Is Information the Motive for Home Bias? A New Perspective from Motives of Trading*

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Abstract

The information-based explanation of home bias argues that informed investors have more precise private information about domestic stocks than about foreign stocks; they therefore have strong informational motive (to counterbalance their risk-sharing motive) to hold more domestic stocks. However, empirical evidence for information-based explanation is very controversial. This paper introduces a new perspective to understand the role of information in investors' motivation of home bias. My approach is based on Llorente, Michaely, Saar, and Wang (2002) in which the relative strength of return continuation (price momentum) vs return reversal following high volume days reflects the relative importance of information-motivated speculative trade vs risk-sharing trade. I find that non-U.S. cross-listed stocks traded in U.S. have weaker (stronger) return continuation (reversal) following high volume days than matched U.S. stocks controlling for size, industry, price, total risk, illiquidity, and the bid-ask bounce effect. This pattern is economically significant and it is especially strong for those non-U.S. stocks from regions where U.S. investors have more difficulty to obtain private information. Cross-listed stocks also have weaker (stronger) return continuation (reversal) following high volume days than their home country counterparts. This pattern is driven by cross-listed stocks from regions where local informed investors' private information trading is strong while U.S. investors have more difficulty to learn information. Overall, the findings suggest that even for cross-listed stocks, the type of stocks that foreign investors should have the least information disadvantage, cross-country information asymmetry is still an important factor in investors' trading. The results provide support for the information-based explanation of home bias.

1 Introduction

The puzzle of home bias in equity holdings has been well documented by many studies [see, e.g., French and Poterba (1991), Cooper and Kaplanis (1994), and Tesar and Werner (1995)]. A popular explanation of this puzzle is that investors have more precise information about home stocks than foreign stocks and therefore have a strong informational motive to hold domestic stocks beyond the level implied by investors' risk-sharing motive. However, the empirical evidence for information-based explanation of home bias is very controversial: while Hau (2001), Choe, Kho and Stulz (2005), and Dvorak (2005) find evidence that investors have information advantage about home stocks, Grinblatt and Keloharju (2000), Seasholes (2004), Huang and Shiu (2006), and Froot and Ramadorai (2008) find that foreign investors are better informed than domestic investors.

One additional major issue of the information-based explanation is cross-listed stocks. As Lewis (1999) pointed out, foreign investors' information acquisition disadvantage appears to be small in investment vehicles like cross-listed stocks, but investors are far from fully using cross-listings to reduce/eliminate their home bias. Evidence shows that despite the fast development of investment vehicles like cross listings in recent decades, home bias remains to be substantial.[1]

Facing the controversy about information-based stories of home bias, this paper introduces a new perspective to understand the role of information in investors' motivation for home bias. I shift the focus from investors' motives of holding stocks to their motives of trading stocks. If information is an important motive relative to the risk-sharing motive in investors' choice of holding domestic stocks over holding foreign stocks, then the difference in the relative importance of informational vs risk-sharing motive between domestic and foreign stocks is likely to show up when investors trade these stocks.

My approach is based on two strands of literature. The first is information-based theories of home bias. Early information-based home bias theories including Gehrig (1993), and Brennan and Cao (1997) assume that investors simply receive much more precise private information about domestic assets than about foreign assets. This assumption seems implausible in today's world where investors can easily learn about foreign information in

[1] A number of papers document that home bias remains to be substantial even in the past decade [see, e.g., Hatchondo (2004) and Ahearne, Griever, and Warnock (2004)]. Karolyi and Stulz (2003) also point out that the allocation to foreign stocks of U.S. investors actually remained stable during 1994-2000 when the number of American Depositary Receipts (ADR) programs increased dramatically, although they do not rule out that momentum trading could affect investors' choice during this period.

various ways. Nieuwerburgh and Veldkamp (2008) propose a new information-based theory arguing that a tiny initial information advantage in terms of higher precision of information about home assets is sufficient for creating substantial information asymmetry ultimately. The key of their model is that if investors have limited capacity of learning information, their optimal choice is to learn additional information about assets about which they have initial information advantage. According to their model, investors with small initial home information advantage will specialize in learning additional information about home assets due to increasing returns to specialization while keep uninformed about foreign assets, even when additional foreign information is no more costly to learn. Through the selective learning, informed domestic investors will ultimately develop much more precise private information about the future value of home assets than that of foreign assets. They therefore have strong informational motive (to counterbalance their risk-sharing motive) to hold more domestic assets while foreign assets are held mainly for risk sharing. Nieuwerburgh and Veldkamp's theory is potentially important under today's world condition that both the initial information disadvantage and the cost of learning additional information about foreign stocks can be substantially reduced through many channels. Cross listing could be an especially relevant case as it is one major such channel.

The second strand of literature is studies that link investors' trading motives to the relation of current return, volume, and future returns of individual stocks. In particular, Llorente, Michaely, Saar, and Wang (LMSW, 2002) propose a model where investors have two motives of trading: risk sharing and speculating on private information. If trading volume increases on a day due to risk-sharing trades, price will adjust on that day to attract another side of the trades.[2] The price change can be considered a way to compensate another side of the trades for providing liquidity. Since the price adjustment does not reflect information on the fundamentals, it will tend to reverse following high-volume days, generating return reversal. However, if trading volume increases on a day due to speculative trades on private information, price change on that day will be less likely to reverse and can even continue in subsequent days. This is because private information, by definition, is not completely impounded into the price in the current period and will be gradually impounded into the price by market participants in subsequent periods. The strength of return continuation (price momentum) relative to return reversal following high volume days therefore reflects

[2] For example, when a subset of investors suddenly want to sell a stock, the stock's price must decrease to attract other risk averse investors to buy.

the importance of information-motivated speculative trade relative to risk-sharing trade in individual stocks. In LMSW's model, the relative strength of return continuation increases with the precision of the overall class of informed investors' private information about the future stock price. This is because as overall informed investors' private information about the future price is more precise, the partial price adjustment in the current period due to overall informed investors' information-motivated trades can the predict future price more precisely.

In this paper, I take the LMSW framework to evaluate the information-based explanation of home bias. Specifically, I examine the difference in the relative importance of information-motivated trade vs risk-sharing trade in LMSW's perspective between non-U.S. cross-listed stocks traded on U.S. exchanges (NYSE and AMEX) and matched U.S. domestic stocks. If overall U.S. informed investors have more precise information about U.S. stocks' future values than about non-U.S. stocks' future values, then can we observe that information-motivated trade is more important in U.S. domestic stocks than in comparable non-U.S. cross-listed stocks, even though U.S. investors may only have a small initial information disadvantage about non-U.S. cross-listed stocks, which is particularly in the spirit of Nieuwerburgh and Veldkamp (2008)?

Cross-listed stocks are important for evaluating the information-based explanation of home bias for two reasons. First, in terms of economic importance, Errunza et al. (1999) show that most benefits from an internationally diversified portfolio can be obtained by just combining domestically traded multinationals, ADRs and closed-end country funds. Second, cross-listed stocks are also important because they are the type of foreign stocks about which investors should have the least initial information disadvantage as well as the cost of learning additional information. If cross-listed stocks' information problem is not big enough to generate home bias, then investors should have largely reduced - even eliminated - their home bias by investing in cross-listings if the information-based explanation is the true explanation for home bias.

