ARTICLE IN PRESS

Available online at www.sciencedirect.com

ScienceDirect

Journal of Financial Markets ▮ (▮▮▮▮) ▮▮▮–▮▮▮

Journal of FINANCIAL MARKETS

www.elsevier.com/locate/finmar

Why do foreign investors underperform domestic investors in trading activities? Evidence from Indonesia ☆

Sumit Agarwal[a,b,1], Sheri Faircloth[c,2], Chunlin Liu[c,*], S. Ghon Rhee[d,e,3]

[a]*Federal Reserve Bank of Chicago, 230 South LaSalle Street, Chicago, IL 60604, USA*
[b]*Indian School of Business, India*
[c]*College of Business Administration, University of Nevada, Reno, Reno, NV 89557, USA*
[d]*College of Business Administration, University of Hawaii, Honolulu, HA 96822, USA*
[e]*Sung Kyun Kwan University of Korea, Korea*

Abstract

Foreign investors generally underperform domestic investors in trading activities. This study shows that their inferior performance is attributable to non-initiated orders. Foreign investors actually perform better than domestic investors in initiated orders. In addition, their performance is also mixed when trades are classified depending on who the counterparties are. These mixed performances can be explained by neither the information disadvantage hypothesis proposed by [Dvořák, T., 2005. Do domestic investors have an information advantage? Evidence from Indonesia. *Journal of Finance* 60, 817–839.] nor the poor timing of trade hypothesis suggested by [Choe, H., Kho, B.C., Stulz, R., 2005. Do domestic investors have an edge? The trading experience of foreign investors in Korea. *Review of Financial Studies* 18, 795–829.]. We propose and confirm that their inferior performance is explained by their aggressive trading behavior. Three metrics we utilize to

☆We would like to thank Avanidhar Subrahmanyam (the editor), the referee, and seminar participants at the Shenzhen Stock Exchange, Renmin University of China, as well as the 2005 and 2007 annual meetings of the Financial Management Association International. The views expressed are those of the authors alone and do not necessarily represent those of the Federal Reserve Bank of Chicago.

*Corresponding author. Tel.: +1 775 682 9179.

E-mail addresses: sagarwal@frbchi.org (S. Agarwal), fairclos@unr.nevada.edu (S. Faircloth), liuc@unr.edu (C. Liu), rheesg@hawaii.edu (S. Ghon Rhee).

[1]Tel.: +1 312 322 5973.

[2]Tel.: +1 775 682 9178.

[3]Tel.: +1 808 956 2535.

1386-4181/$ - see front matter
doi:10.1016/j.finmar.2008.04.001

measure the aggressiveness of foreign investors' trading provide overwhelmingly strong evidence that foreign investors are more aggressive than their domestic counterparts.

JEL classification: G14; G15

Keywords: Trading performance; Foreign investor; Domestic investor; Poor timing of trade hypothesis; Information advantage hypothesis; Aggressive trading hypothesis; Initiated orders; Non-initiated orders; Indonesian stock market

1. Introduction

The existing literature documents mixed findings on the relative performance of foreign and domestic investors. Grinblatt and Keloharju (2000) and Seasholes (2004) report that foreign investors are better traders, since they are better informed. They find evidence that foreign investors generally outperform domestic investors. Brennan and Cao (1997), Hau, 2001, Dvořák (2005), Choe, Kho, and Stulz (2005), however, report the opposite findings. Dvořák (2005) finds that domestic investors earn higher profits than foreign investors in the Indonesian market. Choe, Kho, and Stulz (2005) report that foreign investors pay more than domestic investors for purchases and receive less for sales in the Korean market. After investigating underlying reasons for foreign investors' poor performance, they find that foreign investors trade at worse prices because prices tend to move against them before they trade, indicating the poor timing of their trades. Even though Dvořák (2005) and Choe, Kho, and Stulz (2005) agree that foreign investors' trading performance is inferior to that of domestic investors, their explanations differ. Dvořák (2005) attributes it to information disadvantage, while Choe, Kho, and Stulz (2005) rely on the poor timing of trades by foreign investors.[4]

Based on a much longer study period and more comprehensive data, we find that foreign investors on the Jakarta Stock Exchange (JSX) pay 9 basis points more than domestic investors when they buy and that they receive 14 basis points less than domestic investors when they sell. These results confirm the findings by Choe, Kho, and Stulz (2005) and Dvořák (2005). However, this consistency in empirical findings ends when: (i) we classify executed orders into initiated and non-initiated orders and (ii) we identify the counterparties in the two types of executed orders.

By definition, initiated orders are those that initiate trades, while non-initiated orders are those matched by incoming initiated orders. Initiated and non-initiated orders have different cost implications. Buyer-initiated purchases cost buyers more because buyers have to pay full bid–ask spreads for their purchases, while seller-initiated purchases cost buyers less because sellers incur full bid–ask spreads. Likewise, sellers receive less in seller-initiated sales and receive more in buyer-initiated sales. In the Indonesian market, foreign investors underperform domestic investors in non-initiated orders. To buy with non-

[4]Focusing on the price discovery process rather than trading performance, Chan, Menkveld, and Yang (2007) report that the A-share market (not accessible to foreign investors) led the B-share market in China when the latter was accessible only to foreign investors. After domestic investors were allowed to invest in the B-share market, however, the role of the B-share market was changed to affect in part the price discovery process in the A-share market in support of the informational advantage of domestic investors.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

initiated orders, they pay 33 basis points more than domestic investors. Meanwhile, they receive 40 basis points less than domestic investors with non-initiated sell orders. However, foreign investors outperform their domestic counterparts when they place initiated buy and sell orders. For example, foreign investors pay 20 basis points less than domestic investors when they initiate purchases; and foreign investors receive 18 basis points more than domestic investors when they initiate sales. These results suggest that overall underperformance by foreign investors is totally attributable to their non-initiated orders.

We further categorize buy and sell trades into four different types depending on counterparty classification to gain insight into the seemingly puzzling findings that foreign investors underperform domestic investors in non-initiated orders but outperform them in initiated orders. We find that the performance of both foreign and domestic investors is mixed when trades are classified depending on who the counterparties are. In the trades of foreign investors vis-à-vis domestic investors, foreign investors always underperform domestic investors in both initiated and non-initiated orders. However, foreign investors perform the best (worst) in both buy and sell initiated (non-initiated) orders when trading among themselves, while domestic investors exhibit the worst (best) trading performance in initiated (non-initiated) trading with their fellow domestic investors. As a result, better performance by foreign investors in initiated orders is largely attributable to the trades between foreign investors themselves, even though they do poorly when trading with domestic investors. On the other hand, foreign investors exhibit poor performance in all four types of non-initiated trades. We find that the counterparties to initiated and non-initiated orders do matter.

These findings raise a critical question about the robustness of the information disadvantage in explaining foreign investors' trading performance. The findings are inconsistent with the information disadvantage hypothesis because if foreign investors have worse information, then their profits should be consistently lower regardless of what type of orders they place. A difference in performance between foreign and domestic investors that depends on who the counterparties are also raises a question about the effect of poor timing of orders on their trading performance. If foreign investors are ineffective in timing their trades, then their performance should be consistently worse regardless of whom they trade with. It is difficult to reconcile superior performance by foreign investors when initiating trading among themselves with inferior performance when trading against domestic investors on the basis of poor timing of trades.

