Does the Location of Stock Exchange Matter? a Within-Country Analysis[1]

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ABSTRACT

The current study documents an interesting phenomenon that retail investors prefer to invest in stocks listed at the stock exchange that is geographically close to them in China. This pattern is robust when we control for the well-documented local bias within a country. Among companies with similar distances to both stock exchanges, investors still display a much stronger tendency to invest in locally-listed companies. Among stocks with similar distances to both stock exchanges, those listed in Shanghai (Shenzhen) co-move more in returns and volume, with the benchmark at the Shanghai (Shenzhen) stock exchange. Such a preference for local exchange seems not to be motivated by information advantage, because investors do not obtain abnormal returns from their trades on stocks listed nearby. Our findings provide additional evidence that non-information-based familiarity bias induces investment and that such investor biases and exchange-level sentiment influence asset price formation.

Keywords: Retail investor, local bias, stock exchange, investor sentiment, co-movement

Extant studies document evidence that investors tilt portfolios heavily towards domestic securities. French and Porterba (1991) and Tesar and Werner (1995) are among the first to point out investors' strong tendency to invest in domestic securities. More recent studies find that behavioral reasons other than fundamental economic motivations are responsible for such a home bias and that the degree of home bias across different countries can explain some variations in the differences in cost of capital across different countries (Chan et al. 2003, 2005, Baker et al. 2002).

A closely related strand of research uncovers that the location of corporate headquarters matters to the investment decisions by institutions and retail investors even within the same country. An early study by Huberman (2001) finds that investors are far more likely to invest in baby Bell companies that operate in the investors' home area and concludes that familiarity breeds such investment. Using more comprehensive data on investor transaction records and holdings, following studies show that U.S. professional investors (Coval and Moskowitz 2001) and retail investors (Zhu 2003, Ivkovich and Weisbenner 2005) display a strong preference for geographically nearby companies. Further, international studies that use data from Finland (Grinblatt and Keoloharju, 2001), Sweden (Massa and Simonov 2006), and China (Feng and Seasholes 2004) all confirm that the bias towards nearby companies is not limited to the United States but more of a global phenomenon.

While some studies point out that information advantage is responsible for the local bias by institutional investors (Coval and Moskowitz, 1999 and 2001), there remains considerable controversy as to whether such familiarity is driven by value-relevant information or primarily behavioral bias for retail investors. Ivkovich and Weisbenner (2005) and Massa and Simonov

(2006) show that individual investors can obtain abnormal returns by investing in nearby companies. However, Seasholes and Zhu (2010) and Zhu (2003) show that using appropriate performance-evaluation methods, such outperformance results disappear. Because investing with the familiar can be motivated by both investment-relevant and non-investment-relevant information, it would be interesting if one could investigate such a topic by studying a situation that the investor choice is influenced by one but not the other.

The current paper exploits the unique background in China where there are two similarly important physical stock exchanges and investigates the phenomenon that retail investors favor stocks listed at the local stock exchange. Unlike most leading financial markets, China is unique in that there are two similarly important stock exchanges that are geographically far apart within the same country. As a result, studying investors', especially retail investors' trading behavior provides a unique opportunity to study how stock exchange, and the exchange-induced familiarity matters to investor trading. Because there is arguably little information advantage in the location of listing within the same country, if one finds that retail investors favor locally-listed companies, in addition to the well-documented (distance-based) local bias, then there is stronger support for the argument that local bias by local investors is primarily driven by behavioral biases, instead of informational explanations.

Using data from a large national brokerage house in China, we indeed find a strong bias towards local stock exchange. Among retail investors at a large national-level full-service discount brokerage firm, we find that 39.60 percent of retail investors at the Shanghai branch never traded stocks listed at the Shenzhen Stock Exchange and 24.56 percent of retail investors at the Shenzhen branch never traded stocks listed at the Shanghai Stock Exchange, during our

sample year between 2003 and 2009. At the same time, far fewer investors (2.47 percent for retail investors at the Shanghai branch and 7.41 percent for retail investors at the Shenzhen branch) never traded stocks listed at the local stock exchange. Such a bias is much weaker among investors at other local branches, regardless of their distance to respective stock exchange.

Among investors who have traded stocks on both stock exchanges, the frequency and volume of transactions on companies listed at the local exchange far outweigh those of transactions on stocks listed at the remote exchange. For investors at the Shanghai branch, the frequency and volume on shanghai-listed stocks are 1.45 and 1.44 times that on Shenzhen-listed stocks. On the opposite, for investors at the Shenzhen branch, the frequency and volume on Shenzhen-listed stocks are 1.60 and 1.61 times that on shanghai-listed stocks. Again, such a bias largely disappears among other local branches.

Not surprisingly, such a bias towards local exchange is related to the widely documented tendency that retail investors display towards geographically close companies. For investors at the Shanghai branch, the exchange bias for the quintile of investors with the highest local bias is 4.38 times that for the quintile of investors with the lowest local bias. Similarly, for investors at the Shenzhen branch, the exchange bias for the quartile of investors with the highest local bias is 3.82 times that for the quartile of investors with the lowest local bias.

However, it is more important to point out that the exchange bias is a distinct phenomenon by itself. Among stocks with similar distances to both exchanges, investors display much stronger trading intensity on stocks listed at the local stock exchange than those listed at the remote stock exchange. For example, for investors who have traded on both stock exchanges and for the sample of companies of which the differences in distances to both exchanges are

within 200 kilometers, trading volume on Shanghai-listed stocks is 1.26 times that on Shenzhen-listed stocks for Shanghai investors. However, the trading volume on Shanghai-listed stocks is only 68.82 percent of that on Shenzhen-listed stocks, for Shenzhen investors.

It is important to stress that our results from the large discount brokerage company is indeed representative at the market level. We investigate the co-movement in returns and trading volumes of stocks listed at the same stock exchange and find a significant exchange-level sentiment that is responsible for variations in both returns and trading volumes for stocks listed at the same stock exchange. In particular, for companies whose distances to both stock exchanges are similar (the difference in the distances to both stock exchanges is smaller than 200 kilometers), the returns and trading volume of stocks listed at the Shanghai Stock Exchange co-move much stronger with the Shanghai Stock Exchange benchmark and the trading volume variations at the Shanghai Stock Exchange. At the same time, the returns and trading volume of the stocks listed at the Shenzhen Stock Exchange co-move much stronger with the Shenzhen Stock Exchange benchmark and the trading volume variations at the Shenzhen Stock Exchange. In addition to the market- (country-) level sentiment documented in previous studies in the international finance literature (Chan et al. 2003, Froot and Dabora 1999), we document that there is a significant and important component of investor sentiment at the stock exchange level, partly due to the exchange-bias documented in the current paper. In addition, such a bias towards locally-listed companies can shed further lights on understanding the phenomenon of home bias and local bias, and the formation of asset prices in the international stock markets.

Investigations of the profitability of investors' trades on stocks listed at local exchanges reveal that the exchange bias does not help investors obtain abnormal returns. Using calendar

time portfolio approach, we find that investors' purchases of locally-listed stocks underperform their sales on the same stocks. Such a pattern persists over short- and medium- term horizons. For example, at the one-day holding period, the purchases on locally-listed companies generate an average return of -0.0571 percent per day and the sales on locally-listed companies generate an average return of 0.0576 percent per day. The difference is statistically significant at the 1 percent level. It is worth noting that purchases on remotely-listed companies also significantly underperform the sales on remotely-listed companies. The important message to the current study is, however, that investing in locally-listed companies does not help investors achieve better performance, or at the very least reduce their under-performance. Our analysis at the 20-day holding period (roughly a calendar month) and a series of robustness tests at other short- and medium-term horizons generate very similar results.

We conduct a host of robustness tests. We calculate the exchange bias by using both raw and adjusted trading volumes between the two broker branches; we experiment with alternative definitions of "locally-listed" and "remotely-listed" companies; we study the trading behavior of investors at branches in other cities where there is no stock exchange; and we include/exclude investors who have never traded non-locally-listed companies. We also examine the exchange bias within different industry sectors and within different years. Our main results remain very robust.

The current paper makes three primary contributions to the literature. First, we document a new phenomenon that is consistent with familiarity-bred investment decision making. Unlike the extant studies that show that geographical location of corporate headquarter matters to investors' portfolio choice, we show that the location of listing within a country also matters.

Our findings are consistent with the findings in the international finance literature that the country of listing influences the movement of stock prices. The incremental contribution of the current paper is that, we show in the paper that even within the very same country, where capital flow, culture, language, and time zone (Gordon et al. 1988, Grinblatt and Keloharju, 2001, Miller, 1999) do not matter, the listing location still plays an important role in asset price formation.

Our findings show that stocks listed at the same stock exchange display similarity in movement in stock prices and trading volume. Such findings suggest that investor sentiment can form at the stock exchange level and that such exchange-level investor sentiment affects asset prices. Our results provide additional support for the argument that investor sentiment, in particular the sentiment of retail investors, influences asset prices

Secondly, because the exchange bias is strongly correlated with the local bias, the findings in the current paper provide additional evidence that behavioral tendency, instead of informational advantage, is responsible for investors' bias towards local companies. There is some controversy in the literature regarding whether local bias, especially the local bias by retail investors, is motivated by advantageous information or pure behaviorally-induced familiarity. For example, Ivkovich and Weisbenner (2005) and Massa and Simonov (2006) conclude that retail investors' local trades are motivated by information advantage. However, Seasholes and Zhu (2010) and Zhu (2003) point out that using the appropriate performance-evaluation technique, there is little evidence that information motivates retail investors' local trades.