LMSW's framework has two advantages for investigating the motives for home bias. First, it directly links the precision of overall informed investors' information to the relative importance of informational vs risk-sharing motive in investors' everyday trading. This feature corresponds well with the information-based home bias theories where overall informed investors' information precision also determines the trade-off between investors' informational vs risk sharing motive of holding domestic vs foreign stocks.[3] Second, home bias is an aggregate result of the interaction of all investors. The volume-return dynamics of individual stocks is also a result of the relative strength of the trading of all informed investors vs that of risk-sharing investors.[4] Trading by any subset of investors is unlikely to determine the volume-return dynamics completely.

From an experiment standpoint, comparing trading in LMSW's perspective between non-U.S. cross-listed stocks and U.S. domestic stocks also has two advantages. First, cross-listed stocks are more comparable to U.S. domestic stocks in terms of trading in LMSW's perspective than other non-U.S. stocks. Cross-listed stocks are traded in the same way as U.S. domestic stocks. U.S. investors can avoid much of the cross-border frictions that could distort their trading behavior in other non-U.S. stocks. U.S. stock exchanges' liquidity provision service for cross-listed stocks is potentially more comparable to that for U.S. domestic stocks. U.S. exchanges also have stringent listing standards on major firm-level characteristics such as size, annual turnover, and breadth of shareholder base. These standards screen out non-U.S. firms that are too different from U.S. domestic listed firms in the characteristics that may affect stocks' volume-return dynamics. Comparability in these aspects reduces the noises in the comparison of trading in LMSW's perspective. Second, cross-listed stocks are more comparable to U.S. domestic stocks in terms of standards of public information release. SEC requires them to disclose the same level of information in English. Their financials are reconciled to U.S. GAAP standards. U.S. investors therefore may have small initial information disadvantage about non-U.S. cross-listed firms relative to U.S. domestic firms. This creates a strong experiment environment in the spirit of Nieuwerburgh and Veldkamp(2008).

My first finding is that return continuation following high volume days is significantly stronger for U.S. domestic stocks than for comparable non-U.S. stocks traded on NYSE and AMEX during the 1993 to 2006 sample period. The pattern is robust in year-by-year comparison and robust after controlling for differences in stocks' world/U.S. market capitalization,

[3]Other information asymmetry measures such as bid-ask spreads do not directly have implication on the precision of overall informed investors' information. In addition, a particular issue of bid-ask spreads is that they cannot disentangle the effect of inventory-related illiquidity with the effect of private information because both illiquidity and risk of private information trading are positively related with bid-ask spreads. The volume-return dynamics in LMSW's perspective can somewhat disentangle these two effects since illiquidity will drive up return reversal following high volume days [(see the discussion in LMSW and Cambell, Grossman, Wang (1993)], while information-motivated speculative trade will drive up return continuation following high volume days.

[4]The class of risk-sharing investors could also be broadened by including other non-informational investors as price change due to non-informational trades does not reflect information and therefore will tend to reverse.

industry, total risk, price, trading frequency, illiquidity, and the bid-ask bounce effect. Using the range of cross-sectional variation in the relative strength of return continuation across U.S. domestic stocks as a benchmark for comparison, I also show that the difference in the relative strength of return continuation between non-U.S. cross-listed stocks and U.S. stocks is economically important. The finding is consistent with the interpretation that overall informed investors on U.S. exchanges can predict the future value of U.S. stocks more precisely than for comparable non-U.S. stocks and thus stronger importance of information-motivated trade is observed in U.S. domestic stocks than in comparable non-U.S. cross-listed stocks. Relatively, stronger return continuation is equivalent to weaker return reversal. The finding also suggests that risk-sharing trade (and potentially other non-informational trade) takes more important role in investors' trading of non-U.S. cross-listed stocks than that of matched U.S. stocks.

Although cross-listings are introduced in U.S. mainly for U.S. investors' trading/holding, cross-listed stocks' home country informed investors might have an incentive to engage in cross-country trading/arbitrage when their information is good enough to overcome the cost of doing so. It is not clear to what extent this activity may affect the volume-return dynamics of cross-listed stocks.[5] To address this issue, I partition non-U.S. cross-listed stocks into Canada, non-Canadian developed country and underdeveloped country subsamples. The information-based argument in Nieuwerburgh and Veldkamp (2008) implies that informed investors should gather information about stocks from regions where they have less initial information disadvantage and/or it is easier for them to learn additional information. U.S. investors have potentially less initial information disadvantage and can potentially more easily learn additional information about developed country stocks than about underdeveloped country stocks, given the weaker culture and/or economic relations on average between U.S. and underdeveloped countries. On the other hand, Canada is the major foreign country in the sample that is closest to U.S. in terms of physical distance, (trading) time zone, and economic and cultural relations. U.S. investors can learn additional information about Canadian firms almost as easily and rapidly as about U.S. domestic firms. This suggests that overall U.S. informed investors could have more precise information about developed country stocks than about emerging country stocks. Especially, U.S. informed investors' information precision

[5]The holding home bias literature often uses equity trading flows to infer investors' holding. In many of these flow data sets, only the initial deposit of ADRs on U.S. domestic markets is reflected in the flow data. Therefore, in a few such papers that document holding home bias, the subsequent trading of ADRs on U.S. exchanges is not picked up by the data either [(see the discussion in Tesar and Werner (1995)].

about Canadian stocks should not be too different from their information precision about comparable U.S. domestic stocks. Therefore, the observed information-motivated trade in stocks from developed countries and particularly from Canada is expected to be higher and closer to that in U.S. domestic stocks if U.S. investors' trading dominates the volume-return dynamics of cross-listed stocks on U.S. stock exchanges.

Alternatively, in countries with low-quality information environment, poor corporate governance enables local informed investors to gain more information advantage over uninformed investors.[6] Gagnon, Karolyi, and Lee (2006) and Grishchenk, Litov, and Mei (2008) show that the information-motivated speculative trade in LMSW's perspective is indeed stronger for stocks traded in countries with poor information environment. This suggests that if home country investors' cross-country information-motivated speculative trade significantly affects cross-listings' volume-return dynamics on U.S. stock exchanges, then the observed information-motivated trade in the volume-return dynamics is expected to be stronger in underdeveloped country stocks than in matched U.S. domestic stocks and in developed country stocks.

My finding does not support the alternative interpretation. The difference in the relative strength of return continuation following high volume days between underdeveloped country and U.S. stocks is substantially larger and more significant than that between developed country and U.S. stocks after controlling for various stock-level characteristics including illiquidity. There is some evidence that the difference between Canadian and matched U.S. stocks is only marginally significant. The return continuation (reversal) following high volume days is also significantly weaker (stronger) in underdeveloped country cross-listed stocks than in developed country cross-listed stocks. The results suggest that information-motivated trade on U.S. stock exchanges is observed to be strongest in the volume-return dynamics of U.S. domestic stocks, slightly weaker in that of developed country stocks, and weakest in that of underdeveloped country stocks. This finding is in favor of the hypothesis that U.S. investors' trading dominates cross-listed stocks volume-return dynamics and information-motivated trade is more important in stocks about which U.S. investors have more initial information advantage and/or have less difficulty to learn additional information.

Information-motivated trade and risk-sharing trade observed on U.S. stock exchanges is not the complete picture of the trading of cross-listed stocks. Another way to examine the im-

[6] see discussion in Bhattacharya and Daouk (2002), Bhattacharya, Daouk, and Welker (2003), and Grishchenk, Litov, and Mei (2008).

pact of cross-country trading/arbitrage activities is to compare the volume-return dynamics of cross-listed stocks with that of their home country counterparts. At least two possibilities can arise. First, if cross-country trading/arbitrage activities eliminate any difference in volume-return dynamics between cross-listed stocks and their home country counterparts, we should see no significant difference between these two type of stocks.

