Pacific-Basin Finance Journal 20 (2012) 561–582

Contents lists available at SciVerse ScienceDirect

Pacific-Basin Finance Journal

journal homepage: www.elsevier.com/locate/pacfin

Does the location of stock exchange matter? A within-country analysis

Li Liao [a], Zhisheng Li [b], Weiqiang Zhang [a], Ning Zhu [c,*]

[a] Tsinghua University, PR China
[b] Zhongnan University of Economics and Law, PR China
[c] Shanghai Advanced Institute of Finance, PR China and UC Davis, United States

ARTICLE INFO

Article history:
Received 20 October 2011
Accepted 26 December 2011
Available online 3 January 2012

JEL classification:
G02
G11
G15

Keywords:
Retail investor
Local bias
Stock exchange
Investor sentiment
Co-movement

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 and companies headquartered locally, investors still display a strong tendency to invest in locally-listed stocks. Among stocks with similar distances to both stock exchanges, those listed in Shanghai (Shenzhen) co-move more in returns and trading volumes, 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 bias and exchange-level sentiment influence asset price formation.

1. Introduction

Extant studies document evidence that investors tilt portfolios heavily toward domestic securities. French and Poterba (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

* Corresponding author at: Room 606, 211 West Huaihai Road Datong Plaza, Shanghai, 200030, China. Tel.: +86 21 6293 2280; fax: +86 21 6293 2061.
E-mail addresses: liaol@sem.tsinghua.edu.cn (L. Liao), zsli@znufe.edu.cn (Z. Li), zhangwq@sem.tsinghua.edu.cn (W. Zhang), nzhu@ucdavis.edu (N. Zhu).

0927-538X/$ – see front matter © 2012 Elsevier B.V. All rights reserved.
doi:10.1016/j.pacfin.2011.12.007

across different countries can explain some variations in the differences in cost of capital across different countries (Baker et al., 2002; Chan et al., 2003, 2005).

A closely related strand of research uncovers that the location of corporate headquarters influences investment decisions by institutions and retail investors even within the same country in many markets around the world (Coval and Moskowitz, 2001; Grinblatt and Keloharju, 2001; Huberman, 2001; Ivković and Weisbenner, 2005; Massa and Simonov, 2006; Zhu, 2003) and China (Feng and Seasholes, 2004a). While some studies point out that information advantage may be responsible for the local bias (Coval and Moskowitz, 1999, 2001; Ivković and Weisbenner, 2005; Massa and Simonov, 2006), there remains considerable controversy as to whether local investors indeed possess valuation-related information (Seasholes and Zhu, 2010; Zhu, 2003).

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 two similarly important stock exchanges 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 matter 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 local bias, there is stronger support for the argument that local bias by 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 toward the local stock exchange. Among retail investors at a large national discount brokerage firm, we find that 39.60% of retail investors at the Shanghai branch never traded stocks listed at the Shenzhen Stock Exchange, and 24.56% of retail investors at the Shenzhen branch never traded stocks listed at the Shanghai Stock Exchange during our sample years between 2003 and 2009. At the same time, far fewer investors (2.47% for retail investors at the Shanghai branch and 7.41% 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 branches, regardless of their distance to respective stock exchanges.

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

Not surprisingly, such a bias toward local exchange is related to the widely documented tendency for retail investors to display a bias toward geographically close companies. For investors at the Shanghai branch, the exchange bias for the quartile of investors with the highest local bias is 4.38 times that for the quartile 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 companies with similar distances to both exchanges and companies headquartered locally, investors still display strong trading intensity on stocks listed at the local stock exchange compared with those listed at the remote stock exchange. For example, for the sample of companies of which the differences in distances to both exchanges are within 200 km, the trading volume on Shanghai-listed stocks is 1.50 times that on Shenzhen-listed stocks for Shanghai investors. However, the trading volume on Shanghai-listed stocks is only 62% of that on Shenzhen-listed stocks for Shenzhen investors.

It is important to stress that our results from the large discount brokerage company are 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 distances to both stock exchanges is less than 200 km), the returns (trading volumes) of stocks listed at the Shanghai Stock Exchange co-move much stronger with the Shanghai Stock Exchange benchmark (the trading

volume variations at the Shanghai Stock Exchange). At the same time, the returns (trading volumes) of the stocks listed at the Shenzhen Stock Exchange co-move much stronger with the Shenzhen Stock Exchange benchmark (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 toward locally-listed companies can shed further light 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 a 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 average daily return generated by the purchases on locally-listed companies is 0.1147% lower than that generated by the sales on locally-listed companies. The difference is statistically significant at the 1% level. It is worth noting that purchases on remotely-listed companies also significantly underperform the sales on remotely-listed companies. The important message of the current study is, however, that investing in locally-listed companies does not help investors achieve better performance or reduce their under-performance. Our analysis using the Fama and French (1993)'s three-factor model 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 brokerage branches; we experiment with alternative definitions of local and remote 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 remotely-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 headquarters 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 that even within the very same country, where capital flow, culture, language, and time zone (Grinblatt and Keloharju, 2001; Lee et al., 2008; Liu et al., 2010; 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 volumes. 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 toward 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, Ivković 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 toward either stock exchange. For that 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 subsample 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 electronic stock exchanges and the relative importance of physical stock exchanges in light of the change. Our findings highlight an important role of physical exchanges. 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 and Euronext), the physical location of stock exchanges 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), who investigate whether the location of listing matters in the context of Asian financial markets. Unlike their study that utilizes the differences in locations of listing 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 current study focuses on the impact of the location of stock exchange and makes the distinction between the distance-based local bias from the exchange-based local bias, which distinguishes itself from recent studies by Feng and Seasholes (2004b) and Seasholes et al. (2010). Further, we investigate the impact of exchanged bias on asset price formation and trading correlation and show that, such an exchange-based bias has its own share of influence on equity trading and equity pricing.

The rest of the paper proceeds as follows: Section 2 describes the Chinese stock market 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 toward stocks listed at local stock exchange; Section 5 investigates the implications of local exchange bias to asset price formation and the evolution of stock exchanges; we conclude in Section 6.