Our findings focusing on the exchange bias provide some fresh perspectives on this topic. Whereas local bias is largely attributed to the phenomenon of investing in the familiar, the stock exchange bias is unique in that the listing decision process in China is largely determined by the

Chinese Securities Regulatory Commission (CSRC), the market regulator and there is little evidence of systematic tilt towards either stock exchange. For this matter, if one finds that investors not only favor stocks with nearby headquarters, but also stocks that are listed locally, the findings will be clearly in support of the behavior-induced familiarity explanation. This is indeed what we have found in the paper. We show that the local bias and exchange bias are reasonably highly correlated, suggesting that the local bias is at least partly driven by the exchange bias. Further, we show that even for the sub-sample where there is little local bias, the exchange bias remains strong and significant, suggesting that even when we leave out potential information advantage of the local bias, retail investors still display a strong appetite for companies which they feel that they know better. However, their performance from such trades fails to support such beliefs.

Finally, the current paper relates to the literature regarding the emergence and growth of the electronic stock exchanges and the relative importance of physical stock exchanges in light of the change. Our findings highlight an important role by the physical local exchange. The physical presence of stock exchanges seems to provide confidence and certification to local investors and increase trading volume resulting from familiarity. Whereas this is consistent with the original motivations when people first set up stock exchanges, it is somewhat surprising that, among all the certified and qualified listed companies, the location of listing still matters to investment choice. Our findings highlight that, even with the burgeoning of information technology and growth of many successful virtual exchanges (for example, Nasdaq, Euronext), the physical location of stock exchange still has its appeal to certain investor clientele. Therefore, physical stock exchanges still command some advantages over virtual stock exchanges. Our findings provide rationale to the increasing trend of physical stock exchanges merging with

virtual stock exchanges (for example, New York Stock Exchange's merger with Archipelago and Nasdaq's collaboration with the London Stock Exchange).

The current study relates closely to Chan et al. (2003) that investigates whether the location of listing matters in the context of Asian financial markets. Different from their study that utilizes the differences in location of listings across different international markets, we focus on investors' responses to different stock exchanges within the same country. Due to potential differences in investor clientele, market sentiment, and regulation requirements, our within-country findings provide a sharper focus on the impact of listing exchange on stock trading and asset price formation. Separately, unlike the event study approach adopted in the prior study, we observe the micro-level trading behavior of retail investors and also investigate the general patterns of exchange bias at the market level. As a result, our approach provides a unique perspective that enables us to gain precise observation of the investor trading mechanism behind the phenomenon documented in the previous study.

The rest of the paper proceeds as follows: Section 2 describes the Chinese stock markets and the institutional background of the two stock exchanges in China; Section 3 provides a detailed overview of the brokerage data; Section 4 presents evidence on retail investors' bias towards stocks listed at stock exchange; Section 5 investigates the implications of local exchange bias to asset price formation and stock market trading volume; before we conclude in Section 6.

Section 2. Chinese Stock Market and the Two Stock Exchanges

With the burgeoning economic growth in China during the past two decades, China has now become one of the most important economies in the world economy. Starting from a

relatively low point, the Chinese economy has grown at an average speed of 9.73 percent during the past two decades. As of 2008, Chinese GDP stands at 31,404.5 billion RMB Yuan (4,489.9 billion US dollar), which puts it as the third largest economies in the world. At the same time, GDP per capita also increased from 1,519 RMB Yuan (403 US dollar) to 22,698 RMB Yuan (3,245 US dollar) during the same period, which translates into much improved quality of life and societal welfare.

To capitalize Chinese economic growth, Chinese financial market was founded and grew rapidly during the same time. The Shanghai Stock Exchange (SSE) was founded in 1990 and the Shenzhen Stock Exchange (SZSE) was founded soon afterwards in 1991 to jump start the Chinese economic transformation. The number of listed companies soared from 53 companies back then to about 1,700 companies in 2009. At the same time, the total market capitalization of companies has increased from 104.81 billion RMB Yuan in 1992 to 24393.39 billion RMB Yuan in 2009.

One particularly interesting feature of the Chinese financial market to the current study is that there are two similarly important stock exchanges in China, from the early days of the market foundation. The two stock exchanges are the Shanghai Stock Exchange (referred to as the SSE thereafter in the paper) and the Shenzhen Stock Exchange (referred to as the SZSE thereafter in the paper). As figure 1 indicates, the SSE is located in Shanghai, one of China's most important economic centers and a historically hotbed for Chinese capitalism. Shenzhen, where the SZSE is located, is however, of lower profile at least during the early days of the market. The city is one of the earliest founded Special Economic Zone (SEZ) and the exchange

was established here partly to boost the economic growth in the city and the neighboring provinces.

Unlike the situations in many other countries, where there is one dominant stock exchange and many other smaller, less significant stock exchanges, (For example, the New York Stock Exchange is the leading stock exchange in the U.S. and there are other much smaller exchanges such as the American Stock Exchange in Philadelphia and the Pacific Stock Exchange in San Francisco. In addition, Toronto Stock Exchange is the leading stock exchange in Canada and other smaller exchanges include Bourse de Montreal in Montreal, Vancouver Stock Exchange in Vancouver, and Alberta Stock Exchange in Calgary).

The closest resemblance of such twin physical stock exchanges is the case of Japan. However, these two stock exchanges are geographically very close (with a distance of 400 kilometers apart). Further, according to the latest statistics at the World Federation of Exchanges (WFE), the market capitalization and trade volume at the Tokyo Stock Exchange are about twenty times greater than that at Osaka Stock Exchange (3,115 billion vs. 147 billion and 5,607 billion vs. 236 billion). In contrast, the SSE and SZSE are located fairly apart from each other (the distance between the two cities is about 1200 kilometers) and our below summary statistics suggest that the two exchanges are of similar magnitude and importance, in terms of trading volume and market capitalization. As a result, we feel that the unique institutional environment in China provides an interesting opportunity for one to study the influences that the location of stock exchanges has on investor behavior and asset price formation.

Table 1 reports the number of stocks and total float market capitalization of A-share stocks at both stock exchanges. In the early days of the market, there were 101 A-share stocks

listed at the SSE and 76 at the SZSE. The number of A-share listed stocks increase steadily over time. By the end of June of 2009, there are 854 A-share listed stocks at the SSE and 726 at the SZSE. The total listed market capitalization at the SSE used to be slightly smaller than that at the SZSE and make up about 43 percent of the total market capitalization at both exchanges. Such a pattern changes slightly over time depending on market conditions at respective exchanges. In recent years, the total listed market capitalization at SSE becomes about twice as big as that at the SZSE and makes up about two thirds of the total listed market capitalization in China.[2]

(Insert Table 1 about here)

In addition, unlike the practice in the U.S. where there is a strong distinction in the choice of listing exchange (i.e. large blue-chip companies are typically listed at the NYSE whereas young start-up companies mostly choose to list at the NASDAQ), the choice of place of listing in China is largely exogenous. A company submits a petition for share listing to the China Securities Regulatory Committee (CSRC), the regulatory body of the securities market in China. CSRC then gets to decide which exchange the shares will be listed. Through communications with officials at the CSRC, the choice of listing location is mostly a random one throughout our sample period.

One slight difference that we are aware of exists in the requirement for setting up investment accounts at companies listed at the SSE and SZSE. Retail investors have to submit a fee of a 50 RMB Yuan to open an account to trade stocks listed at the SZSE and the fee

[2] It is worth noting that, in addition to their A-share listings, some Chinese companies also have a distinct B-share class stocks listed at the same two stock exchanges. Unlike the A-share stocks that are intended to be held and traded by Chinese domestic investors, the B-share stocks are intended to be held and traded by foreign investors. With the fast growth in the domestic A-share market, the B-share market becomes relatively unimportant.

requirement is slightly lower at 40 RMB Yuan, for opening an account to trade stocks listed at the SSZ.[3] Given the average household income and the value of their investment account, we do not feel that such a difference should make a difference to investors' choice in which stocks to invest.

In further unreported analysis, we compare the market capitalization, industry concentration, and the valuation level of companies listed respective stock exchange. We note that in the most recent periods, stocks listed at the SSE tend to have slightly bigger market capitalization. Such differences are statistically significant but economically modest and there is no consistent trend over time. Therefore, we do not feel that firm characteristics at the two distinct exchanges influence our main findings. In sum, the unique situation of the twin stock exchanges provides a unique opportunity to study stock exchange location's impact on investor behavior and asset prices.

Section 3. The Chinese Brokerage Data

The data come from the central intelligence center of the brokerage firm and have been verified and checked for data accuracy and integrity. The brokerage is a large national-level brokerage house with about 50 branches in about 10 cities within about 10 different provinces.[4] The company has over one thousand employees and ranks in the top quartiles among all Chinese brokerage companies, in terms of transaction volume.

[3] In practice, some brokerage firms waive some application fees to attract and compete for retail investor clients

[4] We do not report the exact number of cities to protect the identity of the brokerage firm

There are total number of 71,460 investors from six branches at the brokerage house, who make an average daily trading volume over 320.85 million RMB Yuan in 2008. To narrow our focus on the retail investors, we exclude investors who seem to have traded considerable amount. Our final sample include investors who have never made a single transaction valued at more than 100, 000 RMB Yuan (about 15,000 USD) throughout the sample period.[5] Such a criteria reduces our final sample to 55,368 investors. These sample investors make a total of 4,937,508 trades: 2,594,445 purchase trades, 2,343,063 sales trades. Figure 2 shows that the number and volume of trades increase steadily during the sample period, with some stalling in 2003-2005, when the market suffered a more than 50 percent decline from its then peak.