If the volume-return dynamics of cross-listed stocks on U.S. exchanges are on average more affected by U.S. investors' trading while the volume-return dynamics of cross-listed stocks' home country counterparts are on average more affected by cross-listed stocks' home country investors' trading, a second possibility arises.[7] Specifically, we may observe weaker (stronger) return continuation (reversal) following high volume days in cross-listed stocks than in their home country counterparts if information is a less important trading motive in U.S. investors' trading of cross-listed stocks than in local investors' trading of cross-listed stocks' home country counterparts. Admittedly, the difference in liquidity provision across international stock exchanges may blur the comparison of volume-return dynamics across international stock exchanges. The pure illiquidity effect shown in Campbell, Grossman and Wang (1993) may lead to stronger return reversal following high volume days for stocks traded on stock exchanges with less liquidity provision. However, given the existence of this illiquidity effect, in countries where overall local informed investors' information-motivated speculative trade is particularly strong while the difficulty or cost for U.S. investors to learn additional information is also particularly big, the difference in the importance of informational trading motive between U.S. and local investors may still dominate the noise in liquidity provision across international stock exchanges. We may still observe stronger information-motivated trade in cross-listed stocks' home country counterparts than in cross-listed stocks. Natural candidates of this type of countries/regions are again underdeveloped countries.

My finding is in favor of the second possibility. There is significantly stronger (weaker) return reversal (continuation) following high volume days in cross-listed stocks than in their home country counterparts. The finding suggests that stronger information-motivated trade is observed in cross-listed stocks' home country counterparts than in cross-listed stocks. The

[7] A number of studies, as well as popular press, find large price parity deviations of cross-listed stocks from their home market counterparts [see, e.g., Rosenthal and Young (1990), Froot and Dabora (1999), Bedi, Richards and Tennant (2003), de Jong, Rosenthal and van Dijk (2003), and Gagnon and Karolyi (2004)]. Gagnon and Karolyi (2004) also show that the price deviations can persist for at least up to five days and that returns on cross-listed stocks have significantly higher systematic comovements with U.S. market indexes and significantly lower systematic comovements with home market indexes than their equivalent home-market shares. These "excess" comovements are related with location of trading and with institutional and information-based barriers that impede cross-country arbitrage activities.

difference in volume-return dynamics is primarily driven by underdeveloped country cross-listed stocks.

This paper first contributes to understanding the role of information in investors' motivation for home bias by introducing a new perspective from investors' motives of trading. My findings suggest that even for cross-listed stocks, the type of stocks that foreign investors should have the least information disadvantage, cross-country information asymmetry is still an important factor in investors' trading. The results provide support for the information-based explanation of home bias. Since U.S. investors' informational disadvantage about cross-listed stocks is small, the findings are particularly consistent with the information-based story proposed by Nieuwerburgh and Veldkamp (2008). The paper also sheds light on the controversy in the growing literature over whether investors are more informed about domestic stocks. Second, the study contributes to the literature on understanding cross-listings by showing the relative importance of informational vs risk-sharing components in the trading of cross-listed stocks. This question is important for market participants and policy makers as facilitating international risk sharing and reducing foreign investors' information disadvantage are two main supposed goals of introducing cross-listings.

The remainder of this paper is organized as follows. Section 2 provides additional discussion of related literature. Section 3 discusses the methodology. Section 4 describes the data. Section 5 presents the results. Section 6 discusses the limitation of my approach and concludes the paper.

2 Additional Discussion of Related Literature

This paper is first related with the literature on the relationship between trading volume and stock returns at short horizons.[8] A few papers examine aggregate stock market returns and volume [e.g., Duffee (1992), Gallant, Rossi, and Tauchen (1992), LeBaron (1992), Campbell, Grossman, and Wang (1993)]. They find that returns tend to reverse themselves following high volume days. Campbell, Grossman and Wang (1993) propose a model in which risk-averse utility-maximizing agents act as market maker for liquidity investors or other non-informational investors in a symmetric information setting. They explain the return reversal following high volume days as a result of hedging motivated trades.

[8] A separate strand of the literature reveals a different pattern in the volume-return relationship over intermediate and longer returns horizons, e.g., Datar, Naik, and Radcliffe (1998), Lee and Swaminathan (2000), Connolly and Stivers (2003), and Statman, Thorley, and Vorkink (2006).

Other studies focus on the volume-return relation on individual stocks [e.g., Morse (1980), Concrad, Hameed, and Niden (1992), Antoniewicz (1993), Stickel and Verrecchia (1994), Blume, Easley, and O'Hara (1994), Wang (1994), Cooper (1999), Gervais, Kaniel, and Minglegrin (2001), Llorente, Michaely, Saar and Wang (2002)]. In particular, Wang (1994) develops a model of competitive stock trading in which agents are heterogeneous both in their information and in their private investment opportunities. Informed investors trade rationally for both informational and non-informational motives and the extent of information-motivated trade impacts the volume-return dynamics. More recently, LMSW propose a less complex version of the Wang (1994) model and offers sharper predictions: the higher the precision of overall informed investors' private information about future asset payoffs, the stronger the tendency of return continuation following high volume days. LMSW empirically support their theory using U.S. data. Gagnon, Karolyi, and Lee (2006) provide international support for LMSW using a sample of individual stocks from forty markets around the world. There are also several papers testing LMSW's model in individual countries, including Poland [Gebka (2005)] and Ireland [Lucey (2005)]. Gagnon, L. and G. A. Karolyi (2007) and Grishchenk, Litov, and Mei (2008) apply LMSW's framework to examine international comovements and the quality of corporate governance in emerging markets, respectively. My paper applies LMSW's framework to understand the role of information in investors' motivation for home bias.

My paper is also related with the broad strand of literature that contributes to the understanding of home bias. First, Tesar and Werner (1995) find that investors' turnover on foreign equity investments is higher than turnover on domestic equity markets. They use this as evidence to suggest that variable transactions costs are an unlikely explanation for home bias. My paper provides further analysis of the relative strength of informational component vs risk-sharing component in investors' turnover in foreign stocks and domestic stocks. My findings provide support for the information-based explanation of home bias.

Second, recently, a growing literature use different methods and data to study the question that whether investors are more informed about domestic stocks. The question is important not only for information-based stories of home bias but may have implications in other areas [see the discussion in Dvorak (2005)]. However, the results to this question are very controversial. Kang and Stulz (1997) find that foreign investors in Japan tend to concentrate their investment in firms about which foreign investors is supposed to have lower information disadvantage. Hau (2001), Dvorak (2005), and Choe, Kho and Stulz (2005) find evidence that the investment performance of domestic investors is better than that of foreign investors in Indonesia, German, and Korea, respectively. On the other hand, Grinblatt and Keloharju (2000) and Seasholes (2004) find the opposite results in Finland and Taiwan, respectively. Huang and Shiu (2006) also find Taiwanese stocks with high foreign ownership outperform stocks with low foreign ownership. Froot and Ramadorai (2008) use institutional equity flows from the U.S. to a cross-section of 25 countries. They find evidence that foreign investors have a better ability to predict returns in local markets.