2. The Chinese stock market and the two stock exchanges

To capitalize on Chinese economic growth, the Chinese financial market was founded and grew rapidly during the past two decades. The Shanghai Stock Exchange (SSE) was founded in 1990 and the Shenzhen Stock Exchange (SZSE) was founded in 1991 to jump start the Chinese economic transformation. The number of listed companies soared from 53 back then to 2063 in 2010. At the same time, the total market capitalization of companies increased from 104.81 billion Yuan in 1992 to 26,542.24 billion Yuan in 2010.[1]

One particularly interesting feature of the Chinese financial market to the current study is that there have been 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 hereafter in the paper)

[1] It is worth pointing out that Chinese domestic investors CANNOT invest in the Hong Kong Exchange, which is geographically close to Shenzhen, due to capital flow constraints imposed by the Chinese regulators.

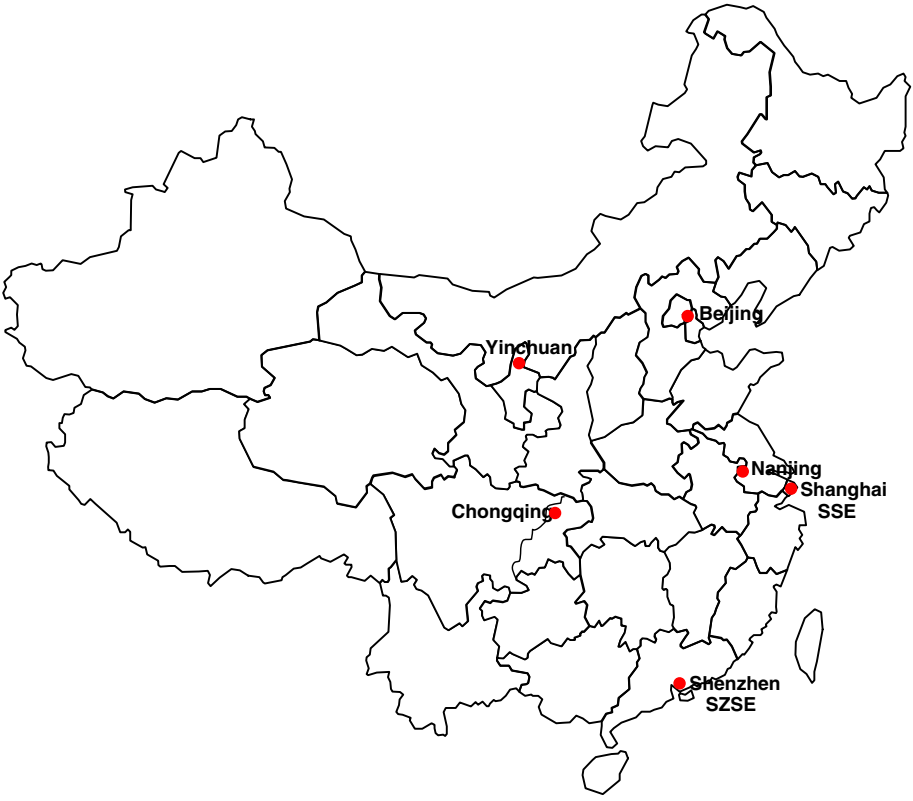

Fig. 1. The geography of the stock exchanges and brokerage branches in China.

and the Shenzhen Stock Exchange (referred to as the SZSE hereafter in the paper). As Fig. 1 indicates, the SSE is located in Shanghai, one of China's most important economic centers and a historical hotbed for Chinese capitalism. Shenzhen, where the SZSE is located, has been of lower profile at least during the early days of the market. The city is one of the earliest founded Special Economic Zones (SEZ), and the exchange was established here partly to boost the economic growth in the city and the neighboring provinces.

This situation is unique and interesting because few countries witness two similarly important stock exchanges. The Pacific Stock Exchange in San Francisco is far smaller than the New York Stock Exchange and the American Stock Exchange in the U.S. and the Vancouver Stock Exchange is much smaller than the Toronto Stock Exchange in Canada. In contrast, the SSE and the SZSE are located far from each other (the distance between the two cities is about 1200 km) and our summary statistics below 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 to study the influences that the location of stock exchange has on investor behavior and asset price formation.[2]

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, 101 A-share stocks were listed at the SSE and 76 at the SZSE. The number of A-share listed stocks increased steadily over time. By the end of June 2009, 854 A-share listed stocks were at the SSE and 746 at the SZSE. The total listed market capitalization at the SSE used to be slightly

[2] 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 km apart). Further, according to the latest statistics at the World Federation of Exchanges (WFE), the market capitalization and the trade volume at the Tokyo Stock Exchange are about twenty times greater than that at the Osaka Stock Exchange (3115 billion U.S. dollars vs. 147 billion U.S. dollars and 5607 billion U.S. dollars vs. 236 billion U.S. dollars in 2008).

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 (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 (in billion CNY)	Number of stocks	Total float market cap (in billion CNY)	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%

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

smaller than that at the SZSE and made up about 43% of the total market capitalization at both exchanges. This pattern fluctuates slightly over time depending on market conditions at the respective exchanges. In recent years, the total listed market capitalization at the SSE has become about twice as large as that at the SZSE and makes up about two thirds of the total listed market capitalization in China.[3]

In addition, unlike the practice in the United States where there is a strong distinction in the choice of listing exchange (i.e. large blue-chip companies typically are 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 decides which exchange the shares will be listed. According to officials at the CSRC, the choice of listing location is mostly a random one throughout our sample period (Qi et al., 2007).[4]

3. The Chinese brokerage data

The data comes from the central information and technology center of a brokerage firm and has been verified and checked for data accuracy and integrity. The brokerage is a large national-level brokerage house with about 50 branches in about ten cities within about ten different provinces.[5] The company has more than 1000

[3] It is worth noting that, in addition to their A-share listings, some Chinese companies also have 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.