Reviewing the summary statistics of the six respective branches in Table 2, we note that there are some considerable variations in the number of observations across different brokerage branches. A couple of reasons are responsible. First, due to different levels of economic development and cultural background, trading intensity varies from city to city. Further, depending on the location and legacy (ingrown versus acquired), the size of different branches at the sample brokerage firm is also quite different. Therefore, it should not be surprising that different branches within the same brokerage firm have different levels of businesses. Even within the same city, the location of each individual branch is very important to its customer traffic and business volume. Given that previous studies (Feng and Seasholes 2004, Ng and Wu, 2009) show that Chinese investors tend to display similar trading patterns within the same city, we believe that such differences should not have meaningful impact on our inferences.

[5] The relatively low threshold requirement reflects the relatively lower income at Chinese households. We also experiment with alternative cutoff criteria, and obtain very similar results.

(Insert Table 2 about here)

In addition to transaction and portfolio holdings data, the brokerage data also provide some information about investor characteristics. The average age of the sample investors is 43.9 (median is 42) and 49.8 percent of the sample investors are male and the remaining 50.2 percent are females. The average trading experience with the broker is 5.5 years (the median is 3 years).

Several features of the brokerage data from China merit some additional discussions. First, In the PRC, it is required that an investor can open one and only one account that trades stocks listed at the SSE and SZSE, respectively. That is, if an investor opens an account with a particular brokerage account to trade stocks listed at the SSE, she or he has to transact all her/his trades on shanghai-listed stocks. Therefore, we feel confident that our data depict a complete picture of investors' trading behavior, as far as the objective of our paper to investigate the bias towards local stock exchange is concerned.

Second, unlike the practice of many more developed markets and partly due to the capital flow constraints, most of Chinese investors invest exclusively in domestic stocks. Two major explanations are responsible. First of all, the restrictions on foreign exchange and international fund flows from the Chinese authorities make it costly and often times difficult to invest overseas. Partly related to this phenomenon, it was not until recently did mutual funds and asset management companies start rolling out products that aim at investing primarily in foreign countries. Such funds are typically raised by using the Qualified Domestic Institutional Investors (QDII) quotas, which are controlled by the Chinese Securities Regulatory Commission (CSRC) and the State Administration of Foreign Exchange (SAFE). Unfortunately, the first batch of QDII funds was launched during the market peak around 2007 and has suffered considerably in performance in the midst of the subsequent global financial crisis. Consequently, the retail

investors grow concerned with the general image of QDII products even as the markets turn around in the latter part of 2009.

Finally, similar to the practices in many other emerging markets, the Chinese stock market is relatively loosely regulated compared to its counterparts in developed markets and there are sometimes discrepancies between regulation and the practice. As a result, it is commonly believed that there is a greater level of information asymmetry and transactions based on insider information. Hence, we feel that there is a greater chance that we may observe some retail investors display advantageous information through their transactions. In addition, there have been reported incidences where, to avoid the scrutiny from the regulators, some investors sometimes use the ID cards of family members or close friends to trade on their own behalf. As a result, the readers should interpret our findings with due discretion.

Section 4. The Exchange Bias

4.1. Broker-level evidence

For the purpose of studying the effect of exchange location bias, we focus mostly on investors located in Shanghai and Shenzhen throughout the study. We later perform robustness tests with investors from other branches and obtain consistent results.

First, we study the fraction of investors who never traded stocks listed in the Shenzhen or Shanghai Exchange. Out of the 3,657 investors at the Shenzhen branch, 898 investors have never traded SSE-listed companies, as opposed to the fact that 271 investors have never traded SZSE-listed companies. The sample investors at the Shanghai branch display a similar and even

stronger pattern. Among all 5,260 sample investors at the Shanghai branch, 130 investors have never traded SSE-listed stocks whereas 2,083 have never traded SZSE-listed companies.

Next, we summarize the trading activities on SSE- and SZSE-listed stocks, by investors at the Shanghai and Shenzhen branch, respectively. We first summarize the number of trades at SSE- and SZSE-listed companies, executed by Shenzhen and Shanghai investors, respectively. As Panel A of Table 3 shows, the sample investors at the Shenzhen branch make a total of 134, 423 trades (70,397 purchases and 64,026 sales) on SSE-listed companies. In contrast, the same investors make a total of 114,094 trades (58,704 purchases and 59,390 sales) on SZSE-listed companies. The ratio of trading activities at SSE- and SZSE-listed companies is 1.18 (1.20 for purchases and 1.16 for sales). Because the number of stocks and total float market capitalization of listed companies at the SSE and the SZSE are different and have changed over time, we use the 2003-2009 times-series average of ratio of the total float market capitalization between the two stock exchanges as the benchmark. We then obtain the ratio of trading volume made by sample investors by dividing the benchmark ratio. The calculated ratio of 0.56 reveals that the ratio of trading activities on SSE and those on SZSE is significantly less than the benchmark.

(Insert Table 3 about here)

Our results on the investors from the Shanghai branch depict a similar picture. The Shanghai investors make a total of 432,023 trades on SSE-listed companies (222,119 purchases and 209,904 sales) and a total of 116,108 trades on SZSE-listed companies (59,959 purchases and 56,149 sales). The ratio of the number of trades executed on SSE-listed to SZSE-listed companies is 3.72. When we apply and divide the same benchmark as above for the SZSE, we find that, for investors at the Shanghai branch, we obtain the adjusted ratio of 1.76, suggesting

that the number of trades executed on SSE-listed companies is far greater than that of trades executed on SZSE-listed companies, even when the different amount of market capitalization at both exchanges are accounted for.

In addition to the trading frequency, we also examine the dollar trading volume. The Shenzhen investors traded a total of 1,448.25 Million RMB Yuan (739.98 in purchases and 708.27 in sales) on SSE-listed companies. At the same time, these investors traded a total of 1,237.86Million RMB Yuan (621.60 in purchases and 616.26 in sales) on SZSE-listed companies. The ratio of trading volume on SSE and SZSE is 1.17 (1.19 for purchases and 1.15 for sales) and very similar to the ratio based on trading frequencies. When we adjust the ratio by the same benchmark as in the analysis of the number of trades, we obtain the adjusted ratio of 0.55, confirming our previous findings that Shenzhen investors trade far more on SZSE-listed stocks than SSE-listed stocks.

We next perform the same exercises for investors at the Shanghai branch. The total trading volume on SSE-listed companies is 3,929.24 Million RMB Yuan (1961.60 for purchases and 1967.64 for sales) and that on SZSE-listed companies is 1,065.84 Million RMB Yuan (539.16 for purchases and 526.68 for sales). The ratio of trading volume on SSE to SZSE is 3.69 (3.64 for purchases and 3.74 for sales), again, very similar to the ratio based on trading frequencies. When we apply the same benchmark as it is for the trading volume by Shenzhen investors, we find that the ratio of the trading volume on SSE-listed companies to the trading volume on the SZSE-listed companies is 1.74 (1.72 for purchases and 1.76 for sales). In addition to the benchmark based on the total float market capitalization, we experiment with some

alternative benchmarks and obtain very similar results.[6] Such results are available upon request from the authors.

All the above results confirm our conjecture that investors located in the city where a significant stock exchange is located prefer to invest in stocks listed at the exchange to stocks listed at the other stock exchange that is geographically farther away.

As we show previously, much more investors at Shanghai (Shenzhen) branch have never traded stocks listed at the Shenzhen (Shanghai) stock exchange. Although we cannot reliably identify whether such investors opened accounts at remote exchanges, it is hard to imagine that the modest difference in transaction fee requirement is responsible for their avoidance of trading stocks listed in the other city. Nevertheless, to avoid influences from such investors who have never traded at stocks listed in the remote exchange, we redo the above summary statistics by excluding investors who have only traded stocks listed at one of the two exchanges.

Panel B of Table 3 reports results consistent with those in Panel A, with the sub-sample of investors who definitively traded both SSE-listed and SZSE-listed stocks (meaning that they must have opened accounts to trade at both exchanges). For such investors from the Shenzhen branch, the average number of trades and trading volume for SZSE-listed companies is 98,677 and 1,076.50 million Yuan, significantly less than than the number of trades (130,846) and trading volume (1,413.14 million Yuan) for the stocks listed at the SSE. Similarly, for such investors from the Shanghai branch, the average number of trades (351,734) and trading volume

[6] For example, we use the 2003-2009 time-series average of the ratio of the total market capitalization, the average of the ratio of the total trading volume, and the average of the ratio of the number of listed companies, between the two stock exchanges as the benchmark to adjust for the trading volume by sample investors at both branches.

(3,204.37 million Yuan) for SSE-listed companies is far greater than the number of trades (114,295) and trading volume (1,048.31 million Yuan) for the SZSE-listed companies. Once we apply the benchmark for adjustment, we find that the benchmark-adjusted trading frequency and volume are significantly higher (lower) on Shenzhen-listed stocks (Shanghai-listed stocks) for Shenzhen investors. Consistently, the trading frequency and volume are significantly higher (lower) on Shanghai-listed stocks (Shenzhen-listed stocks) for Shanghai investors.

In sum, our above results confirm the conjecture that Chinese investors display a significant preference for stocks listed at the local stock exchange than those listed at the remote one.