In this study, we identify the aggressiveness of foreign investors as the underlying reason to explain the differences in trading performance between domestic and foreign investors. Three metrics we utilize to measure the aggressiveness of foreign investors' trading provide overwhelmingly strong evidence that foreign investors are more aggressive than their domestic counterparts: (i) foreign investors are more likely to submit orders to initiate trades; (ii) it takes much less time for the non-initiated orders from foreign investors to be filled; and (iii) foreign investors have a higher probability of having their orders executed. These results are robust regardless of firm size and stock volatility level. The aggressiveness of foreigners' trading does indeed affect their trading performance, particularly in the short term, even though they do not necessarily have any information disadvantage relative to domestic investors.

The remainder of our paper is organized as follows. In Section 2, we discuss our data and sample construction. In Section 3, we compare trading performance of domestic and foreign investors. In Section 4, we assess the trading aggressiveness of foreign and domestic

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

investors to ascertain if trading aggressiveness by foreign investors explains why they underperform their domestic counterparts. In Section 5, we present our concluding remarks.

2. Data and sample construction

The trading system of the JSX is built on a centralized electric limit order book. Unlike other well-known limit order markets, such as the Tokyo Stock Exchange and Paris Bourse, no market orders are allowed on the JSX to enter the system. Because of this feature, a large order will not walk up or walk down the order book, which can lead to higher trading costs in this market. It will also not bypass those orders with uncommitted liquidity. Investors submit a buy (sell) order that matches the lowest (highest) ask (bid) price on the limit order book for execution.

Our study relies on JSX's complete order and transaction records for an eight-year period, from May 1995–2003. These records are limited to JSX's Regular Board and Foreign Board. Prior to the Asian financial crisis (1997–1998), the JSX maintained the Foreign Board for foreign investors trading among themselves on the stocks that had reached the 49% foreign ownership limit. Those orders and trades from odd-lot trading, cross trading, block trading, and other non-standard settlement trading are excluded from the sample. Our study period begins on the day the JSX introduced a fully computerized, automated trading system. A typical order record consists of a unique identification number, stock code, date and time of order submission, order type (buy or sell), price, and the number of shares. The order record also contains information on whether the order-submitting trader is a domestic or foreign investor and the name of the brokerage firm the trader employs to submit the order. A transaction record provides the same information for both buyers and sellers. In addition, one of the most appealing features of the data for our study is that the unique identification number assigned to each order also appears in the corresponding transaction record if the order is executed, which allows us to accurately match each executed order with the corresponding trade.

Our findings compiled in this study are considered as reliable out-of-sample evidence on the question of why foreign investors underperform their local counterparts. Dvořák (2005) has examined 30 liquid stocks from JSX, whereas our analyses cover a larger sample of 110 stocks that meet our minimum liquidity requirements. Our results also represent excellent out-of-sample evidence that support the findings by Choe, Kho, and Stulz (2005); the trading value of foreign investors during their study period accounted for only about 7% of total trading volume in the Korean market, whereas foreign investors' trading in the Indonesian market reached as high as 42% during our study period.[5] In addition, our eight-year study period is much longer than the two-year period examined by Choe, Kho, and Stulz (2005).

[5]The ratio of foreign trading to total trading value varies over time during our study period:

1995	38%	1996	33%	1997	28%
1998	42%	1999	35%	2000	20%
2001	11%	2002	8%	2003	28%

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 1
Summary statistics of samples
This table presents summary statistics of 110 sample stocks for an eight-year period between May 1995 and May 2003. Our study relies on JSX's complete order and transaction records on the JSX's Regular Board and Foreign Board. Prior to the Asian financial crisis, the JSX maintained the Foreign Board for foreign investors trading among themselves on the stocks that had reached the 49 percent foreign ownership limit. Those orders and trades from odd-lot trading, cross trading, block trading, and other non-standard settlement trading are excluded from the sample.

	All	Domestic	Foreign
No. of stocks	110		
No. of brokerage firms	200		
No. of orders	47,219,235	42,656,258	4,562,977
(Average size: shares)	(111,216)	(103,559)	(182,793)
No. of buy orders	21,105,808	19,010,338	2,095,470
(Average size)	(118,763)	(111,652)	(183,272)
No. of sell orders	26,113,427	23,645,920	2,467,507
(Average size)	(105,115)	(97,052)	(182,387)
No. of Trades	17,402,634		
(Average size: shares)	(30,975)		
Act as buyers		14,641,136	2,762,377
(Average size)		(30,450)	(33,753)
Act as sellers		14,536,239	2,867,191
(Average size)		(30,555)	(33,103)

Since the focus of our study is to investigate the performance of foreign and domestic investors, we limit our sample to those stocks traded by both domestic and foreign investors. We identify 110 stocks that have at least five orders placed by both domestic and foreign investors on a given trading day. The 110 stocks account for 84% of market capitalization of the entire JSX market. They also account for 72% of total trading volume and 85% of total trading value. During our study period, a total of 47 million orders were placed in this sample of 110 stocks; approximately 17 million trades were executed; and 200 brokerage firms were involved with trading activities of the 110 stocks.

In Table 1, we present summary statistics of the sample stocks. Of the 47 million orders in the sample, approximately 4.6 million orders were placed by foreign investors representing 10% of the total. The average size of an order from foreign investors, however, was approximately 80% greater than that of domestic investors (183,000 shares per order vs. 104,000 shares per order). The number of sell orders was greater than that of buy orders for both domestic and foreign investors. During the study period, foreign investors were involved as either buyers or sellers in about 19% of total trades.

3. Trading performance by foreign and domestic investors

3.1. Overall trading performance

A number of studies indicate that foreign investors are better traders, since they have an information advantage over domestic investors (Grinblatt and Keloharju, 2000; Seasholes, 2004). Other studies, however, report that domestic investors earn higher profits than

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 2
Trading Performance
Trading performance is measured by:

$$(WP^{i}_{dj}/WP_{dj} - 1) \times 100\%,$$

where WP_{dj} is the volume-weighted average price for stock j on day d, and WP^{i}_{dj} is the volume-weighted average buying or selling prices by investor class i for stock j on day d. This price ratio is computed for purchase and sale and investor class, separately. F and D denote foreign and domestic investors, respectively. Panel A reports the results for all executed orders. Panels B and C report the results for non-initiated orders and initiated orders, respectively. All results are computed over the whole study period. The table also reports t-statistics for testing the difference in trading performance between foreign and domestic investors across the 110 sample stocks.

	D	F	F−D
Panel A: All Executed Orders			
Purchases	−0.02%	0.07%	0.09%
(t-stat)			(3.35)
Sales	0.06%	−0.08%	−0.14%
(t-stat)			(−6.42)
Panel B: Non-initiated Orders			
Purchases	−0.79%	−0.46%	0.33%
(t-stat)			(4.75)
Sales	0.81%	0.41%	−0.40%
(t-stat)			(−6.24)
Panel C: Initiated Orders			
Purchases	0.71%	0.51%	−0.20%
(t-stat)			(−4.27)
Sales	−0.74%	−0.56%	0.18%
(t-stat)			(2.40)

foreign investors (Brennan and Cao, 1997; Dvořák, 2005; Choe, Kho, and, Stulz 2005). Dvořák (2005) argues that domestic investors on the JSX have a short-lived information advantage over foreign investors. Choe, Kho, and Stulz (2005) present evidence that foreign investors underperform domestic investors because of the poor timing of their trades.

