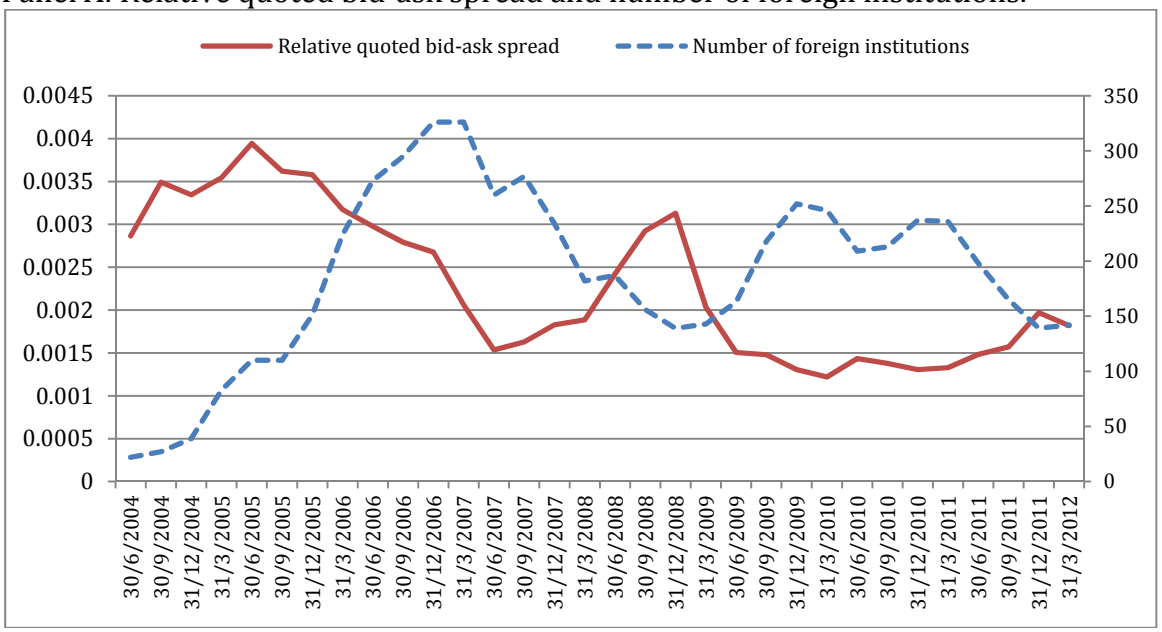
	Dependent Variables					
	Log(ES)		Log(QS)		Log(ILL)	
Independent Variables	SHSE (1)	SZSE (2)	SHSE (1)	SZSE (2)	SHSE (1)	SZSE (2)
FI	-0.008***	-0.006*	-0.008***	-0.004	-0.009**	-0.013***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)
DI	-0.002	0.002	0.003	0.005	-0.026***	-0.030***
	(0.003)	(0.005)	(0.002)	(0.003)	(0.004)	(0.005)
MCAP	-0.171***	-0.196***	-0.195***	-0.234***	-0.931***	-0.915***
	(0.018)	(0.018)	(0.014)	(0.016)	(0.020)	(0.017)
VOL	0.018	0.049	-0.014	-0.002	0.156***	0.112***
	(0.031)	(0.033)	(0.032)	(0.034)	(0.033)	(0.040)
PINV	1.969***	1.901***	1.881***	1.774***	0.487***	0.699***
	(0.369)	(0.324)	(0.258)	(0.231)	(0.156)	(0.197)
TO	-0.104***	-0.119***	-0.143***	-0.157***	-0.493***	-0.427***
	(0.014)	(0.012)	(0.013)	(0.013)	(0.040)	(0.029)
BTM	0.006	-0.054	-0.071	-0.060	-0.259***	-0.369***
	(0.043)	(0.038)	(0.044)	(0.038)	(0.073)	(0.049)
EPS	-0.042***	-0.018	-0.0363**	-0.019	-0.0790***	-0.057***
	(0.010)	(0.016)	(0.012)	(0.011)	(0.029)	(0.013)
LEV	0.077***	0.017	0.069***	-0.012	0.025	0.002
	(0.019)	(0.029)	(0.021)	(0.025)	(0.018)	(0.031)
Constant	-2.713***		-2.068***			-0.354
	(0.422)		(0.327)			(0.402)
Observations	18,442	16,283	18,452	16,323	18,763	16,420

R^2	0.729	0.702	0.772	0.75	0.92	0.887
# of groups	800	1,217	800	1,217	820	1,229
Time dummy	YES	YES	YES	YES	YES	YES

Figure 1. Measures of liquidity and the number of foreign institutions over time.