It is conceivable that part of the bias towards locally listed companies may be another manifestation of the local bias, investor's tendency to invest in companies geographically close to them. For stocks listed at the SSE, the average distance to Shanghai and Shenzhen is 868.58 kilometers and 1,412.79 kilometers respectively. At the same time, for stocks listed at the SZSE, the average distance to Shanghai and Shenzhen are 1,026.48 kilometers and 1,122.70 kilometers, respectively. To disentangle the bias towards local exchange from the bias towards nearby companies, we next compare the trading activities at local exchange and non-local exchange, for the sub-sample of companies with similar distances to both exchanges. Further, we show in Table 4 that there is indeed some correlation between the exchange bias and local bias, at individual investor level. For example, the exchange bias is about three to four times as big for investors in the highest quartile of local bias as that for investors in the lowest quartile of local bias, for investors at both branches.

(Insert Table 4 about here)

In addition to our main analysis, we perform the same analysis on the exchange bias for a sub-sample of companies that are geographically similar to both stock exchanges. In particular, we define companies as "geographically similar to both stock exchanges" if the difference between the distances from the company headquarter to both stock exchanges is less than 200 kilometers. As Panel A of Table 5 suggests, the bias towards the local exchange remains for the group of companies with similar distances to both stock exchanges. That is, we still observe considerable bias towards local exchange even when the local bias is controlled. In unreported analysis, we perform a number of robustness tests with different definitions on geographically similar companies. In addition to our main cutoff value of 200 kilometers, we experiment with alternative cutoff values of 100 and 300 kilometers and our main results remain the same.

In addition to the geographically similar companies, we also adopt alternative criteria that define geographically nearby companies as those companies headquartered within 200 kilometers from the investors. Panel B of Table 4 shows that, the magnitude of the exchange bias is very similar for the Shanghai investors and becomes even stronger for Shenzhen investors. Similar to the above exercise, we adopt alternative cutoff values of 100 and 300 kilometers to define geographically nearby companies. We obtain similar results, which are not reported to conserve space.[7] We interpret the results as further support to our argument that the exchange bias and local bias are two separate phenomena.

(Insert Table 5 about here)

[7] Such results are available from the authors upon request.

In addition, we perform the same analysis for sample investors located at other branches of the sample brokerage company. If what we observe in the previous analysis is largely driven by the bias towards companies with nearby headquarters (the local bias) and that the location of the exchange has only marginal impact on investor behavior, we expect to observe that investors at other branches closer to the SSE/SZSE to favor companies that are listed at the SSE/SZSE. In contrast, if it is indeed the exchange bias that drives our findings, we expect that there is a much weaker pattern for investors located at branches outside the two cities where the stock exchanges are located. Our findings seem to support the argument that the location of the exchange, instead of the geographical distance, is responsible for the phenomenon documented in the current study. When focusing on investors at the same brokerage firm who are located in the other four branches (Beijing, Chongqing, Nanjing, and Yinchuan), we find that the differences in trading frequency and intensity largely disappear.[8]

4.2. Sources of the local exchange bias.

As we indicate in Section 4.1, the exchange bias is partly related to the well-documented home bias and the related local bias (investors' preferences for domestic companies and companies that are geographically nearby). Now that we have documented a strong bias towards companies listed at local exchanges, even when we control for the differences in company headquarter locations, we next focus on exploring why investors display such a tendency towards locally-listed companies.

[8] Such results are available from the authors upon request.

Information advantage has been offered as an important reason for both the home bias in the international economics literature and the local bias in the financial economics literature. For example, Coval and Moskowitz (1999, 2001) show that mutual funds within the U.S. favor geographically nearby companies and indeed obtain better performance from such local investment.[9] At the same time, there remains considerable controversy as to whether retail investors' local bias is driven by advantageous information. Ivkovich and Weisbenner (2005) claim that, similar to institutional investors, retail investors also obtain better returns in their nearby investment. Seasholes and Zhu (2010), however, point out that the methodology in Ivkovich and Weisbenner is flawed and fail to account for the contemporaneous correlation in stock returns. With the correct calendar-time portfolio approach, the authors find that local bias does not help retail investors obtain excess returns.

Following Seasholes and Zhu (2010)'s methodology, we intend to evaluate the performance of retail investors' investment in locally- and remotely-listed companies. In particular, we focus on studying the performance of trades on SSE- and SZSE-listed companies, by sample investors at the Shanghai and Shenzhen branch, respectively. Our hypothesis is straightforward. If retail investors' bias towards locally listed companies is driven by their better information on such companies, we expect to observe that retail investors' investments on locally-listed companies outperform those on remotely-listed companies

Our calendar-time portfolio methodology works as follows. We aggregate the trades of sample individuals on each day and assume that these are all trades from one single

[9] Sulaeman (2010) shows that the choice of methodology is important in interpreting the results on institutional investors. .

representative retail investor. We mimic all the buys and sells of investors by forming a "buys" portfolio and a "sells" portfolio. Each time an investor buys a stock, we place the same number of shares in our calendar-time "buys" portfolio. Each time an investor sells a stock, we place the same number of shares in our calendar-time "sells" portfolio. Shares are held in a portfolio for a pre-determined length of time. Our strategy of mimicking the number of shares traded is called a *value-weighted calendar-time portfolio*. A value-weighted calendar-time portfolio refers to buying or selling the same number of shares that individual investors buy or sell. In this way, large transactions receive more weight than small transactions. In unreported analysis, we also calculate the returns from equal-weighted calendar-time portfolio. An *equal-weighted calendar-time portfolio* refers to initially buying (selling) $1 of each stock bought (sold). Buying (selling) $1 of a stock corresponds to buying (selling) $1 ÷ *Pt* shares of the stock where *Pt* is the share price in dollars. The value of shares held in our portfolio changes as the stock price goes up and down.[10] Thus, both value-weighted and equal-weighted calendar-time portfolios account for changes in stock prices. Both the value-weighted and equal-weighted calendar-time portfolios calculate the weighted average return of stocks in the portfolio each day. The main difference between the two types of portfolios is that a position in the equal-weighted portfolio starts at $1 while a position in the value-weighted portfolio starts at the value of shares actually bought by individuals in our dataset. All returns are calculated before transactions costs.

Such a calendar-time portfolio approach has several advantages. First, the returns of our transactions-based calendar-time portfolios have natural economic interpretations. The calendar-time portfolio returns represent the returns experienced by an investor who mimics the trades of

[10] The equal-weighted calendar-time portfolio approach generates very similar results to the value-weighted calendar-time portfolio results reported in the paper. Such results are available from the authors upon request.

individuals in our data and holds stocks for a set period of time (i.e., 1 day, 5 days, or 20 days). By evaluating the performance of the calendar-time portfolios of "buys" and "sells" portfolios on locally- and remotely-listed companies, one gains understanding of whether retail investors are able to profit from their tendency to invest in locally-listed companies. Second, Barber and Lyon (1997) show that the traditional buy-and-hold methodology suffers from unreliable inferences on the statistical power for the purpose of long-term performance detection. The calendar-time portfolio approach, as they point out, does not suffer from the complications from the contemporaneous correlation in stock returns (please see Barber and Lyon (1997) for greater details). Finally, the calendar-time approach generates a time-series of returns, which are suitable for performance evaluation with characteristics-based performance evaluation models (i.e. the Fama-French three factor models).

(Insert Table 6 about here)

Our results in Panel A of Table 6 suggest that there is little evidence that retail investors gain from investing in locally-listed companies. For the one-day holding period, purchases on locally-listed companies (-0.0571) significantly under-perform the sales on locally-listed companies (0.0576). That is, retail investors lose significantly if they were to trade frequently. Such findings are consistent with findings from the U.S. and other developing markets (Nicolosi et al. 2009, Barber et al. 2009). The same pattern holds for retail investors' trades on remotely-listed companies. Purchases on remotely-listed companies (-0.0990) significantly under-perform sales on the same companies (0.0127). Whereas the underperformance on locally-listed companies comes from both the purchase and sale sides, the underperformance on remotely-listed companies largely stems from their poor decisions on purchases. Further, the buy-minus-sell spread is very similar between locally-listed and non-locally-listed companies, suggesting

that investing in locally-listed companies does not help retail investors obtain better performance, or at least avoid worse performance.

The results are very similar for the twenty-day holding period. Purchases on locally-listed companies significantly under-perform the sales on locally-listed companies. The same pattern holds for retail investors' trades on remotely-listed companies. When evaluating the differences in the buy-minus-sell spread between locally-listed and remotely-listed stocks, we find patterns in line with the 1-day holding period. There is little difference in the buy-minus-sell spreads between the locally- and remotely-listed companies. In sum, consistent with results from the United States and other developed markets (Nicolosi et al. 2008, Grinblatt and Keloharju 2001), retail investors do not seem to have very good timing ability over the monthly horizon. We experiment with alternative holding periods, such as 5-, 10-, 40-, 60-days and our main conclusions remain unchanged.[11]

In addition, we conduct the same exercises for investors at the two separate branches and investigate whether the aggregate results hold separately for the two sub-samples of investors. Our previous results retain: purchases significantly under-perform sales, for both locally- and remotely-listed companies. However, some of the differences in the buy-minus-sale spread are statistically insignificant. In the interest of space, we do not report such results, which are available from the authors upon request.