Following the Choe, Kho, and Stulz (2005) methodology, we examine whether foreign investors are at a disadvantage in their trading activities relative to domestic investors. Trading performance is measured by:

$$[(WP^{i}_{dj}/WP_{dj}) - 1] \times 100\%, \quad (1)$$

where WP_{dj} is the volume-weighted average price for stock j on day d, and WP^{i}_{dj} is the volume-weighted average buying or selling price by investor class i for stock j on day d. This price ratio is computed for purchase and sale, as well as investor class, separately. The ratio is simply a measure of how much more or less an investor pays than the average price on that day when he buys and how much more or less he receives when he sells.

In Panel A of Table 2, we report the results for all executed orders. First, foreign investors, on average, pay 7 basis points more than the average price, while domestic investors pay 2 basis points less than the average price when they purchase. The difference of 9 basis points is statistically and economically significant. Given the buying value of more than 144 trillion Rupiah (or US$16 billion) by foreign investors in our sample period,

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

paying 9 basis points more to purchase is equivalent to paying 130 billion Rupiah (or US$14.4 million) on the JSX by foreign investors. Considering the results for selling, foreign investors, on average, receive 8 basis points less than the average price, while domestic investors receive 6 basis points more than the average price. Hence, foreign investors receive 14 basis points less than domestic investors when they sell stocks. These findings are not unexpected because Dvořák (2005) finds that, in the Indonesian stock market, domestic investors earn more profit in the short term than foreign investors, and Choe, Kho, and Stulz (2005) also find that foreign investors exhibit inferior trading efficiency in the Korean market.

Dvořák (2005) believes that an information advantage is the underlying reason for the better performance of domestic investors. He further observes that domestic clients of global brokerages exhibit higher profits than foreign clients of global brokerages, indicating that the combination of local information advantage and global expertise leads to higher profits. In contrast, Choe, Kho, and Stulz (2005) report that firm and stock characteristics cannot explain the disadvantage of foreign investors. They suggest that the poor timing of foreign investors' trades accounts for the disadvantage of foreign investors relative to domestic investors. They observe that prices tend to move against foreign investors more before they trade intensively. They find no evidence that foreign investors are better informed or more impatient than domestic investors.

3.2. Trading performance in initiated and non-initiated orders

We sort executed orders into initiated and non-initiated orders to calculate the price ratios for each type of orders. This sorting is warranted because initiated and non-initiated orders have different cost implications. Buyer-initiated purchases cost buyers more because buyers have to pay full bid–ask spreads for their purchases, while seller-initiated purchases cost buyers less because sellers incur full bid–ask spreads. Likewise, sellers receive less in seller-initiated sales and receive more in buyer-initiated sales. Once the sorting is complete, we should be able to confirm the validity of the information disadvantage hypothesis and the poor timing of trade hypothesis. If one group of investors has an information disadvantage, their trading performance should be consistently worse than that of the other group of investors in both initiated and non-initiated orders. Likewise, if one group of investors suffers from poor timing of trades, their performance should be consistently worse than other investors regardless of the types of executed orders.

In Panels B and C of Table 2, we present results for non-initiated and initiated orders, respectively. For non-initiated orders, foreign investors underperform domestic investors. For example, the average price ratio of non-initiated buy orders by foreign investors is −46 basis points, meaning that the average price paid by foreign investors to purchase is 0.46% below the average trading price. Meanwhile, the average price ratio for domestic investors is −79 basis points. As a result, foreign buyers pay 33 basis points more than domestic investors in non-initiated purchases. For non-initiated sales, foreign sellers receive 40 basis points less than domestic sellers. Results from Panel B demonstrate that foreign investors underperform domestic investors when they place non-initiated orders.

For initiated orders, however, we find the opposite. Foreign investors outperform domestic investors when they place initiated buy and sell orders. For example, foreign investors, on average, pay 51 basis points above the average price, while domestic investors pay 71 basis points above the average price, which means that foreign investors effectively

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

outperform their domestic counterparts by paying 20 basis points less when they initiate purchases. For initiated sell orders, foreign investors receive 56 basis points less than the average, while domestic investors exhibit worse performance by receiving 74 basis points less than the average. As a result, foreign investors receive 18 basis points more than domestic investors when they initiate sales.

These results have important implications. Although foreign investors generally underperform domestic investors in trading Indonesia stocks, we find that their inferior performance is attributable to non-initiated orders. It is also puzzling to observe the conflicting results on trading performance by domestic and foreign investors in initiated and non-initiated orders. These results are consistent with neither the information disadvantage hypothesis nor the poor timing of trade hypothesis. The results raise the question whether existing hypotheses built on the information disadvantage and the poor timing of orders are able to explain why foreign investors underperform domestic investors. However, before drawing any conclusions, we investigate the counterparty effect to gain a better understanding of what causes the difference in trading performance between foreign and domestic investors for initiated and non-initiated orders.

3.3. Does the trading counterparty matter?

One unique aspect of the JSX data is that we can categorize buy and sell trades into four types depending on counterparty classification: (i) FF; (ii) FD; (iii) DF; and (iv) FF. Here, F and D denote foreign and domestic investors, respectively. The interpretation is straightforward. For purchases, FD means a transaction between foreign buyer and domestic seller, and DF means a transaction between domestic buyer and foreign seller. For sales, FD means a transaction between foreign seller and domestic buyer, and DF means a transaction between domestic seller and foreign buyer. The classification FF represents trading only between foreign investors, and the classification DD represents trading only between domestic investors. Trading performance under each of the four categories will provide a clearer picture of how foreign investors perform in their trades vis-à-vis domestic investors and how foreign investors perform in their trades among themselves. We believe that this study is the first to examine this counterparty effect.

In Panel A of Table 3, we summarize the trading performance for all executed orders. We observe a significant difference in trading costs across four types of trades. The absolute magnitude of price ratio differentials for FD and DF are on average four to six times greater than those computed for FF or DD. It is obvious from Panel A that foreign investors underperform domestic investors when foreigners and locals trade. For example, foreign buyers pay 12 basis points more than the average to domestic sellers, while domestic buyers pay 12 basis points less than the average to foreign sellers. As a result, foreign investors underperform by 24 basis points in the buy trades of foreign investors vis-à-vis domestic investors (FD vis-à-vis DF). Similarly, foreign investors also underperform by 24 basis points in sales between FD and DF. When foreigners (or locals) trade among themselves, however, the results are mixed. For purchases, foreign buyers pay 3 basis points less than the average when they buy from other foreign sellers, while domestic buyers pay 2 basis points more than the average when they buy from other domestic sellers. Compared with domestic investors, foreign investors have a better performance when engaging in these two types of purchasing trades (FF and DD). For sales trades, the conclusion is opposite: domestic investors perform better than their foreign counterparts.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 3
Counterparty Effect

We classify buy and sell trades into four types depending on who the counterparties are: (i) DD; (ii) FD; (iii) DF; and (iv) FF, where F and D denote foreign and domestic investors, respectively. For purchases, FD means a transaction between foreign buyer and domestic seller; and DF means a transaction between domestic buyer and foreign seller. For sales, FD means a transaction between foreign seller and domestic buyer; and DF means a transaction between domestic seller and foreign buyer. The classifications FF and DD mean trading among foreign and domestic investors themselves, respectively. The price ratio is computed for each of four categories. Panel A reports the results for all executed orders. Panels B and C report the results for non-initiated and initiated orders, respectively. All results are computed over the entire study period. The table also reports *t*-statistics for testing the difference in trading performance across the 110 sample stocks.