[4] In further unreported analysis, we compare the market capitalization, industry concentration, ownership structure, and valuation level of firms listed at respective stock exchanges and the differences between companies listed at both exchanges are modest. We further conduct analysis for a sub-sample of Shanghai- and Shenzhen-listed companies with similar characteristics (similar market capitalization, book-to-market ratio, and company age) and our sample results are highly consistent with our main findings. Therefore, we do not feel that firm characteristics at the two distinct exchanges influence our main findings.

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

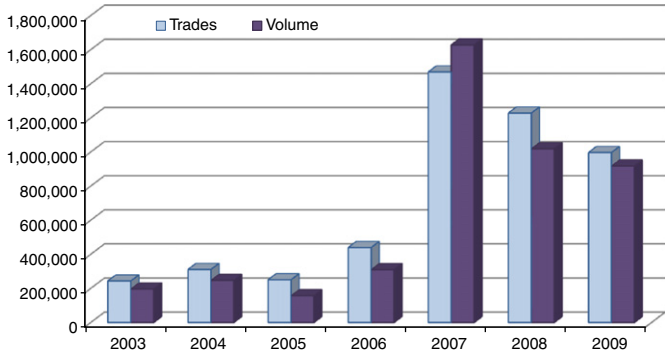

Fig. 2. The number of trades and trading volume (10 thousand Yuan) by sample investors over time. This figure shows the total number and volume of trades by sample investors from 2003 to 2009. The statistics of 2009 are calculated as of the end of June, 2009.

employees and ranks in the top quartile among all Chinese brokerage companies, in terms of transaction volume. Unlike more developed markets, retail investors play an important role in the Chinese stock market during our sample period. According to statistics from the Shanghai Stock Exchange in 2008, retail investors, corporations, and financial institutions respectively account for 42%, 26% and 32% of stock holdings in Chinese stock market. Retail investors' impact becomes even greater, if one were to focus on the trading activities in the market. Chinese retail investors make up 83% of total market trading activities in the Chinese market, far greater than corporations (4% of total trading volume) and financial institutions (13% of total trading volume).

We get the trading history of investors from six branches at the brokerage house between the period of January 2003 and June 2009. There are a total number of 71,460 investors from the six branches, who generate an average daily trading volume over 320.85 million Yuan in 2008. To narrow our focus on retail investors, we exclude investors who seem to have traded considerable amount. Our final sample includes investors who have never made a single transaction valued at more than 100,000 Yuan (about 15,000 U.S. dollars) throughout the sample period.[6] Such criteria reduce our final sample to 55,368 investors. These sample investors make a total of 4,937,508 trades: 2,594,445 purchase trades and 2,343,063 sales trades. Fig. 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% 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 sizes of different branches at the sample brokerage firm also are quite different. Therefore, it should not be surprising that different branches within the same brokerage firm have different levels of business. 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, 2004a; Ng and Wu, 2010) 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.

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% of the sample investors are males and 50.2% are females. The average trading experience with the broker is 5.5 years (median is 3 years).

Several features of the brokerage data from China merit some additional discussion. First, in China, it is required that an investor open one and only one account that trades stocks listed at the SSE and another separate one and only one account that trades stocks listed at the SZSE. That is, an investor who opens an account with a particular brokerage branch has to place all his or her trades with that brokerage branch.

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

Table 2
Summary statistics of the national brokerage data. This table summarizes the number of accounts, the number of transactions (purchases and sales) and the total trading volume (purchases and sales) for the six branches of the sample data. Trading volume is reported in millions of Yuan.

	Number of accounts	Number of trades			Trading volume (million Yuan)		
		Purchases	Sales	Total	Purchases	Sales	Total
Shenzhen	3657	129,101	119,416	248,517	1361.58	1324.53	2686.11
Shanghai	5260	282,078	266,053	548,131	2500.76	2494.32	4995.08
Beijing	6627	375,396	326,994	702,390	2776.76	2626.94	5403.70
Chongqing	7713	398,872	363,950	762,822	3078.24	3012.29	6090.53
Nanjing	12,060	696,987	648,592	1,345,579	5932.96	5944.61	11,877.57
Yinchuan	20,051	712,011	618,058	1,330,069	7045.34	6638.38	13,683.73
Total	55,368	2,594,445	2,343,063	4,937,508	22,695.64	22,041.08	44,736.72

Therefore, we feel confident that our data depict a complete picture of investors' trading behavior as it pertains to the objective of our paper, to investigate the bias toward local stock exchange.

Second, unlike the practice of many more developed markets and partly due to capital flow constraints, most of Chinese investors invest exclusively in domestic stocks for two major reasons. First, the restrictions on foreign exchange and international fund flows from the Chinese authorities make it costly and often difficult to invest overseas. Partly related to this phenomenon, mutual funds and asset management companies only recently started rolling out products aimed at investing primarily in foreign countries. Such funds typically are 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). Secondly, the first batch of QDII funds was launched at poor time during the market peak around 2007 and has suffered considerably in performance in the midst of the subsequent global financial crisis. Consequently, retail investors grew 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 sometimes discrepancies exist between regulation and 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, incidences have been reported in which, to avoid scrutiny from regulators, some investors at times 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.

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 at the Shenzhen or Shanghai Exchange. Out of the 3657 investors at the Shenzhen branch, 898 investors have never traded SSE-listed companies, and 271 investors have never traded SZSE-listed companies. The sample investors at the Shanghai branch display a similar and even stronger pattern. Among all 5260 sample investors at the Shanghai branch, 2083 investors have never traded SZSE-listed stocks whereas 130 have never traded SSE-listed companies.[7]

[7] The number of investors who have never traded in a particular exchange serves as a reasonably good proxy for investors who never opened an account in that exchange. Out of the 3636 Shenzhen investors whose account opening information is available, 854 (239) investors did not have an account in the SSE (SZSE). In contrast, out of the 5245 Shanghai investors whose account information is available, 86 (1824) investors did not have an account in the SSE (SZSE).