To serve as a control, we repeat the same exercises for investors at the Chongqing branch. The advantage of focusing on investors from the Chongqing branch lies primarily in the fact that Chongqing is located in the southern part of the country and shares many cultural similarities

[11] Such results are available from the authors upon request.

with both Shanghai and Shenzhen, which are also located in the southern part of the country. Further, the difference in the distances between Chongqing and Shanghai and Shenzhen is the smallest among the all other sample branches. Therefore, our analysis focusing on the exchange bias should be least affected by the local bias. Our results in Panel B of Table 6 show that, consistent with our conjecture, listing location has little noticeable impact on performance, for investors living outside the cities where the stock exchanges are located. Such results provide some further support to our results on Shanghai and Shenzhen investors, in that the bias towards locally-listed companies does not seem to help retail investors.

Our results so far indicate that retail investors do not seem to make better investments when investing in locally-listed companies: although the purchases on locally-listed companies outperform the purchases on remotely-listed companies, the sales on locally-listed companies outperform than the sales on remotely-listed companies by a similar amount. As a result, there is no net gain for investors to benefit from investing in locally-listed companies. Further, it is worth pointing out that the average holding period on locally-listed companies (41 days) is much shorter than that on remotely-listed companies (61 days). Hence, retail investors' performance net of transaction costs is even worse on locally-listed stocks than that on remotely-listed stocks.

5. Implications to Market-Level Returns and Trading Volumes

5.1. Exchange Bias and Asset Price Formation

Now that we have documented investors' tendency towards locally-listed companies, we next explore whether such systematic trading behavior by investors may turn into meaningful impact on asset price formation.

In their theoretical work, Barberis et al. (1998) and Delong et al. (1990) assume that noise traders move in similar pattern to each other and can exert significant impact on asset prices. Such systematic movement by noise traders, in turn, causes risk-averse professional investors to adjust their investment behavior, which can partly explain why asset prices can systematically and chronically deviate from their fundamental values. Following their studies, several studies (Kumar and Lee 2006, Barber et al. 2009a) show that retail investors' trading behavior is indeed correlated. Understanding the trading pattern of a representative sample of retail investors can provide powerful insight into the behavior of retail investors as a whole investor class. In addition, Barber et al. (2009b) and Hvidjkaer (2009) provide evidence that trading activities by retail investors indeed have the ability to move stock prices, at least in the short run.

More relevant to the current study, a few existing studies show that, in the United States, the location of corporate headquarters, local economic growth speed, and local investor sentiment and risk aversion, can all influence the (co-)movement of stock prices. In particular, Pirinsky and Wang (2006) show that the stocks of companies with geographically nearby headquarters tend to co-move with each other. Korniotis and Kumar (2009) show that local economic conditions and investor sentiment has predictive power over the returns of stocks headquartered within respective states. Both studies attribute their findings to investor bias towards locally headquartered companies and the limits in arbitraging away such local investor sentiment.

Unlike these existing studies that focus on the local bias related to the location of corporate headquarters, the current study is motivated by our findings that retail investors display a bias towards locally-listed companies. Coupling this with the systematic pattern of retail

investor trading behavior, we are concerned with the impact of the listing location of the companies and the impact of local investor sentiment on asset price movement of stocks listed in the local area. Several previous studies show that the country of listing or country of trading have influences on asset price movements. For example, Bonser-Neal et al. (1990) and Boudurtha et al. (1995) show that investor sentiment and investment constraints are responsible for explaining the premiums and discounts in closed-end country funds in the U.S. In particular, the premiums and discounts in closed-end country funds depend partly on the variations of the fundamental value of the foreign assets that they invest in. In the mean time, the discounts and premiums also depend on the returns and sentiments of the U.S. market, where such funds are listed and traded.

The novelty of the current study is that we show that, even without significant differences in country, culture, or location, the exchange-level investor sentiment still has important impact on asset prices within the same country. In particular, we are interested in testing whether the location of listing carries information that leads to similar patterns in price movement and trading activities.

A related strand of research examines price movement of the dual-listed stocks and documents evidence that country-level investor sentiment has explanatory power for returns of dual-listed stocks. Because dual-listings often share the fundamentals of the very same company, one would expect that the share prices move in sync with each other during most of the time. However, extant studies indeed find considerable variations in divergence of the price movement

between the dual listings. For example, Froot and Dabora (1999) find that dual-listed stocks have exposures to both home country and listing country.[12]

Using a natural experiment from the change of listing location by the Jardine's Group from Hong Kong to Singapore, Chan et al. (2003) find clear evidence that the local exchange transaction sentiment is important. They find that after Jardine's group moves its listing location from Hong Kong to Singapore, Jardine's stock prices co-move much more closely with the Singapore market benchmark, even though the company's primary operation remains located in Hong Kong. Such findings suggest that location of listing has considerable impact on international stock price movement.

Unlike the extant studies showing that the sentiment at home country and listing country are both important in influencing stock price movement, the current paper studies stocks listed at two similarly important stock exchanges within the same country. Such a within-country study provides some fresh perspectives as to how exchange-based sentiment affects asset prices. Different from the international setup in prior studies, where capital flow constraints, regulation, and investor segmentation may be responsible for stocks' different trading behavior in stock exchanges located within different countries, the unique feature of Chinese market enables the current study to circumvent the above complicating issues and provides some sharper focus on how exchange-based sentiment influences asset prices.

Our approach is straightforward and similar to those used in many extant studies (Chan et al. 2003, Froot and Dabora 1999). In particular, we are interested in investigating the co-

[12] Another famous and somewhat related example is the Royal Dutch/Shell example, where the two stocks share the same fundamentals yet the stock price movement do not converge during most of the time.

movement of price movement and trading-volume to the benchmarks at respective stock exchanges. If we find similar patterns to the extant study in that stocks listed at an exchange co-move more with the benchmark of that exchange than with benchmark from another leading exchange within the same country, we can conclude that the previously documented country-specific investor sentiment that influences asset prices can and probably does form at the stock exchange level within the same country. We plan to examine whether stocks listed at the same stock exchange display similarity in trading volume and price movement over time. A major challenge to such analysis is that, there are other well-known factors, most notably the local bias (investors' bias towards geographically nearby companies), that could influence the price movement of stocks listed at distinct exchanges (Pirinsky and Wang 2006, Kumar and Korniotis, 2009).

To disentangle the effect from the bias towards nearby companies and the exchange bias, which is the focus of the paper, we follow our prior practice of focusing on stocks with similar distances to both stock exchanges. In particular, consistent with our practice in the previous section, we define a company's stock as "stock with similar distance to both stock exchanges if the difference in distances from the company headquarter to both stock exchanges is less than 200 kilometers. We experiment with alternative definition of 100 kilometers, 300 kilometers, 100 miles, and 200 miles, and obtain very similar results.

Once we obtain the sample of listed companies with similar distances to both stock exchanges, we construct an equal-weighted and a value-weighted index based on the returns of stocks listed at each stock exchange. Specifically, we create the following four indices: the equal-weighted index of all companies listed at SSE, the value-weighted index of all companies

listed at SSE, the equal-weighted index of all companies listed at SZSE, and the value-weighted index of all companies listed at SZSE[13].

Next, we create equal- and value-weighted index of all stocks listed at each stock exchange. The benchmark indices reflect the price movement at the respective exchange level. We then perform CAPM regression and estimate the market beta for index of stocks with similar distances to both exchanges, separately for the sub-group of companies listed at the SSE, and for the sub-group of companies listed at the SZSE. In particular, the specification looks as follows:

$$r_{SZSE\_Sub} - r_f = \alpha + \beta(r_{SZSE} - r_f),\ r_{SSE\_Sub} - r_f = \alpha + \beta(r_{SSE} - r_f)$$

$$r_{SSE\_Sub} - r_f = \alpha + \beta(r_{SSE} - r_f),\ r_{SSE\_Sub} - r_f = \alpha + \beta(r_{SZSE} - r_f)$$

We are interested in comparing the beta and the R-square of the respective univariate regression. In addition, we follow prior studies and perform regressions that include the indices at both the SSE and SZSE within the same specification. The objective is to assess the relative importance of returns at both exchanges in explaining the return variations for the group of companies that are similarly located to both stock exchanges and listed at the SSE, and the group of companies that are similarly located to both stock exchanges and listed at the SZSE. In particular, the specification looks as follows:

$$r_{SZSE\_Sub} - r_f = \alpha + \beta_1(r_{SZSE} - r_f) + \beta_2(r_{SSE} - r_f)$$

[13] The formulae for calculating the four indices are as follows: value-weighted index = total float market capitalization / total number of stocks, equal-weighted index = sum of prices for all stocks / total number of stocks.

$$r_{SSE\_Sub} - r_f = \alpha + \beta_1 (r_{SSE} - r_f) + \beta_2 (r_{SZSE} - r_f)$$

Results in Table 7 confirm that, consistent with our conjecture, stocks listed at a specific stock exchange tend to correlate higher with price movement at the specific stock exchange. In Panel A. the beta is 0.9406 for the regression of Shenzhen-listed stocks on Shenzhen benchmark and is 0.7490 for regression of Shenzhen-listed stocks on Shanghai benchmark. The difference of 0.1916 is highly statistically significant at the 1 percent. The results on Shanghai-listed stocks present a similar pattern. The beta for the regression of Shanghai-listed stocks on Shanghai benchmark is 0.8492 and for the regression of Shanghai-listed stocks on Shenzhen benchmark is 0.7722. The difference is again highly significant at the 1 percent.