This study is different from the above studies in several aspects. First, this paper introduces a different perspective to shed light on the question by examining the relative strength of informational vs risk-sharing motivated trade in individual stocks. Second, my focus is on the difference in trading between foreign and domestic stocks, while prior studies focus on the difference in trading between foreign and domestic investors. The two questions are related but not necessarily the same. Third, I use a longer time series data as my approach only needs public available data. Previous approaches that use proprietary data to measure relative investment performance can only cover time length of several years or even several months. However, many have shown that investors' performances are not stable or persistent. The mixed results in previous papers can be driven by the difference in sample period examined. In contrast, with 14 years of data, my results are potentially more reliable. Fourth, most previous papers can only focus on one particular country due to data availability.[9]. However, home bias is investors' bias against foreign countries in general or on average. It does not exclude the possibility that investors may have abnormal behavior towards one particular foreign country. Therefore, the mixed results in previous papers can also be driven by country-specific factors. In contrast, U.S. hosts the world's largest number of cross-listed firms from a wide variety of countries. The average cross-listings on U.S. exchanges are therefore more representative of a cross-listed stock from an "average" foreign country.

3 Methodology

3.1 Experiment design

My methodology is based on the heterogeneous agent, rational expectations model proposed by Llorente, Michaely, Saar, and Wang (2002). The experiment is two-step estimation. Every

[9] Froot and Ramadorai (2008) is an exception.

year, I first estimate the following time-series regression for each individual stock:

$$R^y_{i,t+1} = C0^y_i + C1^y_i \cdot R^y_{i,t} + C2^y_i \cdot V^y_{i,t} \cdot R^y_{i,t} + \varepsilon^y_{i,t+1} \tag{1}$$

where $R^y_{i,t}$ represents firm i's return on day t in year y, $V^y_{i,t}$ is the stock's abnormal trading volume on day t in year y, $C0^y_i$, $C1^y_i$, and $C2^y_i$ are regression coefficients for individual stocks in year y.

The abnormal trading volume, $V^y_{i,t}$, is described in (2). Here, trading volume is represented by the stock's turnover, which is the total number of shares traded that day divided by the total number of shares outstanding. According to Lo and Wang (2000), the daily time series of turnover is nonstationary, I measure the turnover in logs and detrend the resulting series. Following LMSW, to avoid the problem of zero daily trading volume, a small constant (0.00000255) is added to the turnover before taking logs. We then detrend the resulting series by subtracting a 200 trading day moving average as follows:

$$V^y_{i,t} = \log(turnover_{i,t}) - \frac{1}{200}\sum_{s=-200}^{-1} \log(turnover_{i,t+s}) \tag{2}$$

where $\log(turnover_{i,t}) = \log(turnover_{i,t} + 0.00000255)$.

Each year, the time-series regression coefficients are re-estimated using the daily data of individual stocks in that year. The main coefficient of interest is the C2 coefficient. With 14 years of data, each firm has 14 estimated C2 coefficients. These coefficients are then used to conduct the cross-sectional comparison.

Since trading contains both risk sharing elements (and potentially other non-informational elements) and information-motivated elements, the observed volume-return relation depends on the relative importance of information-motivated trade vs non-informational risk-sharing trade. If a stock only has risk-sharing trade, both Campbell, Grossman and Wang (1993) and LMSW show that current returns together with high volume predict strong reversals in future returns. Thus, the C2 coefficient will be clearly negative. When information-motivated trade is more important for a particular stock, current returns together with high volume predict weaker reversals or even continuation in future returns as information is gradually revealed in future prices. Thus, the C2 coefficients will be less negative or even positive. LMSW shows that the relative importance of information-motivated trade and correspondingly the value of C2 increase with the precision of the overall class of informed investors' private information about future stock price. This is because as overall informed investors' private information about future price is more precise, the partial price adjustment in the current period due to overall informed investors' information-motivated trade can predict the future price more precisely.

The difference between LMSW's C2 coefficient and other information asymmetry measures is that LMSW's model focuses on the relation between C2 and the precision of the class of overall informed investors' private information. This makes it possible to relate LMSW's measure of relative importance of information-motivated trade vs risk-sharing trade to the tradeoff between the informational motive and the risk-sharing motive of holding stocks in information-based home bias theories, because the tradeoff also depends on the precision of informed investors' information.

In the second step, I examine the difference in C2 between non-U.S. cross-listed stocks versus comparable U.S. domestic stocks. To control for the firm characteristics that could affect the extent of information-motivated trading in general regardless of the country origin of the stock, I construct various single-dimension matched and multi-dimension matched U.S. firm control samples. If a firm's data is missing on any matching characteristic needed for a particular matching procedure, then that firm is excluded in that particular matching procedure.

The main proxy for the single-dimension match is market capitalization. According to international CAPM theory, in a frictionless world, investors should hold an internationally diversified portfolio with weights equal to the market capitalization of individual stocks. Therefore, market capitalization is the single variable that reflects individual stocks' importance in investors' portfolio for the sole purpose of risk sharing. There, controlling for the level of market capitalization controls for the level of importance based on investors' risk-sharing motive.

On the other hand, previous research has documented that size [Lo and MacKinlay (1990)] is also a proxy for information asymmetry in general. LMSW use market capitalization as one of the two major proxies for the extent of information-motivated speculative trade in individual stocks and show that it is related with C2.[10] Gagnon, Karolyi, and Lee (2006) also provide similar evidence in a sample of 20305 individual stocks from forty national stock markets around the world. Therefore, from both risk-sharing and informational perspectives,

[10] The other major proxy that LMSW use is bid-ask spreads. Using bid-ask spreads as a control variable will be discussed in the next subsection.

market capitalization should be the major factor to be controlled for in comparing the difference in C2 between non-U.S. and U.S. stocks. For ADRs, I use two concepts of market capitalization in the matching procedure. The first is ADR's world market capitalization, which is the total value of equity securities issued at home country and abroad. This is to consider the case where world stock markets are perfectly integrated. The second is ADR's U.S. market capitalization, which is the dollar value of ADR shares outstanding on U.S. exchanges. This is to consider the extreme case where the share value of cross-listed stocks on U.S. exchanges is the only value that matters for investors on U.S. stock exchanges. Generally, higher (lower) trading volume in ADR stocks can lead to the creation (cancellation) of additional shares of ADRs. Since trading volume itself potentially indicates the intensity of information-motivated trading, the U.S. market capitalization of ADRs somewhat reflects the trading activity that is endogenously determined by information. Due to this problem, I put more emphasis on the results using ADRs' world market capitalization.[11]

In the single-dimension match, each year, each non-U.S. firm is matched with a U.S. domestic firm that has the closest average daily market capitalization in that year. The nature of LMSW's test requires that stock-specific parameters remain constant over time, which may not be the case over a long horizon. Firm-level characteristics for non-U.S. firms (especially emerging market firms) are relatively less stable over long horizons. In addition, in the sample period, there are many non-U.S. firms added in or dropped out of the sample every year. In light of these issues, the foreign-domestic matched pairs are reconstructed every year using the same matching procedure and the C2 coefficient for each stock is estimated every year.

To examine the difference in the relative strength of information-motivated trade in LMSW's perspective, I use two methods. First, to give a sense of the underlying difference without imposing too much structure on the panel data, I present a categorization analysis by comparing the average C2 of non-U.S. firms with that of matched U.S. firms. If information-motivated trade on U.S. stock exchanges is more (less) important for non-U.S. stocks than for comparable U.S. stocks, we should observe that the cross-sectional average of C2 for non-U.S. firms is more (less) negative than for U.S. firms. The cross-sectional average

[11] Except Canadian stocks, most ordinary listed non-U.S. stocks on U.S. stock exchanges do not list their shares in their home countries. Therefore, I do not use world market capitalization for ordinary listed non-U.S. stocks. To account for the possible influence of this choice on the testing results, I report the matching results for ADRs, non-Canadian foreign ordinary listings and Canadian ordinary listings separately in subsample analysis.

of the difference in C2 coefficients between non-U.S. firms and matched U.S. firms is also calculated to conduct the comparison in each year and over the whole sample period. The difference in C2 is expected to be significantly negative (positive), if non-U.S. firms have significantly weaker (stronger) return continuation following high volume days than matched U.S. firms and correspondingly information-motivated trade (risk-sharing trade) is less (more) important in non-U.S. stocks than in matched U.S. stocks.