The two spread measures – the relative effective and quoted spread – are computed using intraday data provided by Thomson Reuters. The Amihud (2002) price impact is computed based on daily data from CCER database. We average all three liquidity measures across firms and sum the number of foreign institutions for all firms in each quarter.

Panel A: Relative quoted bid-ask spread and number of foreign institutions.



Panel B: Relative effective bid-ask spread and number of foreign institutions.

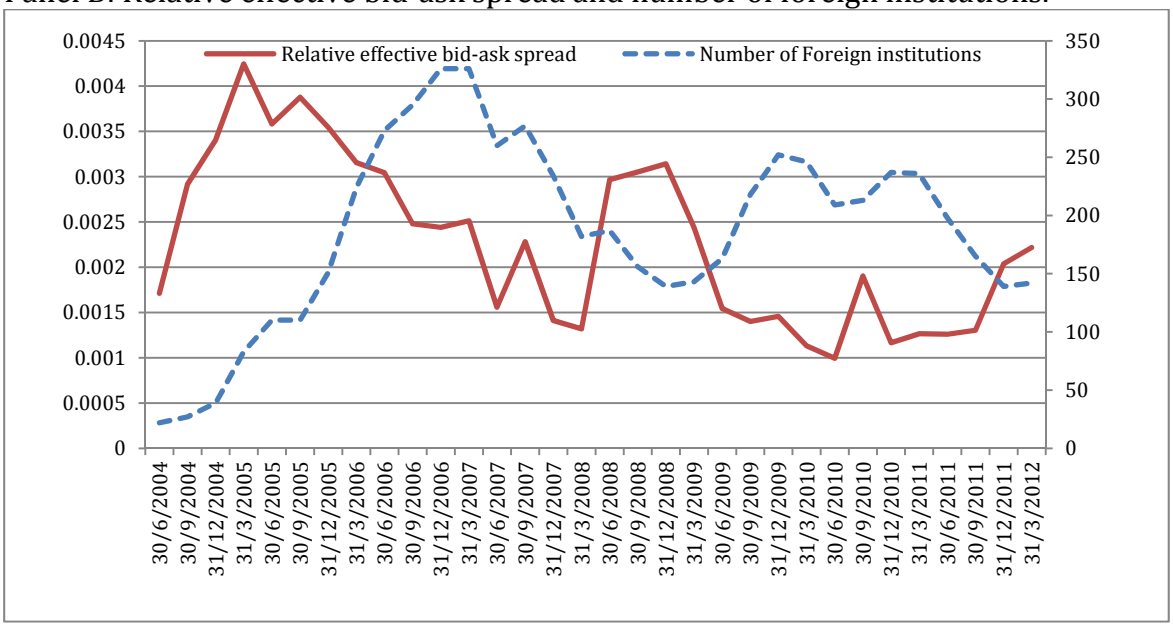


Figure 1. (Continued)

Panel C: Amihud price impact measure and number of foreign institutions.