	DD	DF	FD	FF	FD−DF
Panel A: All Executed Orders					
Purchases	0.02%	−0.12%	0.12%	−0.03%	0.24%
(*t*-stat)					(7.88)
Sales	0.02%	0.12%	−0.12%	−0.03%	−0.24%
(*t*-stat)					(−6.22)
Panel B: Non-initiated Orders					
Purchases	−0.77%	−0.59%	−0.45%	−0.38%	0.14%
					(5.56)
Sales	0.89%	0.58%	0.42%	0.26%	−0.16%
(*t*-stat)					(−6.01)
Panel C: Initiated Orders					
Purchases	0.89%	0.42%	0.58%	0.26%	0.16%
(*t*-stat)					(8.22)
Sales	−0.77%	−0.45%	−0.59%	−0.38%	−0.14%
(*t*-stat)					(−5.03)

These results demonstrate that the performance for both foreign and domestic investors is mixed, depending on who the counterparties are.

In Panel B of Table 3, we summarize the cost differentials for non-initiated orders. Interestingly, foreign investors exhibit poor performance in all four types of non-initiated trades. FF has the worst performance, paying –38 basis points to purchase and receiving 26 basis points to sell. DD shows the best trading performance, paying –77 basis points to purchase and receiving 89 basis points to sell. Domestic investors also outperform foreign investors in the trading between domestic and foreign investors (DF and FD).

Foreign investors outperform domestic investors when they place initiated buy and sell orders. The results in Panel C of Table 3 give us a clue as to why this happens. For instance, the reason domestic buyers pay more overall than foreign investors is that domestic investors pay too much to their fellow domestic sellers. Domestic investors pay 42 basis points more than the average to foreign sellers, but they pay 89 basis points more than the average to domestic sellers. Foreign investors pay 58 basis points more than the average to domestic sellers, but they pay only 26 basis points more than the average to foreign sellers. In other words, better performance by foreign investors in initiated purchases is attributable to the trades between foreign investors themselves. As a result, domestic investors underperform foreign investors in initiated purchases, even though they do better when trading with foreign investors (42 basis points for DF vs. 58 basis points for FD). The same conclusion can be also drawn on the sales side. Domestic investors

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

underperform foreign investors in initiated sales because (i) domestic sellers receive much less (–77 basis points) from domestic buyers and (ii) foreign sellers receive relatively less (–38 basis points) from foreign buyers, even though domestic investors do better when trading with foreign investors (–45 basis points for DF vs. –59 basis points for FD). Note that, among the four types in initiated trades, FF has the best performance and DD has the worst performance. These results are consistent with what has been established in Panel C of Table 2. In the aggregate, foreign investors outperform their domestic counterparts when they initiate buy and sell orders.

Table 3 results allow us to gain insight into the seemingly puzzling findings in Table 2, namely, that foreign investors underperform domestic investors in non-initiated orders but outperform them in initiated orders. This is largely influenced by the trading activities when domestic investors or foreign investors represent both sides of a trade. For the trading between domestic and foreign investors, domestic investors always outperform foreign ones in both initiated and non-initiated orders. More important, the results from Table 3 and, in particular, the results for initiated orders lead us to question the validity of the information advantage hypothesis and the poor timing of trade hypothesis. Given the mixed trading performance by domestic and foreign investors in different trading environments, it is difficult to accept the information advantage hypothesis as an explanation for foreign investors' poor performance relative to that of domestic investors. If domestic investors have an information advantage over foreign investors, what explains the best performance displayed in FF trades by foreign investors or the worst performance displayed in DD trades by domestic investors in initiated orders? It is also difficult to accept the poor timing of orders as an underlying reason for the poor performance of foreign investors because it does not make sense that prices move against them only when they place non-initiated orders but not initiated orders.

3.4. *Persistence of the difference in trading performance between foreign and domestic investors*

So far, the trading performance is measured by how much more or less an investor pays than the average price on the day he buys and how much more or less he receives when he sells. This measurement is effective for trading activities in the short run (daily). Although Dvořák (2005) finds that domestic investors only earn more profit in the short term than foreign investors in the Indonesian market, it is still a legitimate question to ask whether the difference in trading performance between foreign and domestic investors is evident over longer periods under different trading environments. In order to measure the long-term trading performance, we modify Eq. (1) by incorporating price information of several subsequent days after an order is executed as below:

$$[(WP^{i}_{dj}/\mathrm{WP}_{d+n,j}) - 1] \times 100\%, \tag{2}$$

where WP^{i}_{dj} is the volume-weighted average buying or selling prices by investor class i for stock j on day d and where $\mathrm{WP}_{d+n,j}$ is the volume-weighted average price for stock j on day $d+n$. The variable n denotes the number of days after a specific order is executed. For our analyses, one day, five days, and 10 days are chosen. The ratio is computed for purchases and sales, initiated and non-initiated orders, and investor classes, separately. Results are reported in Table 4.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 4
Trading performance in longer periods
Trading performance for longer periods is measured by:

$$(WP^{i}_{dj}/WP_{d+n,j} - 1) \times 100\%,$$

where $WP_{d+n,j}$ is the volume-weighted average price for stock j on day $d+n$, and WP^{i}_{dj} is the volume-weighted average buying or selling prices by investor class i for stock j on day d. The number of days after a specific order is executed is denoted by n. This price ratio is computed for purchase and sale and investor class, separately. F and D denote foreign and domestic investors, respectively. Panel A reports the results for a one day period. Panels B and C report the results for 5-day and 10-day periods, respectively. All results are computed over the entire study period. The table also reports t-statistics for testing the difference in trading performance between foreign and domestic investors across the 110 sample stocks.

	Purchases			Sales		
	D	F	F−D	D	F	F−D
Panel A: One-Day						
All executed orders	0.08%	0.13%	0.05%	0.19%	0.06%	−0.13%
(t-stat)			(1.65)			(−1.72)
Non-initiated orders	−0.86%	−0.49%	0.37%	0.95%	0.59%	−0.36%
(t-stat)			(2.69)			(−2.78)
Initiated orders	0.96%	0.54%	−0.34%	−0.82%	−0.44%	0.38%
(t-stat)			(−2.79)			(2.86)
Panel B: 5-Day						
All executed orders	0.72%	0.87%	0.15%	0.79%	0.96%	0.17%
(t-stat)			(1.13)			(1.47)
Non-initiated orders	−0.32%	−0.14%	0.18%	1.94%	1.52%	−0.42%
(t-stat)			(1.71)			(−2.85)
Initiated orders	1.90%	1.54%	−0.36%	−0.28%	−0.38%	−0.10%
(t-stat)			(−1.83)			(1.17)
Panel C: 10-Day						
All executed orders	1.53%	1.63%	0.10%	2.29%	1.95%	−0.34%
(t-stat)			(0.61)			(−1.61)
Non-initiated orders	1.16%	1.07%	−0.09%	2.71%	2.52%	−0.19%
(t-stat)			(1.31)			(−1.37)
Initiated orders	2.66%	2.26%	−0.40%	1.49%	1.38%	−0.11%
(t-stat)			(−1.82)			(1.09)

Panel A of Table 4 reports one day's trading performance for foreign and domestic investors. One day after orders are executed, foreign investors are still underperforming domestic investors with a magnitude of 5 basis points for purchases and 13 basis points for sales. But the differences are only marginal significant. For non-initiated orders, domestic investors outperform foreign investors, while the results are opposite for initiated orders. These differences are statistically significant.