(Insert Table 7 about here)

Next, we report the results on regressions that include benchmarks at both stock exchanges in Panel B. For the sub-sample of companies with similar distances to both stock exchanges, the companies listed at SZSE correlate much stronger with the benchmark at the SZSE than that at the SSE. The coefficient for SZSE is 0.8335 and that for the SSE is 0.1553. The difference in the coefficients is both economically and statistically significant. At the same time, we obtain similar results for the companies listed at the SSE. The beta of such companies on the SSE index is 0.5884 and 0.3662 that on the SZSE is. Again, the difference in the coefficients is highly significant, both economically and statistically.

In addition to the co-movement with benchmark returns, we also examine the variations in trading volume of the sub-sample of companies and its correlation with exchange-level trading volume at both stock exchanges. Similar to our previous approach, we first calculate daily

trading volume for all companies listed at SSE and SZSE, respectively. Next, we separately calculate the daily trading volume of companies listed at the SSE and at the SZSE, which are located with similar distance to both the SSE and the SZSE. Our objective is to correlate the trading volume of the sub-sample of companies with similar distances to both stock exchanges, with the trading volume at respective stock exchanges. Existing studies provide strong evidence that investors tend to hold and trade more on nearby companies (measured by the distance between investor home and corporate headquarters), our approach of using only the sub-sample of companies with similar distances to both stock exchanges can therefore control the impact of traditional local bias on investor trading and focus squarely on the bias towards locally listed companies.

Similar to the results on stock price movement, we find that there is a distinct pattern in time-series variations in trading volume for companies listed at respective stock exchanges. In Panel A of Table 8, we regress the trading volume of the SZSE-listed companies over the trading volume of the SZSE and the SSE, respectively. As the results indicate, the coefficient on SZSE (local exchange) volume (0.0909) is far greater than that of the SSE (remote exchange) volume (-0.0008) and the difference is statistically significant at the 1 percent level. In addition, the separate uni-variate regressions which we include only SZSE and SSE volume respectively, we find that the R-square for the SZSE (local exchange) volume regression (0.9664) is also slightly greater than that for the SSE (remote exchange) volume regression (0.9522).

(Insert Table 8 about here)

Our regressions that investigate the trading volume of the SSE-listed companies generate very consistent results. Panel B of Table 8 indicates that, when we regress the trading volume of

the SSE-listed companies over the trading volume of the SSE and the SZSE, respectively, the coefficient on SSE (local exchange) volume (0.0606) is far greater than that of the SZSE (remote exchange) volume (0.0304) and the difference is statistically significant at the 1 percent level. In addition, the separate uni-variate regressions which we include only SSE and SZSE volume respectively, we find that the R-square for the SZSE (local exchange) volume regression (0.9565) is also greater than that for the SSE (remote exchange) volume regression (0.9485). It is important to note that unlike the return regressions where the dependent and independent variables are of similar magnitudes, the dependent variable and independent variables differ considerably in their values and hence it is not very meaningful to emphasize much on the magnitude of the coefficients. Instead, we note that the R-square of the univariate regression is greater when we regress the volume of the sample of geographically similar stocks listed at Shanghai (Shenzhen) on the market-level trading volume at Shanghai (Shenzhen). Such results provide some further corroborative support for our conjecture that exchange-level investor sentiment influences the variations of trading volume of stocks listed at such exchanges.

Because the number of stocks with similar distances to both stock exchanges (159) is much smaller than the total number of stocks listed at both stock exchanges (1600), we feel that the inclusion of such companies in calculating benchmark at respective exchanges should not affect our results. Nevertheless, we created an alternative set of indices which are calculated by excluding stocks with similar distances to both stock exchanges. We obtain very similar results, which are available from the authors upon request.

Our findings provide additional evidence to the theory prediction that the sentiment by noise (retail) investors is important and can move stock prices. In addition to existing findings

that such sentiment can be concentrated in different geographical areas and stocks with certain characteristics, our findings stress a new way in which investors' ideas encounter and aggregate, at the stock exchange.

5.2. Implications to the evolution of stock exchanges

The past decade has witnessed the burgeoning growth of electronic stock exchanges (For example, Electronic Communication Networks (ECNs) such as Instinet and Archipelago). At the same time, more companies explore listing their shares at different stock exchanges for economic or strategic reasons (Pagano et al. 2001). One distinction and claimed advantage of the new electronic exchange over the traditional physical stock exchange is that it does not require a physical location for the stock exchange or rely on investors from any particular locale.

Our findings from China, on the other hand, suggest that, even in light of the technology development and the growth in online stock exchanges, the traditional brick-and-mortar stock exchanges still command some advantages over the cyber new comers. Our findings emphasize the role of stock exchanges, especially in light of the recent development of the many electronic stock exchanges that no longer maintain a physical presence. If investors trade more actively on the locally-listed stocks, as we show in the current study, then the size and economy of the home cities of stock exchanges would have important influences on the development of stock exchanges.

Historically, cities and stock exchanges usually grew at the same time. For example, the New York Stock Exchange traces its origin to 1792, when 24 New York City stockbrokers and merchants signed the Buttonwood Agreement. The New York City and the NYSE went through

ups and downs together during the past two centuries. As a result, it is sometimes difficult to disentangle the effect that the urban area has on the stock exchanges.

In contrast, the stock exchanges in China were founded much later than the establishment of the cities where the stock exchanges are located. Despite the urbanization in recent China's history, there is a relatively stable group of investors located around the stock exchange. Our findings in the current paper imply that the decisions by such investors matter to the growth of the stock exchanges and stock market. Our findings that the listing location matters to asset price and trading volume at the market level underlines listing location's importance to securities market.

Several reasons explain why physical stock exchanges play such an important role in investor decisions in China. First of all, like many other Asian markets, retail investors play more important roles in the stock market than their counterparts in the West. Secondly, the high concentration of population in many areas in Asia, particularly major Asian cities, results in much closer social interactions in Asia than in the West. Such close social interaction, in return, leads to greater inter-personal communications, which fosters correlated trading among investors living in the same city (Hong et al 2004). Finally, despite the changing trend that the younger generation of investors are mostly use the internet to transact stocks, many Chinese retail investors still go to branches at brokerage firms (everyday) to watch the market and make transactions.[14]

[14] For example, Liao et. al. (2010) show that 60.9 percent of the sample trades were placed at the branch offices and 13.4 percent were placed on line. In contrast, 70.5 percent of the trades were placed on line and 19.3 percent were placed at branch offices.

Section 6. Conclusions

The current study documents retail investors' tendency to invest in locally-listed companies. Among Chinese investors located in Shanghai and Shenzhen, where two similarly important stock exchanges of China are located, we find that investors are far more likely to invest in locally-listed companies than in remotely-listed companies. For those who have invested in stocks that are listed at both stock exchanges, investors execute far greater number of trades and greater trading volume in locally-listed stocks, than remotely-listed ones.

Although such a listing exchange bias is related to the well-documented phenomenon of local bias, it is distinct from the local bias in that a similarly strong pattern of exchange bias remains, even for the sub-sample of companies whose distances to both stock exchanges are similar and hence least affected by the local bias. Because the listing location does not seem to provide an apparent channel through which investors can obtain advantageous information, we suspect that such a bias cannot help retail investors achieve better investment returns.

Our calendar-time portfolio methodology of performance evaluation confirms the above conjecture. Overall, retail investors in China do not display abilities to outperform the market, regardless of locally- or remotely-listed companies. Further, there is little support that the bias towards locally-listed companies can help investors improve their performance. The buy-minus-sale spread, which we use to evaluate whether investors can profit from their trading, is not statistically different between the locally- and remotely-listed companies. In some occasions, the bias towards locally-listed companies indeed leads to significant underperformance.

The current study provides at least two implications to the extant literature. First, the paper provides some novel evidence of familiarity-based stock investment choices. Because of

the unique feature of the natural experiment, we are able to better disentangle the informational and behavioral components of such familiarity-based investment decisions. Our findings suggest that at least part of the well-documented local bias of retail investors are driven by familiarity not associated with better information set.

Second, our findings provide new support to the argument that retail investor sentiment is important to financial markets. Based on the theoretical framework in Delong et al. (1990) and Barberis et al. (1998) and the empirical findings that retail investors' actions can aggregate to the market level, we show in the paper that the exchange-level investor sentiment has meaningful impact on the stock markets. Finally, our findings stress the advantage that some tradition brick-and-mortar stock exchanges still command, over their new-coming electronic competitors. The physical presence of the stock exchange and a large group of geographically-clustered investors, make physical stock exchange still an important intermediary, at least in some important stock markets.