Table 3
Summary of exchange bias. This table summarizes the number of trades and the trading volume (million Yuan) 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		
		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	222,119	209,904	432,023	1961.60	1967.64	3929.24
	SZSE	59,959	56,149	116,108	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	68,492	62,354	130,846	721.45	691.69	1413.14
	SZSE	51,067	47,610	98,677	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	180,852	170,882	351,734	1603.55	1600.81	3204.37
	SZSE	59,016	55,279	114,295	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

Next, we summarize the trading activities on SSE- and SZSE-listed stocks by investors at the Shanghai branch 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 for purchases and 64,026 for sales) on SSE-listed companies. In contrast, the same investors make a total of 114,094 trades (58,704 for purchases and 59,390 for 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 time-series average of ratio of the total float market capitalization between the two stock exchanges as the benchmark.[8] We then obtain the ratio of trading volume made by sample investors by dividing the benchmark ratio.[9] The calculated ratio of 0.56 reveals that the ratio of trading activities on the SSE and those on the SZSE is significantly less than the benchmark.

Our results on the investors from the Shanghai branch depict a similar picture. Shanghai investors make a total of 432,023 trades on SSE-listed companies (222,119 for purchases and 209,904 for sales) and a total of 116,108 trades on SZSE-listed companies (59,959 for purchases and 56,149 for sales). The ratio of the number of trades executed on SSE-listed to SZSE-listed companies is 3.72 (3.70 for purchases and 3.74 for sales). 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 executed on SZSE-listed companies, even when the different amounts of market capitalization at both exchanges are accounted for.

[8] The value is 2.12 which can be directly calculated based on the data in Table 1.

[9] We experiment with the alternative of subtracting the SSE to SZSE ratio every year first and then calculate the time series of the average of the difference and the results are very similar and available upon request.

In addition to the trading frequency, we also examine the dollar trading volume. Shenzhen investors traded a total of 1448.25 million Yuan (739.98 for purchases and 708.27 for sales) on SSE-listed companies. At the same time, these investors traded a total of 1237.86 million Yuan (621.60 for purchases and 616.26 for sales) on SZSE-listed companies. The ratio of trading volume on the SSE and the 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 finding 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 3929.24 million Yuan (1961.60 for purchases and 1967.64 for sales) and that on SZSE-listed company is 1065.84 million Yuan (539.16 for purchases and 526.68 for sales). The ratio of trading volume on the SSE to the SZSE is 3.69 (3.64 for purchases and 3.74 for sales), which is again very similar to the ratio based on trading frequencies. When we apply the same benchmark 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 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.[10] 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 another stock exchange that is farther away.

As we have shown previously, many more investors at the 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 slight difference in account opening fees required by the SSE and the SZSE is responsible for their avoidance of trading stocks listed in the other city.[11] Nevertheless, to avoid influences from such investors who have never traded stocks listed at 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 subsample 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 number of trades and trading volume for SZSE-listed companies are 98,677 and 1076.50 million Yuan respectively, which are significantly fewer than the number of trades (130,846) and trading volume (1413.14 million Yuan) for the stocks listed at the SSE. Similarly, for such investors from the Shanghai branch, the number of trades (351,734) and trading volume (3204.37 million Yuan) for SSE-listed companies are far greater than the number of trades (114,295) and trading volume (1048.31 million Yuan) for the SZSE-listed companies. Once we apply the benchmark for adjustment, we find that the 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.

4.2. Exchange bias and local bias

It is conceivable that part of the bias toward 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 distances to Shanghai and Shenzhen are 868.58 km and 1412.79 km, respectively. For stocks listed at the SZSE, the average distances to Shanghai and Shenzhen are 1026.48 km and 1122.70 km,

[10] 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 the trading volume by sample investors at both branches.

[11] There is a 10 Yuan difference in the fee requirement for opening a brokerage account to trade Shanghai- or Shenzhen-listed stocks, which is trivial.

Table 4
Exchange bias and local bias. We assess the degree of local preference based on the distance between an investor and his or her portfolio. Investors are divided into four quartiles according to the distance measure. The 1st quartile of investors denote those with lowest local degree of local bias, and the 4th quartile 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	28,155	16,312	1.73	0.81
	2	58,880	41,136	1.43	0.68
	3	38,185	36,300	1.05	0.50
	4	9203	20,346	0.45	0.21
Shanghai	1	72,055	30,365	2.37	1.12
	2	156,305	51,004	3.06	1.45
	3	138,914	28,507	4.87	2.30
	4	64,749	6232	10.39	4.91
Panel B: trading volume					
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

respectively. At the same time, the fraction of Shanghai-listed firms within 100 km from Shanghai is 17.33%, and the fraction of Shenzhen-listed firms within 100 km from Shenzhen is 14.75%. The above statistics indicate that firms are more likely to be listed at a nearby exchange. 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 large 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.

To disentangle the bias toward local exchange from the bias toward nearby companies, we next compare the trading activities at local exchange and remote exchange, for a subsample of companies that are at similar distances from both stock exchanges. In particular, we define companies as "geographically similar companies" if the differences in distances from the company headquarter to both stock exchanges are less than 200 km. As Panel A of Table 5 suggests, the bias toward the local exchange remains for the subsample of companies with similar distances to both stock exchanges. That is, we still observe considerable bias toward 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 km, we experiment with alternative cutoff values of 100 and 300 km 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 headquartered within 200 km from the investors. Panel B of Table 5 shows that the magnitude of the exchange bias is very similar for Shanghai investors and becomes even stronger for Shenzhen investors. Similar to the above exercise, we adopt alternative cutoff values of 100 and 300 km to define geographically nearby companies. We also try another methodology by defining geographically nearby companies as those headquartered in the same province as the investors' home. We obtain similar results, which, to conserve space, are not reported.[12] We interpret the results as further support to our argument that the exchange bias and local bias are two separate phenomena.