We find quite different results for both 5-day and 10-day trading performances, which are reported in Panels B and C of Table 4. No significant differences between foreign and domestic investors are observed for overall performance 5 days or 10 days after purchasing and selling. The differences dissipate even for initiated and non-initiated orders. This finding suggests that the difference in trading performance between foreign and domestic investors is just a short-term phenomenon. This is consistent with Dvořák (2005).

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

4. The aggressiveness of trading by foreign investors

Empirical findings documented in the previous section indicate that the performance of foreign investors relative to that of their domestic counterparts is affected by the type of executed orders and the counterparties to the executed orders. Neither the information disadvantage hypothesis nor the poor timing of trade hypothesis can explain these findings. Consequently, we search for a better explanation of why foreign investors underperform their domestic counterparts. As is implicit in the results in Table 3, we focus on the impatience or aggressiveness exhibited by foreign investors. The underlying presumption is that if foreign investors are more aggressive in trading than domestic investors, they could be in a more vulnerable position to incur losses than domestic investors. When foreign investors trade among other foreign investors, however, the situation may not be the same.

We therefore investigate the difference in trading aggressiveness between domestic and foreign investors by computing three representative metrics that highlight: (i) order initiation rates, (ii) the time length for execution of non-initiated orders, and (iii) order execution rates. Intuitively, aggressive traders are more likely to initiate trades. In this case, aggressive investors submit a buy (sell) order that matches the lowest (highest) ask (bid) price on the limit order book for a fast execution. The cost of this strategy is the full bid–ask spread in return for an immediate execution. Even aggressive traders do not have to initiate trades all the time. On average, however, they are more likely to submit buy (sell) orders with relatively high (low) prices to improve the speed of execution. So, for those non-initiated orders that provide liquidity to the market, we expect the time interval between order submission and order execution to be shorter if traders remain aggressive. Finally, if one group of traders is more aggressive than the other, the execution rate of their orders should be higher. Because no market orders are allowed on the JSX, the order execution rates are an excellent measure of the aggressiveness of investors. Hence, we compare the differences in trade initiation rates, execution times, and the probabilities of order execution between domestic and foreign investors to investigate whether foreign investors are more aggressive in trading than domestic investors. To control for the impact of characteristics of individual stocks on trading behavior, for both domestic and foreign investors, we compute the difference in three trading aggressiveness measures for each of the 110 stocks in the sample. We then average the differences across the 110 stocks. The results from the three measures are separately summarized in Tables 5–7.

4.1. Order initiation rates

The order initiation rate is computed as the ratio of the number of initiated orders from a class of investors to the total number of executed orders submitted by the same investor group. Table 5 reports the differences in order initiation rates between domestic and foreign investors. A higher initiation rate implies that the investors are more impatient and willing to pay more when buying (and to receive less when selling) for an immediate execution. Our results confirm the aggressiveness of foreign investors. Panel A of Table 5 presents the results of initiation rates for all trades. Among all executed buy and sell orders (which include the trades between domestic investors and foreign investors, as well as the trades among domestic investors only and the trades among foreign investors only), foreign investors initiate 55% of orders, while domestic investors initiate 49% of orders,

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 5
Order initiation rates

The table reports the results of order initiation rates of submitted orders by both domestic and foreign investors. The order initiation rate is defined as the ratio (or percentage) of the number of initiated orders from a class of investors to the total number of orders submitted by the same investor class. F and D denote foreign and domestic investors, respectively. The order initiation rates in Panel A are computed based on all executed orders, while Panel B reports the results based on the orders from the trading activities between domestic and foreign investors only. The table also reports *t*-statistics for testing the difference in order initiation rates between foreign and domestic investors across the 110 sample stocks.

	D	F	F−D
Panel A: Based on all executed orders			
Total buy and sell trades	49.13%	54.47%	5.34%
(*t*-stat)			(16.04)
Buy trades	51.55%	57.39%	5.85%
(*t*-stat)			(12.87)
Sell trades	46.71%	51.66%	4.95%
(*t*-stat)			(11.22)
Panel B: Based on the trading between domestic and foreign investors only			
Total buy and sell trades	42.60%	57.39%	14.79%
(*t*-stat)			(18.25)
Buy trades	45.46%	60.05%	14.59%
(*t*-stat)			(18.23)
Sell trades	39.94%	54.54%	14.60%
(*t*-stat)			(18.26)

Table 6
Execution times of non-initiated orders

The table reports the results of execution times of submitted non-initiated orders by both domestic and foreign investors. The execution time is measured as the time interval in minutes between order submission and order execution. F and D denote foreign and domestic investors, respectively. The execution times in Panel A are computed based on the number of orders, while Panel B reports the order-size-adjusted execution times. The table also reports *t*-statistics for testing the difference in execution times between foreign and domestic investors across the 110 sample stocks.

	D	F	F−D
Panel A: Based on all executed non-initiated orders			
Total executed non-initiated buy and sell orders	58.08	46.86	−11.22
(*t*-stat)			(−7.02)
Executed non-initiated buy orders	59.45	48.56	−10.90
(*t*-stat)			(−7.92)
Executed non-initiated sell orders	57.86	46.11	−11.75
(*t*-stat)			(−8.01)
Panel B: Based on the trading between domestic and foreign investors only			
Total executed non-initiated buy and sell orders	72.76	48.08	−24.68
(*t*-stat)			(−15.49)
Executed non-initiated buy orders	71.01	51.90	−19.11
(*t*-stat)			(−9.86)
Executed non-initiated sell orders	73.92	44.96	−28.96
(*t*-stat)			(−16.75)

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 7
Order execution rates
The table reports the results of execution rates of submitted orders by both domestic and foreign investors. The execution rate is defined as the ratio (or percentage) of the number of filled orders from a class of investors to the total number of orders submitted by the same investor group. Considering that a single order could be involved into multiple trades, we utilize the unique identification number information from both order and trade records to avoid the problem of duplicated counting. F and D denote foreign and domestic investors, respectively. The table also reports *t*-statistics for testing the difference in order execution rates between foreign and domestic investors across the 110 sample stocks.

	D	F	F−D
Total buy and sell orders	38.08%	47.12%	9.03%
(*t*-stat)			(10.15)
Buy orders	45.16%	51.78%	6.62%
(*t*-stat)			(6.16)
Sell orders	32.39%	43.15%	10.77%
(*t*-stat)			(12.31)

suggesting that foreigners are willing to trade more aggressively than locals. On the buying side of transactions, the initiation rate for foreign investors is 57%, compared with 52% for domestic investors. Similarly, on the selling side, about 52% of executed orders are initiated by foreign investors, while the percentage for domestic investors is only 47%. The differences in initiation rates between foreign and domestic investors are all statistically significant. In general, foreign investors show more aggressiveness in trading when submitting the initiation orders than domestic investors.