Second, I estimate the following panel regression for the sample that includes both non-U.S. firms and their matched U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y \tag{3}$$

where NonUS is a dummy variable that equals to 1 if the stock is a Non-U.S. stock and 0 otherwise; Year is a set of year dummy variables. Here we should see b>0 (<0) if information-motivated trade is more (less) important in non-U.S. firms than in matched U.S. firms.

3.2 Residual information effect after controlling for illiquidity

As shown by Campbell, Grossman, and Wang (1993) and LMSW, besides information-motivated trade, the other factor that may drive the cross-sectional difference in stocks' volume-return dynamics is stocks' illiquidity. For less liquid stocks, high volume could generate a higher price impact and a larger subsequent return reversal than for more liquid stocks. The illiquidity effect thus affects C2 in the opposite way as the information effect does. One might consider matching stocks based on their illiquidity measures. However, this has to be done with caution. Most illiquidity proxies also capture some private information component in stock's trading. Most illiquidity measures cannot disentangle the information effect and the illiquidity effect. Matching on illiquidity proxies therefore unavoidably lose at least part of the information effect that are captured by illiquidity proxies. Therefore, the comparison of C2 between non-U.S. firms and U.S. firms matched on liquidity effectively examines the residual information effect after controlling for illiquidity.

I use Amihud illiquidity ratio as the major liquidity proxy in constructing liquidity-matched U.S. firm control samples. For stock i in year y, the illiquidity ratio is defined as:

$$Amihud_i^y = \frac{1}{N_i^y} \sum_{t=1}^{N_i^y} \frac{|R_{i,t}^y|}{dvol_{i,t}^y} \tag{4}$$

where N_i^y is the number of days for which data are available for stock i in year y, $R_{i,t}^y$ is the stock return on day t in year y, and $dvol_{i,t}^y$ is the dollar volume for the stock on day t in year y. Intuitively, if a stock's price moves a lot in response to little volume, the stock is illiquid, i.e., has a high value in the above Amihud ratio. Amihud (2002) shows empirically that the illiquidity ratio is positively related to measures of price impact and fixed trading costs. Similarly, Hasbrouck (2006) reports that "[a]mong the daily proxies, the Amihud illiquidity measure is most strongly correlated with the TAQ-based price impact coefficient." The illiquidity ratio is widely employed in the empirical literature as a liquidity measure, such as, Acharya and Pedersen (2005), Hou and Moskowitz (2005), and Avramov, Chordia, and Goyal (2006).

The Amihud measure is closely related with the C2 coefficient since both contain the contemporaneous impact of volume on returns. The major difference between Amihud and C2 is that Amihud does not capture whether future returns will follow the trend of current returns or reverse it. Therefore, matching firms based on the Amihud measure, we control for the contemporaneous price impact due to the illiquidity effect while keep the subsequent return continuation effect caused by gradual revealing of information. The latter effect is one of the key elements in LMSW's perspective of information-motivated trade.

As complements to the Amihud measure of illiquidity, I also use two other alternative illiquidity measures. The first is the relative closing bid-ask spread. Bid-ask spread is a major proxy for illiquidity in the literature. It does not directly measure the impact of volume on returns and therefore has a different perspective from the Amihud measure. However, bid-ask spread generally contains a component that reflects the information risk in stock trading [(e.g., Lee, Mucklow and Ready (1993)]. In light of the information component in bid-ask spread, I elect to use the relative closing bid-ask spread. Madhavan, Richardson and Roomans (1997) show that the information risk component in the bid-ask spread declines throughout the day because market participants learn from the trading process and information asymmetries are resolved through price discovery.[12]. At the end of the day, the private information component is relatively small in bid-ask spread while only the inventory-related or other noninformational illiquidity component is large. Using the closing bid-ask spread somewhat alleviates the problem of directly matching on the private information risk component in the trading activity

[12] Theoretical models [Handa and Schwartz (1991) and Madhavan (1992)] and evidence from experimental markets [Bloomfield (1996), Bloomfield and O'Hara (1999)] also suggest that information asymmetry decreases steadily throughout the day, where market makers learn from order flow.

while still captures the illiquidity effect in individual stocks.

The second alternative measure of liquidity is turnover. Turnover is a measure of investors' trading frequency, while trading frequency affects the illiquidity of the underlying stock.

3.3 Multi-dimension Match

In multi-dimension match, I match a non-U.S. firm with a U.S. firm in a particular year based on a set of variables. Specifically, each year, for each non-U.S. firm, I first identify all U.S. firms that have the same first two-digit SIC code as the non-U.S. firm[13]. I then choose the best match from these firms based on market capitalization, price, total risk and illiquidity. Although the volume-return literature does not suggest that industry is related with the volume-return dynamics of individual stocks, investors on U.S. stock exchanges may have advantage in learning information about particular industries. Stock price is a relatively exogenous variable that also affects the trading activity and liquidity in general. In LMSW's original model, an individual stock's total risk is held constant when deriving the relation between C2 and informed investors' information precision. Therefore, I use an individual stock's daily return volatility in each year to proxy for its total risk in each year.

Following an approach similar to Huang and Stoll (1996), I identify a matching U.S. stock for each non-U.S. stock in each year by determining which U.S. stock minimizes the following:

$$\sum_{i=1}^{n}\left(\frac{X^y_{i,Non-U.S.} - X^y_{i,U.S.}}{(X^y_{i,Non-U.S.} + X^y_{i,U.S.})/2}\right)^2$$

where $X^y_{i,Non-U.S.}$ denotes the value of the ith matching variable for the non-U.S. stock in year y; $X^y_{i,U.S.}$ denotes the value of ith matching variable for the U.S. stock in year y; and n is the number of matching variables excluding industry. This minimization is done subject to the constraint

$$\left|\frac{X^y_{i,Non-U.S.} - X^y_{i,U.S.}}{(X^y_{i,Non-U.S.} + X^y_{i,U.S.})/2}\right| < 1 \tag{5}$$

for all i[14]. The constraints are added so that the matched sample has characteristics that are sufficiently similar to those of non-U.S. stocks.

[13] Alternatively, I also match on Fama-French 48 industries. The results (unreported) are similar.

[14] Using stricter constraints (i.e. the critical values less than one) reduces the sample size, but the results are qualitatively similar.

4 Data

The primary sample consists of ADRs, non-U.S. ordinary listed common stocks, and U.S. common stocks traded on NYSE and AMEX.[15] From the Center for Research in Security Prices (CRSP), I construct the complete list of non-U.S. stocks listed on NYSE either in the form of ADRs or ordinary listings. The ADRs in the sample are all classified as exchange-listed Level II and Level III (capital-raising) programs. Over-the-counter issues (Level I ADRs), as well as Securities and Exchange Commission (SEC) Regulation S shares and private placements issues falling under SEC Rule 144a, are excluded. I also exclude preferred shares, closed-end funds, and Real Estate Investment Trust units.