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

Table 5
Robustness tests. This table reports the exchange bias, for subsample of stocks. Panel A reports the exchange bias for the sample of "geographically similar companies," defined as companies headquartered with comparable distances to both exchanges (difference in distances from the company headquarter to the two cities is less than 200 km). Panel B reports the exchange bias for the sample of "geographically nearby companies," defined as companies headquartered within 200 km 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		
		Purchases	Sales	Total	Purchases	Sales	Total
Panel A: geographically similar companies							
Shenzhen	SSE	6020	5577	11,597	60.52	58.63	119.15
	SZSE	4744	4468	9212	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	145.76	147.14	292.90
	SZSE	6105	5777	11,882	53.98	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	4651	4151	8802	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	742.82	744.29	1487.12
	SZSE	4320	4029	8349	39.60	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

In addition, we perform the same analysis for sample investors located at other branches of the same brokerage company. If what we observe in the previous analysis is largely driven by the bias toward 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) 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 a much weaker pattern for investors located at branches outside the two cities where the stock exchanges are located. Our findings indeed 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.[13]

4.3. Sources of the local exchange bias

As we indicate in Section 4.2, the exchange bias is related partly to the well-documented home bias and the related local bias (investors' preferences for domestic companies and companies that are nearby). Now that we have documented a strong bias toward companies listed at local exchanges even when we control for the difference in company headquarter locations, we next focus on exploring why investors display such a tendency toward locally-listed companies.

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 United States favor nearby companies and indeed obtain better performance from such local investment.[14] At the same time, there remains considerable controversy as to whether retail investors' local bias is driven by advantageous information. Ivković

[13] Such results are available from the authors upon request.
[14] Sulaeman (2008) shows that the choice of methodology is important in interpreting the results on institutional investors.

and Weisbenner (2005) claim that, similar to institutional investors, retail investors also obtain better returns from their nearby investments. Seasholes and Zhu (2010), however, point out that the methodology in Ivković and Weisbenner (2005) is flawed and fails 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 toward 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 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.[15] 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 transaction 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 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 model).

Our results in 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 significantly under-perform sales on locally-listed companies by 0.1147% per day. That is, retail investors lose significantly if they were to trade frequently. Such findings are consistent with findings from the United States and other developed markets (Barber et al., 2009a; Nicolosi et al., 2009). The same pattern holds for retail investors' trades on remotely-listed companies. Purchases on remotely-listed companies significantly under-perform sales on the same companies by 0.1117% per day. Further, the buy-minus-sell spread is very similar between locally-listed and remotely-listed companies, suggesting that investing in

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

Table 6
Performance of trades on locally- and remotely-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 as the investors' home and "remote" is defined as investors' trades on stocks listed the city other than the investors' home. 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 at a similar distance from the SSE and the SZSE. Panel A reports the results with the assumption of one trading-day holding period and Panel B reports the results with the assumption of a 20 trading-day holding period. Raw returns are $r_{Bt} - r_{St}$, where r_{Bt} is the percentage return of the value-weighted calendar-time portfolio based on purchases in day t and r_{St} is the percentage return of the value-weighted calendar-time portfolio based on sales in day t. The Fama–French three-factor intercept is estimated from a time-series regressions of $r_{Bt} - r_{St}$ on the market excess return, a zero-investment size portfolio (SMB), and a zero investment book-to-market portfolio (HML). The p-value of student *t*-test for significance of the average raw return and significance of the Fama–French three-factor excess return are reported, respectively.

Brokerage branch loc.	Stock exchange	Raw return (buy - sale)		Fama–French three-factor intercept (buy - sell)	
		Return	P-value	Excess return	P-value
Panel A: holding 1 trading day					
Shanghai and Shenzhen	Local	−0.1147%	<.0001	−0.1178%	<.0001
	Remote	−0.1117%	<.0001	−0.1140%	<.0001
	Local–Remote	−0.0030%	0.9218	−0.0038%	0.9007
Chongqing	SSE	−0.0919%	<.0001	−0.0957%	<.0001
	SZSE	−0.0799%	<.0001	−0.0833%	<.0001
	SSE–SZSE	−0.0120%	0.6326	−0.0124%	0.6231
Panel B: holding 20 trading days					
Shanghai and Shenzhen	Local	−0.0204%	<.0001	−0.0203%	<.0001
	Remote	−0.0260%	<.0001	−0.0267%	<.0001
	Local–Remote	0.0056%	0.2972	0.0064%	0.2371
Chongqing	SSE	−0.0211%	<.0001	−0.0213%	<.0001
	SZSE	−0.0221%	<.0001	−0.0224%	<.0001
	SSE–SZSE	0.0010%	0.8173	0.0011%	0.7891

locally-listed companies does not help retail investors obtain better performance or avoid worse performance. We also conduct the Fama–French three-factor model to control potential differences in firm characteristics between the locally-listed and remotely-listed portfolios and such risk-adjustment method generates consistent findings (Table 6, columns 5–6).

The results are very similar for the 20-day holding period. Purchases on locally-listed companies significantly underperform 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 one-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 (Barber et al., 2009a; Grinblatt and Keloharju, 2001; Nicolosi et al., 2009), 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.[16]

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 subsamples 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 at the Chongqing branch lies primarily in the fact that Chongqing is located in the southern part of the country and shares many cultural similarities with both Shanghai and Shenzhen, which are also located in the southern part of the country. Further, the difference in the distances from

[16] Results are available from the authors upon request.

Chongqing to 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 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 toward locally-listed companies does not seem to help increase trading performance.

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 the sales on remotely-listed companies by a similar amount. As a result, investors experience no net gain by investing in locally-listed companies.