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Figure 1. China Geography

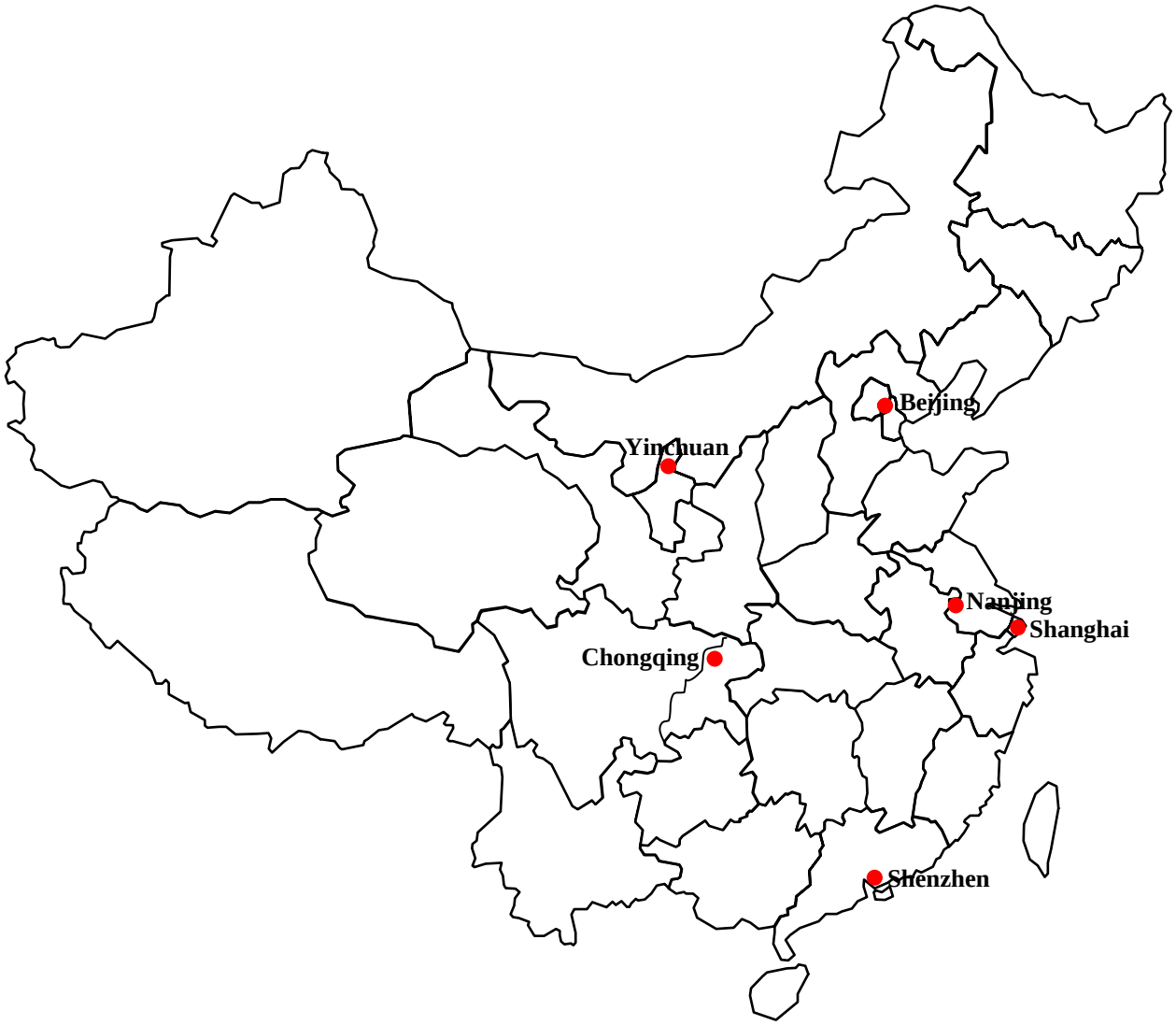
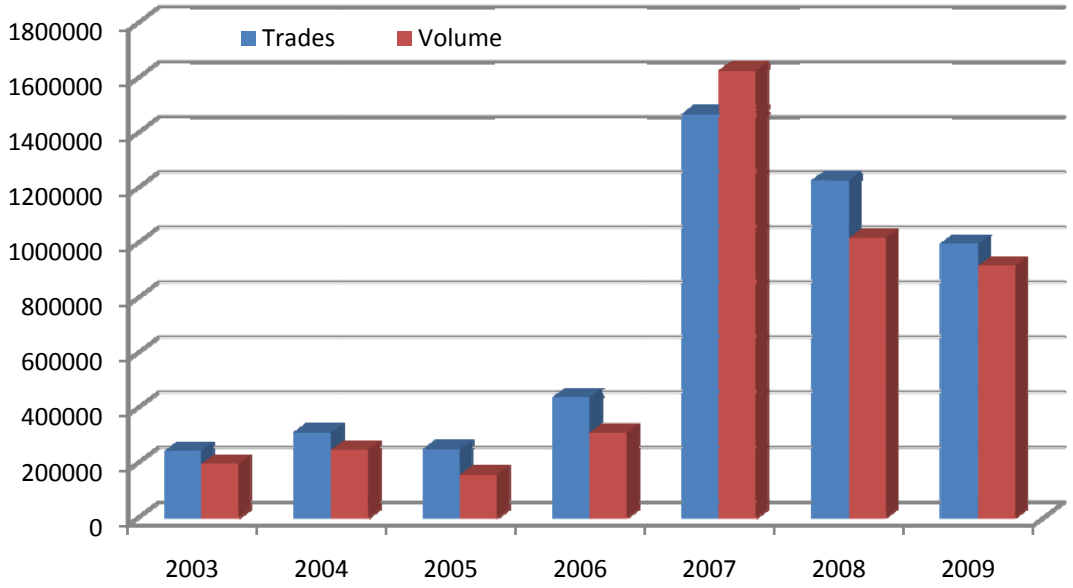


Figure 2. The Number of Trades and Trading Volume (divided by 10,000) by Sample Investors over Time



2009 statistics are calculated as of the end of June, 2009.

Table 1. Summary Statistics of the Shanghai Stock Exchange and Shenzhen Stock Exchange

This table summarizes the number of stocks and total float market cap at the Shanghai Stock Exchange and the Shenzhen Stock Exchange. The number of stocks includes all A-share stocks listed at respective stock exchanges and the total float market cap is the sum of the market capitalization of float A-share stocks listed at respective stock exchanges. The percent of Shanghai-listed stocks in the number of stocks or the total float market cap is calculated as the number of stocks (total float market cap) at the Shanghai Stock Exchange divided by number of stocks (total float market cap) at both the Shanghai Stock Exchange and the Shenzhen Stock Exchange.

	Shanghai		Shenzhen		Percent of Shanghai-listed stocks	
	Number of stocks	Total Float Market Cap	Number of stocks	Total Float Market Cap	Number of stocks	Total Float Market Cap
1993	101	29.44	76	38.86	57%	43%
1994	169	47.04	118	34.35	59%	58%
1995	184	49.51	127	29.59	59%	63%
1996	287	124.71	227	126.70	56%	50%
1997	372	232.79	348	252.82	52%	48%
1998	425	284.69	400	270.31	52%	51%
1999	471	410.99	450	382.75	51%	52%
2000	559	814.68	451	737.74	55%	52%
2001	636	772.61	494	561.88	56%	58%
2002	705	702.50	494	469.38	59%	60%
2003	770	779.69	491	450.91	61%	63%
2004	827	705.06	526	394.79	61%	64%
2005	824	651.46	534	351.39	61%	65%
2006	832	1593.39	579	779.74	59%	67%
2007	850	6319.06	677	2733.60	56%	70%
2008	854	3192.93	748	1248.98	53%	72%
2009	854	6459.75	746	2537.63	53%	72%

Table 2. Summary Statistics of the National Brokerage Data

This table summarizes the number of transactions (purchases and sales) and the total trading volume (purchases and sales) for the seven branches at the sample data. Trading volume is reported in millions of RMB Yuan

	Number of Trades			Trading Volume (Million RMB Yuan)		
	Purchases	Sales	Total	Purchases	Sales	Total
Shenzhen	129101	119416	248517	1361.58	1324.53	2686.11
Shanghai	282078	266053	548131	2500.76	2494.32	4995.08
Beijing	375396	326994	702390	2776.76	2626.94	5403.70
Chongqing	398872	363950	762822	3078.24	3012.29	6090.53
Nanjing	696987	648592	1345579	5932.96	5944.61	11877.57
Yinchuan	712011	618058	1330069	7045.34	6638.38	13683.73
Total	2594445	2343063	4937508	22695.64	22041.08	44736.72

Table 3. Summary of Exchange Local Bias

This table summarizes the number of trades and the trading volume by sample investors at the Shanghai and Shenzhen branches of the brokerage firm, respectively. Panel A reports the summary statistics for all investors at both branches. Panel B reports the summary statistics for only investors who have made at least one transaction at both stock exchanges. The adjusted SSE/SZSE is calculated by dividing the SSE/SZSE by the benchmark. The benchmark is calculated as the average of the ratio of total float market capitalization of the SSE to that of the SZSE, over the sample years of 2003 to 2009.

		Number of Trades			Volume of Trades (Million Yuan)		
		Purchases	Sales	Total	Purchases	Sales	Total
Panel A: All investors							
Shenzhen	SSE	70,397	64,026	134,423	739.98	708.27	1448.25
	SZSE	58,704	55,390	114,094	621.60	616.26	1237.86
	SSE/SZSE	1.20	1.16	1.18	1.19	1.15	1.17
	Adjusted SSE/SZSE	0.57	0.55	0.56	0.56	0.54	0.55
	% of investor who never traded in SSE	24.56					
	% of investor who never traded in SZSE	7.41					
Shanghai	SSE	222119	209904	432023	1961.60	1967.64	3929.24
	SZSE	59959	56149	116108	539.16	526.68	1065.84
	SSE/SZSE	3.70	3.74	3.72	3.64	3.74	3.69
	Adjusted SSE/SZSE	1.75	1.77	1.76	1.72	1.76	1.74
	% of investor who never traded in SSE	2.47					
	% of investor who never traded in SZSE	39.60					
Panel B: Investors trading in both exchanges							
Shenzhen	SSE	68492	62354	130846	721.45	691.69	1413.14
	SZSE	51067	47610	98677	543.25	533.25	1076.50
	SSE/SZSE	1.34	1.31	1.33	1.33	1.30	1.31
	Adjusted SSE/SZSE	0.63	0.62	0.63	0.63	0.61	0.62
Shanghai	SSE	180852	170882	351734	1603.55	1600.81	3204.37
	SZSE	59016	55279	114295	530.27	518.04	1048.31
	SSE/SZSE	3.06	3.09	3.08	3.02	3.09	3.06
	Adjusted SSE/SZSE	1.45	1.46	1.45	1.43	1.46	1.44

Table 4. Exchange Bias and Local Bias

We assess the degree of local preference based on the distance between an investor and his portfolio. Investors are divided into four quartiles according to the distance measure. The 1st quintile of investors denote those with lowest local degree of local bias, and the 4th quintile of investors denote those with highest local degree of local bias.