From CRSP, I obtain stock data on daily return, price, share volume, shares outstanding and SIC codes. For each firm-year, I measure annual U.S. market capitalization as the average daily market capitalization (number of shares outstanding multiplied by the daily closing price) over the year. I obtain the annual world total market capitalization data for ADRs from the Worldscope database in Datastream.

I obtain quotes and bid-ask spreads data from the NYSE Trade and Quote (TAQ) database. The annual relative closing bid-ask spread is defined as the average of the daily closing percentage spread (closing bid-ask spread divided by the closing mid-quote) over a year.

I identify the country of incorporation of non-U.S. stocks from COMPUSTAT. The developed country classifications follow the classifications of the FTSE Global Equity Index. All other countries except developed countries are classified as underdeveloped countries.

The sample period is from January 1, 1993 to December 31, 2006. I choose this sample period primarily because the TAQ database only starts from 1993.

To allow a more precise estimation of the time-series regressions, and a more uniform cross-sectional comparison of the regression parameters in each year, I include a stock in a particular year if they trade at least 200 days out of 250 trading days in that year.[16] I exclude all stocks with an annual average stock price <$1.00 or >$500 per share to control for extreme illiquidity as well as different tick sizes for stocks trading below $1.00.

After applying these screens, there are 26124 U.S. domestic firm-year observations (on average 1866 stocks per year) available for constructing matching samples. There are 4718

[15] I do not include NASDAQ stocks because the daily volume on NASDAQ includes the after-hour trading volume while returns do not. This makes the testing results hard to interpret.

[16] In unreported results, I also try looser requirement (150 days out of 250 days) or tighter requirement (225 days out of 250 days). The results are similar.

non-U.S. firm-year observations (on average 337 stocks per year) among which are 2856 ADR firm-year observations (on average 204 stocks per year) and 1862 ordinary listing firm-year observations (on average 133 stocks per year). Divided by region, there are 2156 non-Canadian developed country firm-year observations (on average 154 stocks per year), 1442 underdeveloped country firm-year observations (on average 103 stocks per year), and 1120 Canadian firm-year observations (on average 80 stocks per year) where Canadian stocks are all in the form of ordinary listings.

[Insert Table 1 about here]

Table 1 presents the sample summary statistics. The sample is first divided into two groups of stocks: U.S. domestic stocks and non-U.S. cross-listed stocks. I then further divide non-U.S. cross-listed stocks into ADRs and foreign ordinary listings. Alternatively, I also divide non-U.S. cross-listed stocks into Canadian stocks, developed country (excluding Canada) stocks, and underdeveloped country stocks. For each group of stocks, I report the average number of stocks per year, as well as the cross-sectional mean, median, and standard deviation of stocks' world market capitalization, U.S. market capitalization, price, Amihud illiquidity measure, turnover, bid-ask spread and total return volatility in each group. The table shows a great deal of cross-sectional variation along all the dimensions in each group of stocks I examined.

The average world market capitalization of non-U.S. cross-listed stocks is 11214.25 million (USD). It is larger than the average market capitalization of U.S. stocks, which is 4503.50 million. On the other hand, the U.S. market capitalization of cross-listed stocks is 2881.68 million which is small than the average market capitalization of U.S. stocks. Foreign ordinary listings' average U.S. market capitalization is 4911.74 million. It is more than three times larger than ADRs' average U.S. market capitalization (1552.68 million). The world market capitalization and the U.S. market capitalization of underdeveloped country stocks are 5110.84 million and 1749.23 million, respectively. They are lower than the world and the U.S. market capitalization of developed country stocks, which are 19196.88 million and 3190.14 million, respectively.

Trading related measures exhibit some interesting patterns. The average turnover of U.S. domestic stocks (0.46%) is lower than the average turnover of non-U.S. cross-listed stocks (0.75%). The result is consistent with the finding in Tesar and Werner (1995) that investors' turnover on foreign equity investments is higher than turnover on domestic equity markets. The high turnover of non-U.S. cross-listed stocks is driven by ADRs (0.98%). In contrast, foreign ordinary listed stocks only have an average turnover of 0.40%. Especially, Canada ordinary listings actually have an average turnover of 0.35%.

Using Amihud's (2002) price impact measure to represent stocks' illiquidity, the average illiquidity measure of U.S. domestic stocks (0.54) is higher than that of non-U.S. cross-listed stocks (0.43). This suggests that U.S. domestic stocks are on average less liquid than cross-listed stocks. Developed country (excluding Canada) stocks are the most liquid stocks (0.26), following by ADR stocks (0.33). On the other hand, foreign ordinary listings, Canadian ordinary listings, and underdeveloped country stocks all have high illiquidity measure values. They are 0.60, 0.61, and 0.56, respectively.

The average bid-ask spread of U.S. domestic stocks (2.15%) is higher than that of non-U.S. cross-listed stocks (1.84%). This is possible since cross-listed stocks are generally larger and more liquid stocks. ADRs and developed country (excluding Canada) stocks are the lowest two groups of stocks in terms of bid-ask spread with averages of 1.67% and 1.46%, respectively. On the other hand, foreign ordinary listings and particularly Canadian ordinary listings have relatively high bid-ask spreads with averages of 2.34% and 2.09%, respectively.

The annualized average total return volatility of U.S. domestic stocks (42.02%) is close to that of non-U.S. cross-listed stocks (41.14%). ADRs and developed country (excluding Canada) stocks are the lowest two groups of stocks in terms of total return volatility with averages of 38.88% and 36.55%, respectively. On the other hand, the total return volatility of underdeveloped country stocks, foreign ordinary listings, and particularly Canadian ordinary listings are all relatively high with averages of 44.53%, 44.60% and 45.59%, respectively.

5 Results

5.1 Overall sample comparison

In Table 2, I compare the cross-sectional average C2 coefficients between non-U.S. stocks and size-matched U.S. stocks from 1993 to 2006. In each year, each non-U.S. firm is matched with a U.S. firm that has the closest annual market capitalization in that year. The cross-sectional average C2 coefficient is calculated for each year and for the overall sample period, respectively. For ADRs, since I use two concepts of market capitalization, Panel A and Panel

B provide the categorization analysis where ADRs' world market capitalization and their U.S. market capitalization are used in the matching procedure, respectively.

[Insert Table 2 about here]

Panel A shows that return continuation following high volume days is weaker for non-U.S. firms than for size-matched U.S. domestic firms when ADRs' world market capitalization is used in the matching procedure. In the overall sample, the all-year average C2 coefficient is -0.011 for non-U.S. firms. Negative C2 indicates that return reversal is stronger than continuation following high volume days. This suggests that noninformational risk-sharing trade is more important than information-motivated trade in the trading of non-U.S. stocks on U.S. stock exchanges. The all-year average C2 coefficient is 0.007 for matched U.S. firms. It suggests that information-motivated trade is more important than noninformational risk-sharing trade in the trading of size-matched U.S. stocks. The pooled average of the difference in C2 coefficients between non-U.S. firms and matched U.S. firms over all years is -0.017, which means size-matched U.S. domestic firms has stronger return continuation following high volume days than non-U.S. firms on U.S. stock exchanges do. This suggests that information-motivated trade is more important in the trading of size-matched U.S. stocks than in that of non-U.S. stocks on U.S. stock exchanges. A two-tailed t test of the difference in C2 for each year is significant in 10 out of the 14 years. This suggests that the result is not driven by a particular year. The size-matched U.S. domestic firms' market capitalization is reasonably close to non-U.S. firms' market capitalization. The all-year average market capitalization for non-U.S. firms versus size-matched U.S. firms is 11214.25 million dollars versus 11166.97 million dollars.[17]

In Panel B, ADRs' U.S. market capitalization is used in the matching procedure. Return continuation following high volume days is still weaker for non-U.S. firms than for U.S. domestic firms. The all-year average C2 coefficient is 0.004 for matched U.S. firms. The pooled average of the difference in C2 between non-U.S. firms and matched U.S. firms over all years is -0.015. A two-tailed t test of the difference in C2 for each year is significant in 10 out of the 14 years. The market capitalization of non-U.S. firms and that of matched U.S.