In the previous section, we documented that the trading activities between domestic and foreign investors are the distinguishing factor in explaining the difference in their overall trading performance. With this observation in mind, we compare the initiation rates of domestic and foreign investors for the trades in which domestic investors and foreign investors are counterparties. In Panel B of Table 5, we report these results. The initiation rates of domestic and foreign investors are strikingly different. Foreign investors are likely to initiate trades when trading with domestic investors. For example, 60% of the orders to purchase are initiated by foreign investors buying from domestic sellers, while domestic investors initiate only 45% of orders to buy from foreign sellers. On the sale side, initiation rates by foreign and domestic investors are 55% and 40%, respectively. These results suggest that foreign investors are more likely to be the initiators when trading with domestic investors. Such behavior definitely increases the trading cost of foreign investors.

4.2. Length of execution time for non-initiated orders

In Table 6, we present results for the differences in time-length for execution of orders. By definition, the execution time interval should be zero for all initiation trades, since they are essentially equivalent to market orders. Consequently, we focus on non-initiation orders when computing the time-length for execution. Since under JSX's trading rules, buy and sell orders are matched according to price and time priorities, the length of execution time is a good proxy for investors' aggressiveness. The results in Table 6 indicate that non-initiation orders submitted by foreign investors are executed faster than those submitted by

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

domestic investors. For example, when the execution time is computed based on all types of trades, a typical buy order from foreign investors requires about 49 minutes to be executed, while domestic investors wait, on average, over 59 minutes. For selling orders, the average execution time-length is 46 minutes for foreign investors and 58 minutes for domestic investors. In addition, the difference in execution time-length between foreign and domestic investors is even more pronounced after limiting the trades to those between domestic investors only and foreign investors only, as illustrated in Panel B of Table 6. The differences reported in the last column are all statistically significant.

There are at least two potential explanations for the differences in execution time-lengths between foreign and domestic investors. First, foreign investors are willing to enter buy orders at relatively high prices and sell orders at relatively low prices. Since their orders are more competitive, they are executed faster. As a result, the orders placed by foreign investors spend less time on the limit order book before execution. Under those circumstances, the short average execution time of foreign investors' orders suggests they are more aggressive than domestic investors. Second, foreign investors have better judgment about the direction of market price movements to the extent that their non-initiation limit order submissions are consistent with market price movements. For instance, they only submit buy orders when share prices are in an upward trend, and submit sell orders when prices are in a downward trend. Even without offering competitive prices on their orders, it is still possible to have their orders executed faster than those of the domestic investors. A comparison of trading performance of non-initiation orders by foreign and domestic investors, however, can differentiate between the two explanations. Specifically, we should expect to observe that foreign investors pay more to buy and that they receive less to sell as compared with domestic investors in the first explanation (in which foreign investors submit more competitive non-initiated orders). If the second explanation holds, however, there will be no difference in trading performance between foreign and domestic investors. Our results in Table 3 provide support only for the first explanation: foreign investors are more aggressive than domestic investors in placing non-initiated orders.

4.3. Order execution rates

If foreign investors are more aggressive than domestic investors in initiating trades and submitting more competitive non-initiated orders, their orders are more likely to be executed than those from domestic investors. In Table 7, we report the results of execution rates of submitted orders by both domestic and foreign investors. The execution rate is defined as the ratio of the number of filled orders from a class of investors to the total number of orders submitted by the same investor class. Given the fact that a single order could be involved in multiple trades, we utilize the unique identification number information from both order and trade records to avoid the problem of duplicated counting.

Significant differences are exhibited in execution rates between domestic and foreign investors. The execution rate of all buy and sell orders submitted by foreign investors is 47%, compared with only 38% recorded for domestic investors. The 9% difference is statistically significant. Similar differences exist when we analyze buy and sell orders separately. The execution rate of buy orders from foreign investors is greater than that from domestic investors by 7%. The difference is even greater for sell orders at 11%.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Overall, Table 7 reports relatively higher execution rates for foreign investors, which is another indication that foreign investors are more aggressive than domestic investors.

4.4. Why Do Foreign Investors Underperform Domestic Investors?

Given the overwhelming evidence that foreign investors are more aggressive than domestic investors, how does their aggressiveness explain the mixed performance of foreign investors in different trading environments? The results from the previous section illustrate that the performance of foreign investors depends on the type of orders and the type of counterparty. We believe that the differences in trading costs between foreign and domestic investors are direct results of the aggressiveness of foreigners' trades.

First, we focus on initiated orders, which appear to be most puzzling. Note that the trading performance of initiated orders is largely dependent on the competitiveness of the non-initiated orders placed by the counterparties. In other words, initiated orders will incur high (low) trading costs against less (more) competitive non-initiated orders. Why do domestic investors outperform foreign investors in the trading between domestic and foreign investors (DF and FD) in initiated orders? It can be readily explained by the fact that the non-initiated orders from foreign investors are, on average, more competitive than those from domestic investors. For purchases, a higher pay by foreign investors is due to less competitive non-initiated sell orders from domestic investors, while a lower pay by domestic investors is due to more competitive non-initiated sell orders from foreign investors. More (less) competitive non-initiated sell orders mean that sellers are willing to ask a lower (higher) price to sell. If foreign sellers generally demand lower prices than domestic sellers, domestic buyers will benefit from paying relatively lower prices to foreign sellers, while foreign buyers will suffer from paying relatively higher prices to domestic sellers. As a result, foreign investors underperform domestic investors in initiated buy orders. The same is true for sales. Non-initiated buy orders by foreign investors are more competitive than those by domestic investors: Foreign investors are willing to offer relatively higher prices to buy in their non-initiated orders as compared with domestic investors. So domestic sellers will receive higher prices from foreign buyers to sell, and foreign sellers can only receive lower prices from domestic buyers. Foreign investors still underperform domestic investors in initiated sell orders.

Then, how do we explain the best performance in the initiated trading among foreign investors themselves (FF) and the worst performance in the initiated trading among domestic investors themselves (DD)? Since foreign investors offer more competitive non-initiated orders, foreign investors will benefit in initiating trades against other foreign investors as their counterparties: they pay less to buy when encountering non-initiated sell orders from foreign investors and receive more to sell when encountering non-initiated buy orders by foreign investors. It is not surprising to find that foreign investors will incur the lowest trading cost in the initiated trading among foreign investors themselves. On the other hand, domestic investors intend to submit less competitive non-initiated orders in trading. That increases the cost of initiating trading by domestic investors when other domestic investors are the counterparties.

With regard to non-initiated orders, foreign investors will always underperform domestic investors. Moreover, any gain (loss) for initiated orders will be the loss (gain) for their counterparties: non-initiated orders. If FF has the best performance in initiated trades, it must display the worst performance in non-initiated trades. The same is true for

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

other types of trades. Hence, as far as non-initiated orders are concerned, domestic investors outperform foreign investors.

According to these explanations, the mixed performance of foreign investors under different trading environments can be easily understood given the evidence that foreign investors, on average, submit more competitive non-initiated orders to the market than domestic investors do. Additionally, foreign investors are more likely to submit orders to initiate trades. These two actions will definitely increase their trading cost because they are willing to pay more to buy and receive less to sell. This alone will reduce the profitability of trading for foreign investors. As a result, domestic investors can outperform foreign investors even without an informational advantage, particularly in the short term.

4.5. The impact of firm size and volatility on trading aggressiveness

Overall, the results summarized in Tables 5–7 provide strong evidence that foreign investors are more aggressive than domestic investors in trading. One interesting question is whether foreign investors' aggressiveness varies depending on a firm's characteristics such as the size of the firm and its stock volatility. Hence, we perform the following analyses to investigate the relationship between the aggressiveness of foreign investors and characteristics of individual stocks.