The adjusted SSE/SZSE is calculated by dividing the SSE/SZSE by the benchmark. The benchmark is calculated as the average of the ratio of total float market capitalization of the SSE to that of the SZSE, over the sample years of 2003 to 2009.

Brokerage Branch Loc.	Degree of Local Preference	Trades or Trading Volume (Buy + Sell)			
		SSE	SZSE	SSE/SZSE	Adjusted SSE/SZSE
Panel A: Number of Trades					
Shenzhen	1	28155	16312	1.73	0.81
	2	58880	41136	1.43	0.68
	3	38185	36300	1.05	0.50
	4	9203	20346	0.45	0.21
Shanghai	1	72055	30365	2.37	1.12
	2	156305	51004	3.06	1.45
	3	138914	28507	4.87	2.30
	4	64749	6232	10.39	4.91
Panel B: Trading Volume (Million PRC Yuan)					
Shenzhen	1	302.51	174.88	1.73	0.82
	2	618.19	445.54	1.39	0.66
	3	426.88	397.82	1.07	0.51
	4	100.67	219.62	0.46	0.22
Shanghai	1	690.09	295.56	2.33	1.10
	2	1381.07	449.37	3.07	1.45
	3	1249.63	258.38	4.84	2.28
	4	608.45	62.53	9.73	4.59

Table 5. Robustness Tests

This table reports the exchange bias, for sub-sample of stocks. Panel A reports the exchange bias for the sample of "Geographically similar companies", defined as companies headquartered with comparable distances to Shanghai and Shenzhen (difference in distances from the company headquarter to the two cities is less than 200 kilometers). Panel B reports the exchange bias for the sample of "geographically nearby companies", defined as companies headquartered within 200 kilometers from the investors. Adjusted SSE/SZSE is defined as the SSE/SZSE divided by the benchmark. The benchmark is calculated as the average of the ratio of total float market capitalization of the sample companies listed at the SSE to those listed at the SZSE, over the sample years of 2003 to 2009.

		Number of Trades			Volume of Trades (Million Yuan)		
		Purchases	Sales	Total	Purchases	Sales	Total
Panel A: Geographically similar companies							
Shenzhen	SSE	6,020	5,577	11,597	60.52	58.63	119.15
	SZSE	4,744	4,468	9,212	53.09	51.27	104.36
	SSE/SZSE	1.27	1.25	1.26	1.14	1.14	1.14
	Adjusted SSE/SZSE	0.69	0.68	0.69	0.62	0.62	0.62
Shanghai	SSE	17,152	16,336	33,488	145.7615	147.14	292.90
	SZSE	6,105	5,777	11,882	53.97991	52.51	106.49
	SSE/SZSE	2.81	2.83	2.82	2.70	2.80	2.75
	Adjusted SSE/SZSE	1.53	1.54	1.53	1.47	1.53	1.50
Panel B: Geographically nearby companies							
Shenzhen	SSE	4,651	4,151	8,802	56.29	52.08	108.37
	SZSE	17,180	16,033	33,213	176.28	178.43	354.71
	SSE/SZSE	0.27	0.26	0.27	0.32	0.29	0.31
	Adjusted SSE/SZSE	0.34	0.33	0.33	0.40	0.37	0.38
Shanghai	SSE	84,234	78,991	163,225	742.8221	744.29	1487.12
	SZSE	4,320	4,029	8,349	39.59794	38.45	78.04
	SSE/SZSE	19.50	19.61	19.55	18.76	19.36	19.05
	Adjusted SSE/SZSE	1.53	1.54	1.54	1.48	1.52	1.50

Table 6. Performance of Trades on Locally Listed Stocks

This table reports the performance of the calendar-time portfolio of trades on locally- and remotely-listed companies, by sample investors. We combine the transactions by Shanghai and Shenzhen investors. "Local' is defined as investors' trades on stocks listed in the same city and 'Non-local' is defined as investors' trades on stocks listed in the other city. Average per-day performance is reported in percentages. As a control, we also report the performance of transactions on SSE- and SZSE-listed companies, by sample investors at the branch in Chongqing, which is similarly away from the SSE and the SZSE. Panel A reports the results with the assumption of 1 trading-day holding period and Panel B reports the results with the assumption of a 20 trading-day holding period. The p-value of student t-test for the equality of means and the signed rank test for the equality of the medians are reported, respectively.

Brokerage Branch Loc.	Stock Exchange	Buy Portfolio	Sell Portfolio	Diff: Buy - Sell	P-value (Student-t)	P-value (Singed Rank)
Panel A: holding 1 trading day						
Shanghai & Shenzhen	Local	-0.0571	0.0576	-0.1147	<.0001	<.0001
	Non-local	-0.0990	0.0127	-0.1117	<.0001	<.0001
	Local - Non-local	0.0419	0.0449	-0.0030	0.9218	0.9947
Chongqing	SSE	-0.0720	0.0199	-0.0919	<.0001	<.0001
	SZSE	-0.0714	0.0085	-0.0799	<.0001	<.0001
	SSE - SZSE	-0.0006	0.0114	-0.0120	0.6326	0.9304
Panel B: holding 20 trading days						
Shanghai & Shenzhen	Local	0.0500	0.0704	-0.0204	<.0001	<.0001
	Non-local	0.0309	0.0569	-0.0260	<.0001	<.0001
	Local - Non-local	0.0191	0.0134	0.0056	0.2972	0.3323
Chongqing	SSE	0.0377	0.0588	-0.0211	<.0001	<.0001
	SZSE	0.0395	0.0616	-0.0221	<.0001	<.0001
	SSE - SZSE	-0.0018	-0.0028	0.0010	0.8173	0.8120

Table 7. Co-movement in Stock Returns for Stocks with Different Listing Locations

This table reports stock return regression results. Panel A reports uni-variate regression results. The dependent variables are the value- (equal-) weighted average of returns of the stocks with similar distances to both stock exchanges and listed in Shanghai (Shenzhen). The independent variable is the SSE and SZSE benchmark, respectively. Stock with similar distances to both stock exchanges are defined as companies headquartered with comparable distances to Shanghai and Shenzhen (difference in distances from the company headquarter to the two cities is less than 200 kilometers). Panel B reports bi-variate regression results. The dependent variables are the value- (equal-) weighted average of returns of the stocks with similar distances to both stock exchanges and are headquartered in Shanghai (Shenzhen). The independent variables include the SSE benchmark and SZSE benchmark.

Panel A: Uni-variate regression

	Value-weighted index				Equal-weighted index			
Model	SZSE=SZSE	SZSE=SSE	SSE=SSE	SSE=SZSE	SZSE=SZSE	SZSE=SSE	SSE=SSE	SSE=SZSE
β	0.9406	0.7490	0.8492	0.7722	1.0277	0.9787	1.0192	0.9500
R-Square	0.3110	0.1910	0.2637	0.2251	0.5514	0.4900	0.7241	0.6421
correlation	0.5577	0.4370	0.5136	0.4745	0.7426	0.7000	0.8509	0.8013

Panel B: Bi-variate regression

	Value-weighted index		Equal-weighted index	
Model	SZSE= SZSE+SSE	SSE=SSE+SZSE	SZSE= SZSE+SSE	SSE=SSE+SZSE
β1	0.8335	0.5884	0.8799	0.8786
β2	0.1553	0.3662	0.1627	0.1516
R-Square	0.3152	0.2895	0.5535	0.7267

Table 8. Co-movement in Trading Volume for Stocks with Different Listing Locations

This table reports trading volume regression results. Panel A reports the results for SZSE-listed stocks and Panel B reports the results for SSE-listed stocks. In Panel A, the dependent variable is the trading volume of the stocks with similar distances to both stock exchanges and listed in Shenzhen. In Panel B, the dependent variable is the trading volume of the stocks with similar distances to both stock exchanges and listed in Shanghai. Stock with similar distances to both stock exchanges are defined as companies headquartered with comparable distances to Shanghai and Shenzhen (difference in distances from the company headquarter to the two cities is less than 200 kilometers). The independent variable is the SSE and SZSE benchmark, respectively.

Panel A: Regress the trading volume of the SZSE-listed companies over the trading volume of the SZSE and the SSE

Model	SZSE=SZSE+SSE	SZSE=SZSE	SZSE=SSE
β1	0.0909	0.7466	0.0446
β2	-0.0008	/	/
R-Square	0.9664	0.9664	0.9522
Correlation	/	0.9830	0.9758

Panel B: Regress the trading volume of the SSE-listed companies over the trading volume of the SZSE and the SSE

Model	SSE=SSE+SZSE	SSE=SSE	SSE=SZSE
β1	0.0606	0.0757	0.1499
β2	0.0304	/	/
R-Square	0.9571	0.9565	0.9485
Correlation	/	0.9780	0.9739