[17] In unreported results, I also use stricter constraints to construct foreign-domestic matched pairs [i.e., eliminate the pairs where U.S. firms' matching variable(s) are more than 10% bigger or smaller than the corresponding non-U.S. firms' matching variable(s)]. The results are qualitatively similar.

domestic firms are reasonably close to each other with an all-year average of 2881.68 million dollars and 2878.22 million dollars, respectively.

Panel C provides the panel regression analysis using Equation (3). The t-statistics of this panel regression uses standard errors clustered by firm. The coefficient, b, on the Non-U.S. firm dummy is negative and highly significant, indicating stronger return continuation following high volume days for size-matched U.S. firms than for non-U.S. firms. For example, the t-statistics is -6.51 (-6.16) when year dummies in the panel regression are included and ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure.

Overall, the results in Table 2 suggest that information-motivated trade is significantly less strong for non-U.S. stocks on U.S. stock exchanges than for matched U.S. stocks. The results are consistent with the interpretation that informed investors on U.S. stock exchanges as a whole group have stronger informational motive to trade U.S. domestic stocks than comparable non-U.S. stocks. On the other hand, weaker return continuation is equivalent to stronger return reversal. The results also suggest that trading of cross-listed stocks are more dominated by non-informational, risk-sharing trades than trading of size-matched U.S. stocks on U.S. stock exchanges.

5.2 Subsample comparison

In Table 3, I compare the cross-sectional average C2 coefficients between non-U.S. firms and size-matched U.S. firms from 1993 to 2006 in various subsamples. The subsamples I examine are ADRs, foreign ordinary listings, Canadian ordinary listings, developed country firms (excluding Canadian firms), and underdeveloped country firms. The reason for separating foreign ordinary listings from ADRs is that the listing requirements of ordinary listings are slightly different from those of ADRs.

Although cross-listings are introduced in U.S. mainly for U.S. investors' trading/holding, cross-listed stocks' home country informed investors might have an incentive to engage in cross-country trading/arbitrage when their information is good enough to overcome the cost of doing so. It is not clear to what extent this activity may affect the volume-return dynamics of cross-listed stocks. To address this issue, I also partition non-U.S. cross-listed stocks into Canada, non-Canadian developed country and underdeveloped country subsamples. The information-based argument in Nieuwerburgh and Veldkamp (2008) implies that informed investors should gather information about stocks from regions where they have less initial information disadvantage and/or it is easier for them to learn additional information. U.S. investors have potentially less initial information disadvantage and can potentially more easily learn additional information about developed country stocks than about underdeveloped country stocks, given the weaker culture and/or economic relations on average between U.S. and underdeveloped. In particular, Canada is the major foreign country in the sample that is closest to U.S. in terms of physical distance, (trading) time zone, and economic and cultural relations. U.S. investors may learn additional information about Canadian firms almost as easily and rapidly as about U.S. domestic firms. Canadian firms have a long tradition of listing in the US directly as ordinary shares instead of ADRs and they make up the single largest group of foreign firms listed as ordinary shares on U.S. stock exchanges.This suggests that overall U.S. informed investors could have more precise information about developed country stocks than about emerging country stocks. Especially, U.S. informed investors' information precision about Canadian stocks should not be too different from their information precision about comparable U.S. domestic stocks. Therefore, the relative strength of information-motivated trade in stocks from developed countries and particularly Canada is expected to be higher and closer to that in U.S. domestic stocks if U.S. investors' trading dominates the volume-return dynamics of cross-listed stocks on U.S. stock exchanges.

Alternatively, in countries with lower quality information environment, poor corporate governance enables local informed investors to gain more information advantage over uninformed investors [see discussion in Bhattacharya and Daouk (2002), Bhattacharya, Daouk, and Welker (2003), and Grishchenk, Litov, and Mei (2008)]. Gagnon, Karolyi, and Lee (2006) and Grishchenk, Litov, and Mei (2008) show that information-motivated trade in LMSW's perspective is indeed stronger in these countries. This suggests that if home country investors' cross-country information-motivated trade in cross-listings significantly affects cross-listings' volume-return dynamics on U.S. stock exchanges, then the observed information-motivated trade in the volume-return dynamics is expected to be stronger in underdeveloped country stocks than in matched U.S. domestic stocks and in developed country stocks.

In Panel A and B of Table 3, the first vertical panel (the second vertical panel) provides the results when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. Panel A provides the categorization analysis of each subsample. The analysis is conducted on the pooled cross-sectional average C2 coefficients over the whole sample period. Panel B provides the panel regression analysis of the C2 coefficients estimated in year for each stock.

[Insert Table 3 about here]

The results for ADR subsample are very similar to the overall non-U.S. firm sample. Panel A shows that there is weaker (stronger) return continuation (reversal) following high volume days for ADRs than for U.S. domestic firms matched by either ADRs' world market capitalization or by their U.S. market capitalization. The all-year average C2 coefficient is -0.011 for ADRs. It suggests that noninformational risk-sharing trade is more important than information-motivated trade in trading of ADRs on U.S. stock exchanges. The all-year average C2 coefficient is 0.008 (0.004) for U.S. firms matched on ADRs' world market capitalization (U.S. market capitalization). It suggests that information-motivated trade is more important than noninformational, risk-sharing trade in trading matched U.S. stocks. The pooled average difference in C2 coefficients between ADRs and matched U.S. firms over all years is -0.019 (-0.014) when matched by ADRs' world market capitalization (U.S. market capitalization). The market capitalization of ADRs versus matched U.S. domestic firms are reasonably close with an average of 15133.74 versus 15057.26 million dollars when matched by ADRs' world market capitalization and an average of 1552.68 versus 1550.11 million dollars when matched by ADRs' U.S. market capitalization. The panel regression analysis in Panel B shows that the C2 of ADRs is significantly more negative than that of matched U.S. firms. The t-statistics for the coefficient, b, on the Non-U.S. firm dummy (i.e., the dummy equals to 1 for an ADR firm and 0 for a matched U.S. firm) is -5.53 (-4.86) when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. It suggests that information-motivated trade is more important in size-matched U.S. stocks than in ADRs on U.S. stock exchanges, while trading of ADRs is more dominated by risk-sharing trade than that of size-matched U.S. domestic stocks.

The results for foreign ordinary listings are similar to those of ADRs. There is still weaker (stronger) return continuation (reversal) following high volume days for foreign ordinary listings than for size-matched domestic firms. The all-year average C2 coefficient is -0.011 for foreign ordinary listings and 0.005 for matched U.S. firms. The pooled average difference in C2 coefficients between foreign ordinary listings and matched U.S. firms over all years is -0.015. The t-statistics for the coefficient on the Non-U.S. firm dummy is -4.05. It suggests that information-motivated trade is more important in size-matched U.S. stocks than in foreign ordinary listings on U.S. stock exchanges, while trading of foreign ordinary listings is more dominated by risk-sharing trade than that of size-matched U.S. domestic stocks.