5. Implications to market-level returns and trading volumes

5.1. Exchange bias and asset price formation

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

In their theoretical work, Barberis et al. (1998) and De Long 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. At the same time, Brennan and Cao (1996) are among the first to show how information flow may cause trades to cluster around local stocks and Feng and Seasholes (2004b) provide further theory and empirical support to their original framework. Following their studies, several other studies (Barber et al., 2009b, 2009c; Kumar and Lee, 2006) 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 Hvidkjaer (2008) 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, all can influence the (co-)movement of stock prices. In particular, Pirinsky and Wang (2006) show that the stocks of companies with nearby headquarters tend to co-move with each other. Korniotis and Kumar (2009) show that local economic conditions and investor sentiment have predictive power over the returns of stocks headquartered within respective states. Both studies attribute their findings to investor bias toward locally headquartered companies and the limit 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 toward 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 movement. For example, Bodurtha et al. (1995) and Bonser-Neal et al. (1990) show that investor sentiment and investment constraints are responsible for explaining the premiums and discounts in closed-end country funds in the United States. 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 sentiment 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 same company, one would expect that the share prices move in sync with each other most of the time. However, extant studies 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.[17]

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 the location of listing has considerable impact on international stock price movement.

Unlike the extant studies showing that the sentiments at the 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 exchanges located within different countries, the unique feature of the 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-movement of price and trading-volume for stocks listed at a particular exchange to the benchmarks at respective stock exchanges. If we find similar patterns to those in the extant studies (stocks listed at an exchange co-move more with the benchmark at that exchange than with the benchmark at 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 toward nearby companies), that could influence the price movement of stocks listed at distinct exchanges (Korniotis and Kumar, 2010; Pirinsky and Wang, 2006).

To disentangle the effect from the bias toward nearby companies on 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 km. We experiment with alternative cutoff values of 100 km and 300 km 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 the SSE, the value-weighted index of all companies listed at the SSE, the equal-weighted index of all companies listed at the SZSE, and the value-weighted index of all companies listed at the SZSE.[18]

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

$$r_{SZSE_{sub}} - r_f = \alpha + \beta \times \left(r_{SZSE} - r_f\right)$$
$$r_{SZSE_{sub}} - r_f = \alpha + \beta \times \left(r_{SSE} - r_f\right)$$

[17] Another famous and somewhat related example is the Royal Dutch/Shell example in which the two stocks share the same fundamentals, yet the stock price movements do not converge most of the time.

[18] 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.

$$r_{SSE_{sub}} - r_f = \alpha + \beta \times \left(r_{SSE} - r_f\right)$$

$$r_{SSE_{sub}} - r_f = \alpha + \beta \times \left(r_{SZSE} - r_f\right).$$

We are interested in comparing the betas and the R-squares of the respective uni-variate regressions. In addition, we follow prior studies and perform regressions that include the indices at both the SSE and the 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 Shanghai-listed companies that are at a similar distance to both stock exchanges, and the group of Shenzhen-listed companies that are at a similar distance to both stock exchanges. In particular, the specification looks as follows:

$$r_{SZSE_{sub}} - r_f = \alpha + \beta_1 \times \left(r_{SZSE} - r_f\right) + \beta_2 \times \left(r_{SSE} - r_f\right)$$

$$r_{SSE_{sub}} - r_f = \alpha + \beta_1 \times \left(r_{SSE} - r_f\right) + \beta_2 \times \left(r_{SZSE} - r_f\right).$$

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 of Table 7 the beta is 0.94 for the regression of Shenzhen-listed stocks on the Shenzhen benchmark and is 0.75 for the regression of Shenzhen-listed stocks on the Shanghai benchmark. The difference of 0.19 is highly statistically significant at the 1%. The results on Shanghai-listed stocks present a similar pattern. The beta for the regression of Shanghai-listed stocks on the Shanghai benchmark is 0.85 and for the regression of Shanghai-listed stocks on the Shenzhen benchmark is 0.77. The difference is again highly significant at the 1%.

Next, we report the results on regressions that include benchmarks at both stock exchanges in Panel B of Table 7. For the subsample of companies with similar distances to both stock exchanges, the companies listed at the SZSE correlate much more strongly with the benchmark at the SZSE than that at the SSE. The coefficient on the SZSE index is 0.83 and that on the SSE index is 0.16. 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 0.59 and that on the SZSE index is 0.37. 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 subsample of companies and their correlation with exchange-level trading volume at both stock exchanges. Similar to our previous approach, we first calculate the daily trading volume for all companies listed at the SSE and the SZSE, respectively. Next, we separately calculate the daily trading volume of companies listed at the SSE and 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 subsample of companies with similar distances to both stock exchanges, with the trading volume at the respective stock exchanges. Existing studies provide strong evidence that investors tend to hold and trade more on nearby companies (measured by the distance between investors' home and corporate headquarters). Our approach of using only the subsample 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 toward locally listed companies. To allow better interpretation, both the dependent and independent trading volume variables are log transformed in the regression equations.

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. Considering the fact that all the volume variables are persistent and the correlation between the SZSE and SSE volumes is very high. We first run an autoregressive model[19] to obtain innovations in trading volume for each volume variable, and then run the same regressions as used to investigate the co-movement in stock returns.

In Panel A of Table 8, we regress the trading volume residuals of the SZSE-listed companies with similar distances to both exchanges over the trading volume residuals of the SZSE and the SSE, respectively. As the results indicate, the coefficient on the SZSE (local exchange) volume (0.72) is far greater than that on the

[19] We apply the following AR(5) model: $\mathrm{Vol} = \alpha + \beta 1 * \mathrm{lag}\,1(\mathrm{vol}) + \beta 2 * \mathrm{lag}\,2(\mathrm{vol}) + \beta 3 * \mathrm{lag}\,3(\mathrm{vol}) + \beta 4 * \mathrm{lag}\,4(\mathrm{vol}) + \beta(\mathrm{vol})$. We also try to use autoregressive models with other different orders and get very similar results.

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 subsamples of stocks with similar distances to both stock exchanges that are listed in Shanghai (Shenzhen). The independent variable is the SSE and the 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 km). 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 that are listed and are headquartered in Shanghai (Shenzhen). The independent variables include the SSE benchmark and the SZSE benchmark.