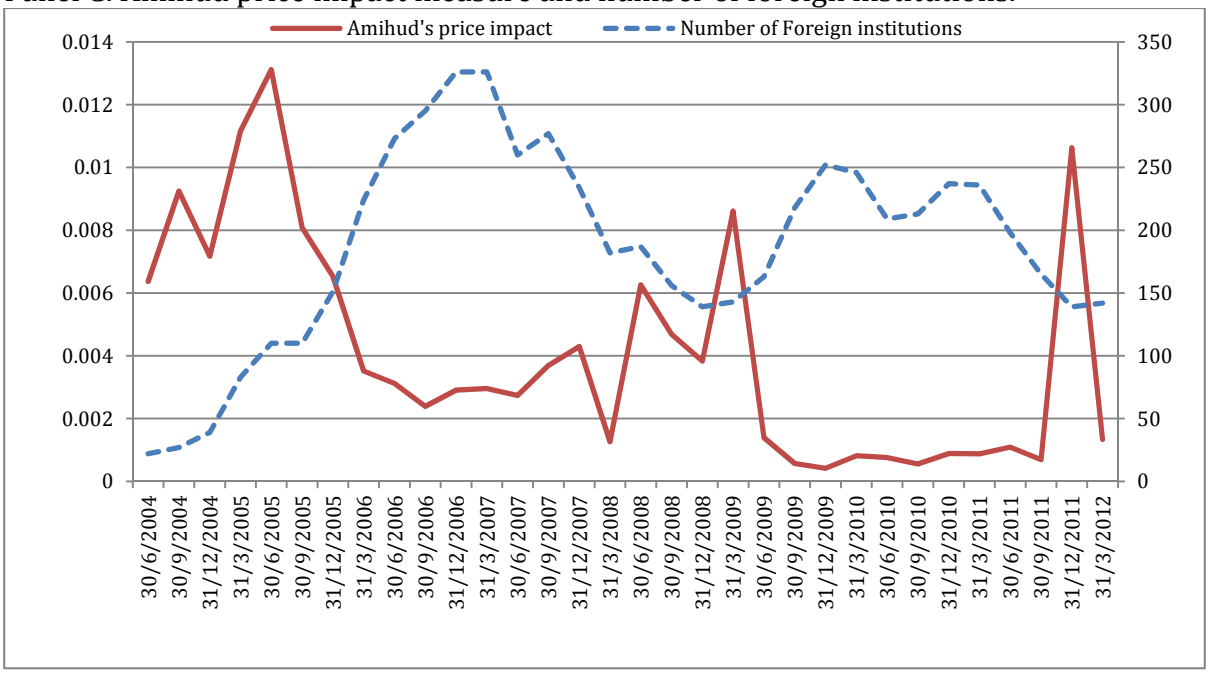


Figure 2. Holding profile of foreign institutions in Chinese stocks.