4.5.1. Firm size

First, we investigate whether the differences in the aggressiveness of trading between foreign and domestic investors are related to firm size. Firm size is a good proxy for liquidity of trading. We divide our sample into five portfolios of the same number of stocks. Each stock is assigned to one of the five portfolios in any given year based on its market value at the beginning of the year. In Panel A of Table 8, we report the results of the differences in execution rates, initiation rates, and execution times between foreign and domestic investors.

No clear pattern emerges in the relationship between firm size and differences of trading aggressiveness between foreign and domestic investors with the exception of execution time, which shows some tendency that foreign investors are even more aggressive with large-sized firms, but the differences are only marginally significant. In addition, results on the execution rate and execution time suggest that both foreign and domestic investors are likely more aggressive with large-sized firms. The overall results in Panel A of Table 8 suggest that firm size or liquidity plays a very limited role in explaining why foreign investors are more aggressive than domestic investors.

4.5.2. Stock volatility

We also investigate whether the differences in the aggressiveness of trading between foreign and domestic investors are related to price volatility of individual stocks. As in the analysis in the previous section, the sample stocks are sorted into five portfolios on the basis of average daily price volatility during the year. The daily price volatility is measured by:

$$DVol = (daily\ highest\ price - daily\ lowest\ price)/[(daily\ highest\ price + daily\ lowest\ price)/2]$$

As shown in Panel B of Table 8, foreign investors demonstrate more aggressive trading behavior than their local counterparts across all volatility portfolios. Moreover, the

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 8
The Impact of Firm Size and Stock Volatility on Trading Aggressiveness

Panel A reports the results of the differences in execution rates, initiation rates, and execution times between foreign and domestic investors conditioned on firm size. We divide our sample into five portfolios of the same number of stocks. Each stock is assigned to one of the five portfolios in any given year based on its market value at the beginning of the year. Panel B presents the results conditioned on stock price volatility. The sample is divided into five portfolios with an equal number of stocks in each portfolio, and each stock is assigned to one of the resulting portfolios in any given year based on its average daily price volatility during the year. The daily price volatility is measured by: $DVol = (daily\ highest\ price - daily\ lowest\ price)/[(daily\ highest\ price + daily\ lowest\ price)/2]$.

	Execution rate			Initiation Rate			Execution Time of Non-initiated Orders		
	D	F	F−D	D	F	F−D	D	F	F−D
Panel A: Firm size									
s1 (smallest)	35.21%	43.63%	8.42%	49.08%	54.84%	5.76%	64.41	55.17	−9.24
(*t*-stat)			(4.56)			(6.81)			(−1.93)
s2	35.65%	44.76%	9.11%	48.70%	56.53%	7.83%	60.44	51.03	−9.41
(*t*-stat)			(4.11)			(6.11)			(−1.16)
s3	37.09%	45.55%	8.46%	49.27%	55.22%	5.95%	60.17	50.73	−9.44
(*t*-stat)			(2.45)			(7.48)			(−5.12)
s4	38.94%	47.27%	8.32%	48.96%	55.80%	6.85%	58.74	46.27	−12.47
(*t*-stat)			(4.64)			(10.83)			(−2.86)
s5 (Largest)	39.29%	49.71%	10.42%	49.22%	53.99%	4.77%	54.56	43.21	−11.35
(*t*-stat)			(12.11)			(9.09)			(−9.06)
s5 − s1	4.08%	6.08%	2.00%	0.22%	−0.85%	−0.99%	−9.85	−11.96	−2.11
(*t*-stat)	(2.24)	(2.77)	(1.65)	(0.87)	(−1.02)	(−1.56)	(−3.02)	(−3.35)	(−1.88)
Panel B: Stock volatility									
V1(Lowest)	40.48%	48.12%	7.64%	49.05%	54.57%	5.51%	49.66	42.07	−7.59
(*t*-stat)			(3.20)			(4.06)			(−3.53)
v2	39.06%	46.95%	7.89%	49.17%	55.61%	6.43%	52.31	43.28	−9.03
(*t*-stat)			(3.84)			(9.58)			(−3.16)
v3	38.08%	44.27%	6.19%	49.21%	54.86%	5.65%	54.56	45.19	−9.37
(*t*-stat)			(2.70)			(8.73)			(−2.34)
v4	36.07%	47.31%	11.24%	48.87%	55.45%	6.58%	61.16	49.30	−11.86
(*t*-stat)			(5.91)			(7.78)			(−1.32)
v5(Highest)	31.50%	45.27%	13.77%	48.93%	55.91%	6.99%	68.63	54.56	−14.06
(*t*-stat)			(10.88)			(10.84)			(−6.54)
v5 − v1	−8.98%	−2.85%	6.13%	−0.12%	1.34%	1.48%	18.97	12.49	−6.47
(*t*-stat)	(−3.66)	(−2.22)	(2.45)	(−0.33)	(0.95)	(1.12)	(4.23)	(3.89)	(−2.66)

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

differences in trading aggressiveness between foreign and domestic investors become more pronounced for more volatile stocks than less volatile stocks. The differences are also statistically significant for both execution rate and execution time measurements. These results indicate that foreign investors are relatively more aggressive in trading stocks with higher price volatility.

4.5.3. *The impact of firm size and stock volatility on trading performance*

In the previous section, we document that foreign investors exhibit relatively more aggressive behavior compared with domestic investors when trading those stocks with large capitalization and high volatility. We further investigate whether the differences in trading performance between foreign and domestic investors are also sensitive to firm size and stock volatility. We divide our sample into five portfolios of the same number of stocks, and each stock is assigned into one of the resulting portfolios based on its market value and stock volatility measurement. The results in Table 9 show that the differences in

Table 9
The impact of firm size and stock volatility on trading performance

Panel A reports the results of the differences in trading performance between foreign and domestic investors conditioned on firm size. We divide the sample into five portfolios of the same number of stocks. Each stock is assigned to one of the five portfolios in any given year based on its market value at the beginning of the year. Panel B presents the results conditioned on stock price volatility. The sample is divided into five portfolios with an equal number of stocks in each portfolio, and each stock is assigned to one of the resulting portfolios in any given year based on its average daily price volatility during the year. The daily price volatility is measured by: $DVol = (daily\ highest\ price - daily\ lowest\ price)/[(daily\ highest\ price + daily\ lowest\ price)/2]$.

	Purchases			Sales		
	D	F	F−D	D	F	F−D
Panel A: Firm size						
s1 (smallest)	−0.03%	0.07%	0.09%	0.08%	−0.12%	−0.20%
(*t*-stat)			(1.08)			(−2.65)
s2	−0.01%	0.07%	0.08%	0.06%	−0.03%	−0.09%
(*t*-stat)			(2.47)			(−2.36)
s3	−0.02%	0.03%	0.05%	0.06%	−0.07%	−0.12%
(*t*-stat)			(1.71)			(−3.64)
s4	−0.04%	0.07%	0.11%	0.05%	−0.08%	−0.12%
(*t*-stat)			(2.10)			(−8.03)
s5 (Largest)	−0.01%	0.08%	0.10%	0.05%	−0.13%	−0.18%
(*t*-stat)			(2.88)			(−4.49)
Panel B: Stock volatility						
v1(Lowest)	0.00%	−0.01%	−0.01%	0.04%	−0.02%	−0.05%
(*t*-stat)			(−0.46)			(−4.44)
v2	−0.01%	0.00%	0.01%	0.05%	−0.06%	−0.11%
(*t*-stat)			(0.36)			(−5.72)
v3	−0.04%	0.01%	0.05%	0.06%	−0.06%	−0.12%
(*t*-stat)			(1.46)			(−3.84)
v4	−0.04%	0.09%	0.14%	0.06%	−0.10%	−0.16%
(*t*-stat)			(2.45)			(−4.25)
v5(Highest)	−0.01%	0.24%	0.25%	0.09%	−0.18%	−0.27%
(*t*-stat)			(3.28)			(−3.46)

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

trading performance become pronounced when trading small-sized stocks as compared with large-sized stocks. However, the efficiency of trading by both domestic and foreign investors improves when trading large-sized stocks as opposed to small-sized stocks. In addition, results also indicate that their differences in trading efficiency are associated with stock volatility. Specifically, domestic investors' advantage in trading efficiency over foreign investors is more pronounced when trading stocks with higher volatility. This is understandable because results from Table 8 show that the differences in trading aggressiveness between foreign and domestic investors are larger for those stocks with high price volatility.