Panel A: uni-variate regression

	Value-weighted index				Equal-weighted index			
Model	$SZSE_{sub} = \beta * SZSE$	$SZSE_{sub} = \beta * SSE$	$SSE_{sub} = \beta * SSE$	$SSE_{sub} = \beta * SZSE$	$SZSE_{sub} = \beta * SZSE$	$SZSE_{sub} = \beta * SSE$	$SSE_{sub} = \beta * SSE$	$SSE_{sub} = \beta * SZSE$
β	0.94	0.75	0.85	0.77	1.03	0.98	1.02	0.95
R-square	0.31	0.19	0.26	0.23	0.55	0.49	0.72	0.64
Correlation	0.56	0.44	0.51	0.47	0.74	0.70	0.85	0.80

Panel B: bi-variate regression

	Value-weighted index		Equal-weighted index	
Model	$SZSE_{sub} = \beta1 * SZSE + \beta2 * SSE$	$SSE_{sub} = \beta1 * SSE + \beta2 * SZSE$	$SZSE_{sub} = \beta1 * SZSE + \beta2 * SSE$	$SSE_{sub} = \beta1 * SSE + \beta2 * SZSE$
$\beta1$	0.83	0.59	0.88	0.88
$\beta2$	0.16	0.37	0.16	0.15
R-square	0.32	0.29	0.55	0.73

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 residual of an AR(5) model of the logarithm of the trading volume of the subsamples of stocks with similar distances to both stock exchanges that are listed in Shenzhen. In Panel B, the dependent variable is the residual of an AR(5) model of the logarithm of the trading volume of the stocks with similar distances to both stock exchanges that are listed in Shanghai. Stocks 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 km). The independent variable is the residual of an AR(5) model of the logarithm of the SSE and the 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	$SZSE_{sub} = \beta1 * SZSE + \beta2$ SSE	$SZSE_{sub} = \beta1 * SZSE$	$SZSE_{sub} = \beta1 * SSE$
β1	0.72	0.92	0.82
β2	0.21	/	/
R-square	0.63	0.62	0.56
Correlation	/	0.79	0.75

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

Model	$SSE_{sub} = \beta1 * SSE + \beta2 * SZSE$	$SSE_{sub} = \beta1 * SSE$	$SSE = \beta1 * SZSE$
β1	0.51	0.86	0.91
β2	0.42	/	/
R-square	0.71	0.69	0.67
Correlation	/	0.83	0.82

SSE (remote exchange) volume (0.21) and the difference is statistically significant at the 1% level. In addition, we find that the correlation between the trading volume of the SZSE-listed companies and the trading volume of the SZSE (0.79) is also slightly greater than the correlation between the trading volume of the SZSE-listed companies and the trading volume of the SSE (0.75).

Our regressions that investigate the trading volume residuals of the SSE-listed companies generate very consistent results. Panel B of Table 8 indicates that, when we regress the trading volume residuals of the SSE-listed companies with similar distances to both exchanges over the trading volume residuals of the SSE and the SZSE, respectively, the coefficient on the SSE (local exchange) volume (0.51) is greater than that on the SZSE (remote exchange) volume (0.42) and the difference is statistically significant at the 1% level. In addition, the correlation between the trading volume of the SSE-listed companies and the trading volume of the SSE (0.83) is also slightly greater than the correlation between the trading volume of the SSE-listed companies and the trading volume of the SZSE (0.82).

It is important to note that unlike the return regressions, in which 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 the magnitude of the coefficients. Instead, we note that the R-square of the uni-variate 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 additional 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 companies with similar distances to both stock exchanges (159) is much smaller than the total number of companies listed at both stock exchanges (1600), we feel that inclusion of such companies in calculating the benchmark at respective exchanges should not affect our results. Nevertheless, we created an alternative set of indices that 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 on 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 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 newcomers. Our findings emphasize the role of physical 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 influence 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 China's recent 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 prices and trading volumes at the market level underline the importance of the listing location to securities market.

Several reasons explain why the physical stock exchanges play such an important role in investor decisions in China. First of all, as in 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 in 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 foster correlated trading among investors living in the same city (Hong et al., 2004). Finally, despite the changing trend of younger investors mostly using the Internet to transact stocks, many Chinese retail investors still go to branches at brokerage firms (every day) to watch the market and make transactions.[20]

6. Conclusions

The current study documents the tendency of retail investors to invest in locally-listed companies. Among Chinese investors located in Shanghai and Shenzhen, where two similarly important stock exchanges 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 both stock exchanges, investors execute far greater number of trades and greater trading volume in locally-listed stocks, than in 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 subsample of companies whose distances to both stock exchanges are similar and the subsample of companies that are locally headquartered which are 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 choosing

[20] For example, Liao et al. (2010) show that 60.9% of the sample trades were placed at the branch offices and 13.4% were placed online in 2003. In contrast, 70.5% of the trades were placed online and 19.3% were placed at branch offices in 2008.

locally- or remotely-listed companies. Further, there is little support that the bias toward 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.

The current study provides at least three 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 is 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 De Long 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 traditional brick-and-mortar stock exchanges still command over their newer electronic competitors. The physical presence of the stock exchange and a large group of geographically-clustered investors make the physical stock exchange still an important intermediary, at least in some important stock markets.

Acknowledgments

We are very grateful to the anonymous brokerage firm for making available the data used in the paper and answering questions related to the data. The authors benefit from comments from Brad Barber, John Griffin, Alok Kumar, Neil Pearson, Anna A. Obizhaeva, Mark Seasholes, Hao Zhou and seminar participants at the Central University of Finance and Economics, Tsinghua University, and Emerging Market Finance Meeting (2010). We acknowledge financial support from the Tsinghua-Citi Financial Research and Education Program. Li acknowledges financial support from the National Natural Science Foundation of China (70801063). Zhu acknowledges financial support from the National Natural Science Foundation of China (70972009 and 70932002). All remaining errors are ours only.