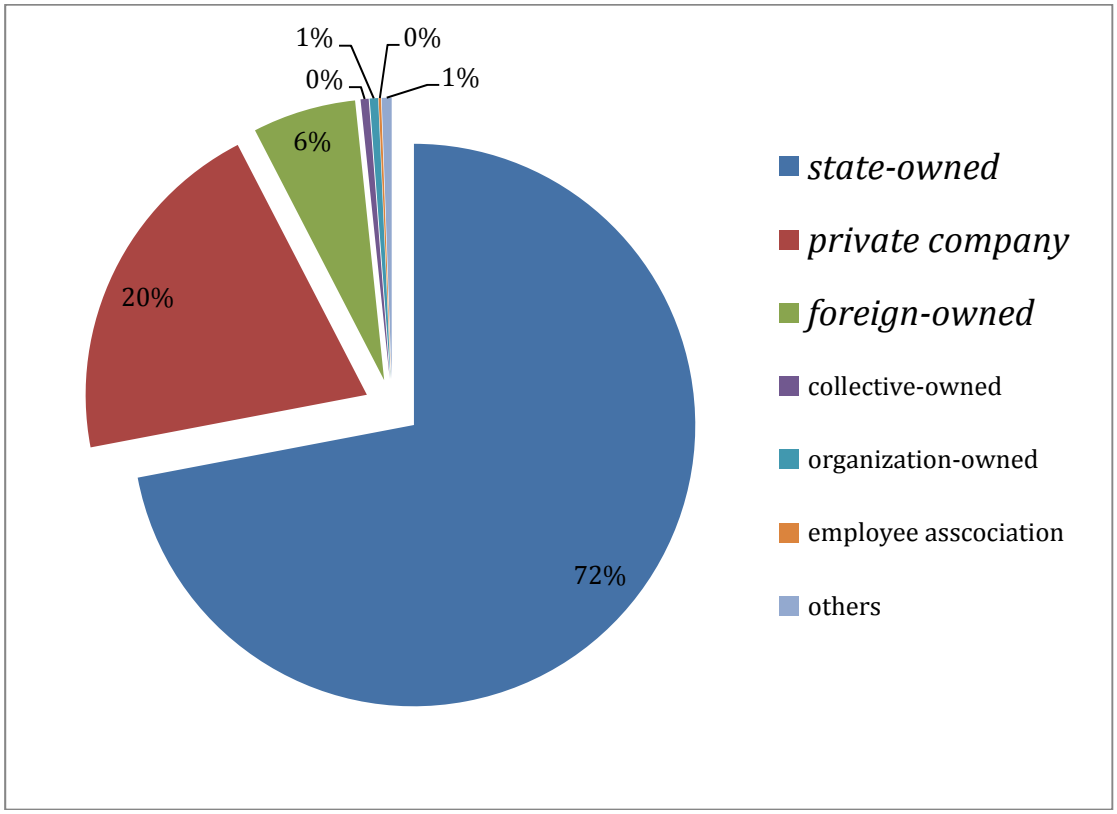
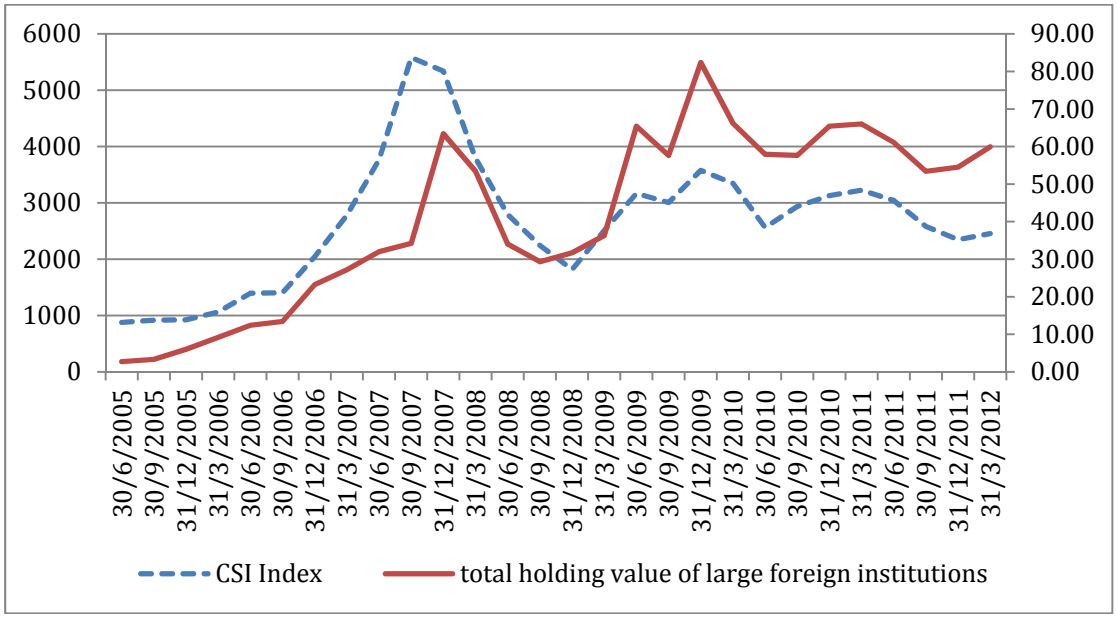


Figure 3. CSI index and total holding value of large foreign institutions.



References

Acharya, V. V., Pedersen, L. H., 2005. Asset pricing with liquidity risk. Journal of Financial Economics 77 (2), 375-410.

Agarwal, P., 2007. Institutional ownership and stock liquidity. Working Paper, Available at SSRN 1029395.

Agarwal, P., 2009. Institutional ownership, liquidity and liquidity risk. Ph.D. thesis, Cornell University.

Ali, A., Durtschi, C., Lev B., Trombley M. A., 2004. Changes in institutional ownership and subsequent earnings announcement abnormal returns. Journal of Accounting, Auditing & Finance 19 (3), 221-248.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. Journal of Financial Markets 5 (1), 31-56.

Amihud, Y., Mendelson, H., 1986. Asset pricing and the bid-ask spread. Journal of Financial Economics 17 (2), 223-249.

Back, K., Cao, C. H., Willard, G. A., 2000. Imperfect competition among informed traders. Journal of Finance 55 (5), 2117-2155.

Bacmann, J.-F., and Bolliger, G., 2002. Who are the best? Local versus foreign analysts on Latin American stock markets. Working Paper, FAME Research Paper Series.

Bekaert, G., Harvey, C. R., Lumsdaine, R. L., 2002. Dating the integration of world equity markets. Journal of Financial Economics 65 (2), 203-247.

Bekaert, G., Harvey, C. R., Lundblad, C., 2007. Liquidity and expected returns: Lessons from emerging markets. Review of Financial Studies 20 (6), 1783-1831.