4.6. *Asian financial crisis*

The study period of this analysis is from May 1995 to May 2003, covering the period of the Asian financial crisis in 1997–1998. A potential issue is whether our results are biased because foreign and domestic investors might have exhibited abnormal trading behavior during the crisis period. Taking this factor into consideration, we divide the study period into three sub-periods: the pre-crisis period (May 1995–June 1997), the crisis period (July 1997–September 1998) and the post-crisis period (October 1998–May 2003). Results for the three sub-periods are reported in Table 10. Results on execution rates, initiation rates, and execution time intervals are presented in Panel A of Table 10. We do not find any significant qualitative differences between the crisis period and the pre-crisis and post-crisis periods. The results, however, do seem to suggest that foreign investors, on average, traded more aggressively during and after financial crisis. As a result, the differences in trading aggressiveness between foreign and domestic investors became more pronounced for the crisis period and post-crisis period. For instance, before the crisis, the difference in execution rates between foreign and domestic investors is 6%. It increases to 10% during the crisis and then it further increases to 13% after the crisis. The difference in initiation rates also increases from 2.5% before the crisis to 6.9% after the crisis. A similar pattern is documented for the difference in execution times. This evidence implies that more-risk-averse foreign investors must have left the Indonesian market during and after the financial crisis. This is partially supported by the fact that the proportion of foreign investors' trading is reduced after the financial crisis as shown in Footnote 2.

The differences in trading performance over the three sub-periods also show interesting patterns in Panel B of Table 10. Before the crisis, foreign investors underperform domestic investors by 0.05% for purchases and –0.06% for sales, respectively. During the crisis, the underperformance is 0.08% for purchases and –0.24% for sales. After the crisis, foreign investors underperform by the largest margins: 0.19% for purchases and –0.25% for sales. More pronounced performance differences between foreign and domestic investors for the crisis period and post-crisis period largely contribute to the deterioration of trading performance by foreign investors. Given that foreign investors trade more aggressively during and after financial crisis, it is not surprising to observe the decline of their performance. Moreover, it is one more piece of evidence that the relatively inferior trading performance by foreign investors is related to their aggressive trading behavior.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

Table 10
The differences in trading aggressiveness and performance during asian financial crisis

The study period is divided into three sub-periods: the pre-crisis period (May 1995 to June 1997), the crisis period (July 1997 to September 1998) and the post-crisis period (October 1998 to May 2003). Panel A reports results of the execution rates, initiation rates and execution times between foreign and domestic investors for the three sub-periods while Panel B reports the results of the differences in trading performance between foreign and domestic investors for each sub-period.

	May 1995–June 1997			July 1997– Sep. 1998			Oct. 1998–May 2003		
	D	F	F−D	D	F	F−D	D	F	F−D
Panel A: Trading Aggressiveness									
Order Execution Rate	36.63%	42.98%	6.35%	39.47%	49.13%	9.66%	38.69%	52.02%	13.33%
(*t*-stat)			(6.25)			(6.76)			(8.47)
Initiation Rate	49.05%	51.77%	2.72%	49.02%	52.79%	3.77%	50.38%	57.24%	6.86%
(*t*-stat)			(8.11)			(14.12)			(15.32)
Execution Time of Non-initiation Orders	61.93	55.03	−6.90	57.58	44.27	−13.32	56.97	40.08	−16.89
(*t*-stat)			(−5.87)			(−7.34)			(−9.18)
Panel B: Trading Performance									
Purchases	−0.02%	0.03%	0.05%	−0.02%	0.06%	0.08%	−0.02%	0.17%	0.19%
(*t*-stat)			(1.98)			(2.63)			(4.62)
Sales	0.04%	−0.02%	−0.06%	0.10%	−0.14%	−0.24%	0.07%	−0.18%	−0.25%
(*t*-stat)			(1.79)			(−4.36)			(−5.22)

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001

5. Conclusion

With executed orders classified into initiated and non-initiated orders and with the counterparties to trades identified, new findings emerge that raise questions about the validity of the information advantage hypothesis proposed by Dvořák (2005), as well as the validity of the poor timing of trade hypothesis suggested by Choe, Kho, and Stulz (2005). The performance of foreign investors depends on whether they place initiated or non-initiated orders, as well as who the counterparties are. If both hypotheses are correct, the foreign investors' performance should be consistently worse than that of domestic investors no matter what type of orders they place and who their counterparties are. We find evidence that suggests the aggressiveness of foreign investors in their trading activities best explains the performance discrepancies displayed when considering order types and counterparties involved. The aggressive trading behavior of foreign investors does affect their performance, particularly in the short term, even though foreign investors do not necessarily have an information disadvantage relative to their domestic counterparts. In a recent study of the Taiwan market, Barber, Lee, Liu, and Odean (2005) find that the aggressiveness of trading plays a significant role in explaining the difference in trading performance between individual and institutional investors, especially in the short term. For instance, they find that, at horizons of ten and 25 days, more than half of institutional trading profits are from their less competitive orders (or passive trading). In contrast, the losses incurred by individuals are almost entirely from their aggressive orders. We believe that trading aggressiveness is a characteristic that will require further research.

References

Barber, B.M., Lee, Y.-T., Liu, Y.-J., Odean, T., 2005. Who loses from trade? Evidence from Taiwan. Review of Financial Studies, forthcoming.

Brennan, M., Cao, H., 1997. International portfolio investment flows. Journal of Finance 52, 1851–1880.

Chan, K., Menkveld, A.J., Yang, Z., 2007. Are domestic investors better informed than foreign investors? Evidence from the perfectly segmented market in China. Journal of Financial Markets 10, 391–415.

Choe, H., Kho, B.C., Stulz, R., 2005. Do domestic investors have an edge? The trading experience of foreign investors in Korea. Review of Financial Studies 18, 795–829.

Dvořák, T., 2005. Do domestic investors have an information advantage? Evidence from Indonesia. Journal of Finance 60, 817–839.

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

Hau, H., 2001. Location matters: an examination of trading profits. Journal of Finance 56, 1959–1983.

Seasholes, M.S., 2004. Re-examining information asymmetries in emerging stock markets. Working paper. U.C. Berkeley.

Please cite this article as: Agarwal, S., et al., Why do foreign investors underperform domestic investors in trading activities? Evidence from.... Journal of Financial Markets (2008), doi:10.1016/j.finmar.2008.04.001