References

Baker, H.K., Nofsinger, J.R., Weaver, D.G., 2002. International cross-listing and visibility. Journal of Financial and Quantitative Analysis 37 (3), 495–521.
Barber, B.M., Lyon, J.D., 1997. Detecting long-run abnormal stock returns: the empirical power and specification of test statistics. Journal of Financial Economics 43 (3), 341–372.
Barber, B.M., Lee, Y., Liu, Y., Odean, T., 2009a. Just how much do individual investors lose by trading? Review of Financial Studies 22 (2), 609–632.
Barber, B.M., Odean, T., Zhu, N., 2009b. Do retail trades move markets? Review of Financial Studies 22 (1), 151–186.
Barber, B.M., Odean, T., Zhu, N., 2009c. Systematic noise. Journal of Financial Markets 12 (4), 547–569.
Barberis, N., Shleifer, A., Vishny, R., 1998. A model of investor sentiment. Journal of Financial Economics 49 (3), 307–343.
Bodurtha, J.N.J., Dong-Soon, K., Lee, C.M.C., 1995. Closed-end country funds and U.S. market sentiment. Review of Financial Studies 8 (3), 879–918.
Bonser-Neal, C., Brauer, G., Neal, R., Simon, W., 1990. International investment restrictions and closed-end country fund prices. Journal of Finance 45 (2), 523–547.
Brennan, M.J., Cao, H.H., 1996. Information, trade, and derivative securities. Review of Financial Studies 9 (1), 163–208.
Chan, K., Hameed, A., Lau, S.T., 2003. What if trading location is different from business location? evidence from the Jardine group. Journal of Finance 58 (3), 1221–1246.
Chan, K., Covrig, V., Ng, L., 2005. What determines the domestic bias and foreign bias? Evidence from mutual fund equity allocations worldwide. Journal of Finance 60 (3), 1495–1534.
Coval, J.D., Moskowitz, T.J., 1999. Home bias at home: local equity preference in domestic portfolios. Journal of Finance 54 (6), 2045–2073.
Coval, J.D., Moskowitz, T.J., 2001. The geography of investment: informed trading and asset prices. Journal of Political Economy 109 (4), 811–841.
De Long, J.B., Shleifer, A., Summers, L.H., Waldmann, R.J., 1990. Noise trader risk in financial markets. Journal of Political Economy 98 (4), 703–738.
Fama, E.F., French, K.R., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33 (1), 3–56.
Feng, L., Seasholes, M.S., 2004a. Correlated trading and location. Journal of Finance 59 (5), 2117–2144.
Feng, L., Seasholes, M.S., 2004b. Portfolio Choice and Location of Trade. Working Paper. University of California Berkeley.
French, K.R., Poterba, J.M., 1991. Investor diversification and international equity markets. American Economic Review 81 (2), 222–226.

Froot, K.A., Dabora, E.M., 1999. How are stock prices affected by the location of trade? Journal of Financial Economics 53 (2), 189–216.
Grinblatt, M., Keloharju, M., 2001. How distance, language, and culture influence stockholdings and trades. Journal of Finance 56 (3), 1053–1073.
Hong, H., Kubik, J.D., Stein, J.C., 2004. Social interaction and stock-market participation. Journal of Finance 59 (1), 137–163.
Huberman, G., 2001. Familiarity breeds investment. Review of Financial Studies 14 (3), 659–680.
Hvidkjaer, S., 2008. Small trades and the cross-section of stock returns. Review of Financial Studies 21 (3), 1123–1151.
Ivković, Z., Weisbenner, S., 2005. Local does as local is: information content of the geography of individual Investors' common stock investments. Journal of Finance 60 (1), 267–306.
Korniotis, G.M., Kumar, A., 2009. Long Georgia, short Colorado? The geography of return predictability. Working Paper, Western Finance Association Annual Meeting 2009. .
Korniotis, G.M., Kumar, A., 2010. Do older investors make better investment decisions? The Review of Economics and Statistics 93 (1), 244–265.
Kumar, A., Lee, C.M.C., 2006. Retail investor sentiment and return comovements. Journal of Finance 61 (5), 2451–2486.
Lee, Y., Liu, Y., Zhu, N., 2008. The cost of owning employer stocks: lessons from Taiwan. Journal of Financial and Quantitative Analysis 43 (3), 717–740.
Liao, L., Li, Z., Zhang, W., Zhu, N., 2010. The Internet and Retail Investors: New Evidence from China. Working Paper. University of California, Davis.
Liu, Y., Tsai, C., Wang, M., Zhu, N., 2010. Prior consequences and subsequent risk taking: new field evidence from the Taiwan futures exchange. Management Science 56 (4), 606–620.
Massa, M., Simonov, A., 2006. Hedging, familiarity and portfolio choice. Review of Financial Studies 19 (2), 633–685.
Miller, P.D., 1999. The market reaction to international cross-listings: evidence from depositary receipts. Journal of Financial Economics 51 (1), 103–123.
Ng, L., Wu, F., 2010. Peer effects in the trading decisions of individual investors. Financial Management 39 (2), 807–831.
Nicolosi, G., Peng, L., Zhu, N., 2009. Do individual investors learn from their trading experience? Journal of Financial Markets 12 (2), 317–336.
Pagano, M., Randl, O., Röell, A.A., Zechner, J., 2001. What makes stock exchanges succeed? Evidence from cross-listing decisions. European Economic Review 45 (4–6), 770–782.
Pirinsky, C., Wang, Q., 2006. Does corporate headquarters location matter for stock returns? Journal of Finance 61 (4), 1991–2015.
Qi, B., Liu, J., Zhang, D., 2007. Listing Decisions of Chinese Companies. Research Report 2007–0830. Chinese Securities Regulatory Commission.
Seasholes, M.S., Zhu, N., 2010. Individual investors and local bias. Journal of Finance 65 (5), 1987–2010.
Seasholes, M.S., Tai, M., Yang, Z., 2010. Individual Investors and Portfolios Choice. Working Paper. Hong Kong University of Science & Technology.
Sulaeman, J., 2008. Do Local Investors Know More? Evidence from Mutual Fund Location and Investments. Working Paper. Southern Methodist University.
Tesar, L.L., Werner, I.M., 1995. Home bias and high turnover. Journal of International Money and Finance 14 (4), 467–492.
Zhu, N., 2003. The Local Bias of Individual Investors. Working Paper, Yale University.