Benston, G. J., Hagerman, R. L., 1974. Determinants of bid-asked spreads in the over-the-counter market. Journal of Financial Economics 1 (4), 353-364.

Blume, M. E., Goldstein, M. A., 1997. Quotes, order flow, and price discovery. Journal of Finance 52 (1), 221-244.

Boubakri, N., Cosset J.-C., Guedhami O., 2005. Liberalization, corporate governance and the performance of privatized firms in developing countries. Journal of Corporate Finance 11 (5), 767-790.

Brennan, M. J., Subrahmanyam, A., 1996. Market microstructure and asset pricing: On the compensation for illiquidity in stock returns. Journal of Financial Economics 41 (3), 441-464.

Brockman, P., Chung, D. Y., 1999. An analysis of depth behavior in an electronic, order-driven environment. Journal of Banking and Finance, 23 (12), 1861-1886.

Brockman, P., Chung, D. Y., 2003. Investor protection and firm liquidity. Journal of

Finance 58 (2), 921-938.

Brockman, P., Yan, X., 2009. Block ownership and firm-specific information. Journal of Banking and Finance 33 (2), 308-316.

Brockman, P., Chung, D. Y., Yan, X., 2009. Block ownership, trading activity, and market liquidity. Journal of Financial and Quantitative Analysis 44 (6), 1403-1426.

Bushee, B. J., Theodore, H. G., 2007. Which institutional investors trade based on private information about earnings and returns? Journal of Accounting Research 45 (2), 289-321.

Bushman, R. M., Piotroski, J. D., Smith, A. J., 2004. What determines corporate transparency? Journal of Accounting Research 42 (2), 207-252.

Chaney, P. K., Faccio, M., Parsley, D., 2011. The quality of accounting information in politically connected firms. Journal of Accounting and Economics 51 (1), 58-76.

Copeland, T. E., Galai, D., 1983. Information effects of the bid-ask spread. Journal of Finance, 38 (5), 1457-1469.

Dahlquist, M., Robertsson, G., 2001. Direct foreign ownership, institutional investors, and firm characteristics. Journal of Financial Economics 59 (3), 413-440.

Demsetz, H., 1968. The cost of transacting. Quarterly Journal of Economics 82 (1), 33-53.

Dennis, P., Weston, J., 2001. Who's informed? An analysis of stock ownership and informed trading. Working Paper, Available at SSRN 267350.

Dewenter, K. L., Malatesta, P. H., 2001. State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. American Economic Review 91 (1), 320-334.

Ding, S. X., Guedhami, O., Ni Y., Pittman, J., 2010. Where do foreign institutional investors lose their edge? The mediating role of state ownership in shaping their relative informational advantage. Working Paper, Available at SSRN 1676629.

Diamond, D. W., Verrecchia, R. E., 1991. Disclosure, liquidity, and the cost of capital. Journal of Finance 46 (4), 1325-1359.

Driscoll, J. C., Kraay A. C., 1998. Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data. Review of Economics and Statistics 80 (4), 549–560.

Fan, J., Wong, T. J., Zhang, T., 2007. Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms. Journal of Financial Economics 84 (2), 330-357.

Foster, F. D., Viswanathan, S., 1996. Strategic trading when agents forecast the forecasts of others. Journal of Finance 51 (4), 1437-1478.

Glosten, L. R., Milgrom P. R., 1985. Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. Journal of Financial Economics 14 (1), 71-100.

Glosten, L. R., Harris, L. E., 1988. Estimating the components of the bid/ask spread. Journal of Financial Economics 21 (1), 123-142.

Grinblatt, M., Keloharju, M., 2000. The investment behavior and performance of various investor types: a study of Finland's unique data set." Journal of Financial Economics 55 (1), 43-67.

Heflin, F., Shaw, K. W., 2000. Blockholder ownership and market liquidity. Journal of Financial and Quantitative Analysis 35 (4), 621-633.

Hoechle, D., 2007. Robust standard errors for panel regressions with cross-sectional dependence. Stata Journal 7 (3), 281-312.

Holden, C. W., Subrahmanyam, A., 1992. Long-lived private information and imperfect competition." Journal of Finance 47 (1), 247-270.

Huang, R. D., Stoll, H. R., 1997. The components of the bid-ask spread: A general approach. Review of Financial Studies 10 (4), 995-1034.

Johnson, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2000. Tunneling. American Economic Review 90 (2), 22-27.

Ke, B., Petroni, K., 2004. How informed are actively trading institutional investors? Evidence from their trading behavior before a break in a string of consecutive earnings increases. Journal of Accounting Research 42 (5), 895-927.

Khanna, T., Palepu, K., 2000. Emerging market business groups, foreign intermediaries, and corporate governance. In: Morck, R. K. (Ed.), Concentrated Corporate Ownership. University of Chicago Press, Chicago.

Kyle, A. S., 1985. Continuous auctions and insider trading. Econometrica, 53 (6), 1315-1335.

Lee, K.-H., 2011. The world price of liquidity risk. Journal of Financial Economics 99 (1), 136-161.

Lee, C., Ready, M. J., 1991. Inferring trade direction from intraday data. Journal of Finance 46 (2), 733-746.

Levine, R., Zervos, S., 1998. Capital control liberalization and stock market development. World Development 26 (7), 1169-1183.

Lin, J.-C., Sanger, G. C., Booth, G. G., 1995. Trade size and components of the bid-ask spread. Review of Financial Studies 8 (4), 1153-1183.

Madhavan, A., 1992. Trading mechanisms in securities markets. Journal of Finance 47 (2), 607-641.

Mendelson, H., Tunca, T. I., 2004. Strategic trading, liquidity, and information acquisition. Review of Financial Studies 17 (2), 295-337.

Pástor, L., Stambaugh, R. F., 2003. Liquidity risk and expected stock returns. Journal of Political Economy 111 (3), 642-685.

Porta, R., Lopez-de-Silanes, F., Shleifer, A., 1999. Corporate ownership around the world. Journal of Finance 54 (2), 471-517.

Rhee, S. G., Wang, J., 2009. Foreign institutional ownership and stock market liquidity: Evidence from Indonesia. Journal of Banking and Finance 33 (7), 1312-1324.

Rubin, A., 2007. Ownership level, ownership concentration and liquidity. Journal of Financial Markets 10 (3), 219-248.

Seasholes, M. S., 2004. Re-examining information asymmetries in emerging stock markets. Working Paper, University of California at Berkeley.

Shleifer, A., Vishny, R. W., 1997. A survey of corporate governance. Journal of Finance 52 (2), 737-783.

Spiegel, M., Subrahmanyam, A., 1992. Informed speculation and hedging in a noncompetitive securities market. Review of Financial Studies 5 (2), 307-329.

Stoll, H. R., 2000. Friction. Journal of Finance 55 (4), 1479-1514.

Stoll, H. R., Whaley, R. E., 1983. Transaction costs and the small firm effect. Journal of Financial Economics 12 (1), 57-79.

Stulz, R., 1999a. International portfolio flows and security markets. NBER Conference Report Series.

Stulz, R., 1999b. Globalization of equity markets and the cost of capital. Working Paper, NBER 7021.

Subrahmanyam, A., 1991. Risk aversion, market liquidity, and price efficiency. Review of Financial Studies 4 (3), 417-441.

Sun, Q., Tong, W., 2003. China share issue privatization: the extent of its success. Journal of Financial Economics 70 (2), 183-222.

Wang, J., 1993. A model of intertemporal asset prices under asymmetric information. Review of Economic Studies 60 (2), 249-282.

Wang, Q., Wong, T.-J., Xia, L., 2008. State ownership, the institutional environment, and auditor choice: Evidence from China. Journal of Accounting and Economics 46 (1), 112-134.

Foreign Institutional Investors and Stock Market Liquidity in China: State Ownership, Trading Activity and Information Asymmetry

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The Chinese government has implemented the Qualified Foreign Institutional Investor (QFII) system in order to promote stock market liquidity by participation of foreign institutional investors. This paper is the first to explicitly identify the channels through which foreign institutional investors influence the liquidity on the Chinese stock markets. Firstly, we find that market participation by foreign institutional investors promotes liquidity both for state-owned enterprises (SOEs) and non-SOEs. Secondly, foreign institutions influence liquidity through the informational frictions channel, but not through the real frictions channel. Thirdly, as implied by these two results, foreign institutions are not informationally disadvantaged when investing in SOEs. Finally, the link between foreign institutional participation and liquidity remains strong before, during, and after the recent financial crisis.

Keywords: liquidity; emerging markets; foreign institutional investors; real frictions; informational frictions

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