The results for both ADRs and foreign ordinary listings are consistent with the interpretation that informed investors on U.S. stock exchanges as a whole group have stronger informational motive to trade U.S. domestic stocks than comparable non-U.S. stocks.

When we look at the Canadian ordinary listings, an interesting picture emerges. The return continuation following high volume days is still weaker for Canadian firms than for size-matched U.S. domestic firms but the magnitude and the significance of the difference are both smaller. The all-year average C2 coefficients are -0.005 for Canadian ordinary listings and 0.002 for matched U.S. firms, both of which are closer to zero. The pooled average difference in C2 coefficients between Canada firms and matched U.S. firms over all years is -0.008. The t-statistics for the coefficient on the Non-U.S. firm dummy is only -1.67.

The results for developed country (excluding Canada) subsample provide a similar picture as Canada subsample does. The return continuation following high volume days for non-Canada developed country firms is weaker than for size-matched U.S. domestic firms. The all-year average C2 coefficients are -0.006 for non-Canada developed country firms and 0.007 (0.006) for matched U.S. firms when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. The differences in C2 coefficients between non-Canada developed country firms and size-matched U.S. domestic firms are -0.013 (-0.012) when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. The t-statistics for the coefficients on the Non-U.S. firm dummy are -3.28 (-3.42) when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure.

In contrast, the magnitude and significance of the difference in C2 coefficients between underdeveloped country firms and matched U.S. firms is substantially stronger than that between developed country firms and matched U.S. firms. The all-year average C2 coefficients are -0.022 for underdeveloped country firms and 0.010 (0.003) for matched U.S. firms when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. The big negative value of C2 for underdeveloped country firms suggests that risk-sharing or non-informational trade for underdeveloped country firms significantly dominates information-motivated trade in the trading of underdeveloped country firms on U.S. stock exchanges. The differences in C2 coefficients between underdeveloped country firms and size-matched U.S. domestic firms are -0.032 (-0.025) when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. The t-statistics for the coefficient on the Non-U.S. firm dummy is -7.19 (-6.02) when ADRs' world market capitalization (U.S. market capitalization) is used in the matching procedure. The magnitude and significance of the difference in C2 is bigger than any other non-U.S. firm subsample.

In addition, an unmatched comparison between developed country firms (including both Canadian firms and non-Canadian developed country firms) and underdeveloped country firms indicates that the average C2 of developed country firms is significantly less negative than that of underdeveloped country firms.[18] This suggests that information-motivated trade is observed to be stronger in trading developed country stocks than in trading underdeveloped country stocks on U.S. stock exchanges.

Overall, the results for Canada, non-Canadian developed country, underdeveloped country subsample suggest that information-motivated trade on U.S. stock exchanges is observed to be strongest in the volume-return dynamics of U.S. domestic stocks, slightly weaker in that of developed country stocks, and weakest in that of underdeveloped country stocks. Trading of underdeveloped cross-listed stocks is predominated by non-informational risk-sharing trade. This finding is in favor of the hypothesis that U.S. investors' trading dominates cross-listed stocks volume-return dynamics and information-motivated trade is more important in stocks about which U.S. investors have more initial information advantage and/or have less difficulty to learn additional information.

5.3 Bid-ask bounce effect

One concern of the results in the previous sections is the bid-ask bounce effect [e.g., Roll (1984)] caused by bid-ask spreads. The bid-ask bounce effect creates first order negative return autocorrelation in daily returns. The return autocorrelation conditional on high volume (i.e. C2) could be affected by the bid-ask bounce effect. We would expect a less negative or even positive C2 coefficients for stocks with large bid-ask spreads if more volume could reduce bid-ask spreads and therefore reduce the bid-ask bounce effect.

To examine this issue I use a return series that is free from bid-ask bounce. Specifically I use the TAQ database to generate returns from end-of-day midquotes for all stocks where the end-of-day midquotes data are available. I adjust the split in stock prices using CRSP Cumulative Factor to Adjust Price. The new return series is less reliable than the CRSP return series. There are more days without a valid end-of-day quote in the TAQ database

[18] Given the much smaller total number of non-U.S. firms than U.S. domestic firms, I do not impose any matching criterion when comparing the difference in C2 coefficients between developed country firms and underdeveloped country firms.

than there are days without a valid return in the CRSP database. Each day without an end-of-day quote results in two days without valid midquote returns. To deal with this issue, I eliminate a firm in a particular year when there are less than 200 valid returns for the firm in that year. Then I re-estimate Equation (1) with the midquote return series for all firms in the sample. Table 4 reports the comparison of the cross-sectional average C2 coefficients between non-U.S. firms and size-matched U.S. firms in the overall sample and in various subsamples. Panel A provides the categorization analysis and Panel B provides the regression analysis. The results show that the differences in C2 between non-U.S. firms and size-matched U.S. firms in the overall sample and in various subsamples are similar to those reported in Table 2 and 3. I note, though, that the significance level of the coefficient on the Non-U.S. firm dummy for Canada subsample increases (the t-statistics jumps from 1.67 to 2.88, which is still the smallest among all non-U.S. firm subsamples).

[Insert Table 4 about here]

5.4 Residual information effect after controlling for illiquidity

In this section, I compare the cross-sectional average C2 coefficients of non-U.S. firms and U.S. firms matched on illiquidity. The purpose of this single-dimension match on illiquidity is to evaluate the effect of illiquidity on return continuation and reversal following high volume days. The illiquidity effect documented in Campbell, Grossman, and Wang (1993) implies that there may be stronger return reversal following high volume days for less liquid stocks. On the other hand, since illiquidity proxies also capture some private information component in trading, I effectively examine the residual information effect contained in the C2 coefficient after controlling for the illiquidity effect.

I focus on three illiquidity proxies: Amihud illiquidity measure, the relative closing bid-ask spread, and turnover. I construct three illiquidity-matched U.S. firm control samples using one of the three liquidity proxies at a time. Table 5 reports the results of the comparison. Panel A reports the categorization analysis and Panel B reports the regression analysis.

[Insert Table 5 about here]

In the first illiquidity-matched comparison, the illiquidity proxy is Amihud illiquidity measure. As shown by Campbell, Grossman, and Wang (1993) and LMSW, the illiquidity effect generates a contemporaneous price impact following high volume days and a subsequent return reversal if no information is revealed in the next day. After controlling for the Amihud measure, we focus on the subsequent return continuation effect that is due to information. The first vertical panel in Panel A of Table 5 shows that the magnitude of the difference in C2 coefficients between non-U.S. and liquidity-matched U.S. firms in the overall sample and in various subsamples are qualitatively similar to the main results in Table 2 and 3. The first vertical panel in Panel B of Table 5 shows that the significance of the coefficient, b, on the Non-U.S. firm dummy is still highly significant for the overall non-U.S. firm sample, ADR subsample, and foreign ordinary listing subsample. It suggests that after controlling for the illiquidity effect on contemporaneous price change, matched U.S. firms still have stronger return continuation following high volume days.

In subsamples divided by region, the significance of the coefficient, b, on the Non-U.S. firm dummy decreases for Canadian firms (now an insignificant t-statistic of -1.51) and for non-Canadian developed country firms (a t-statistic of -2.25), compared with the results in Table 2 and Table 3. It increases for underdeveloped country firms (now a t-statistic of -7.43). This suggests that after controlling for the illiquidity effect, the information component in the volume-return dynamics of underdeveloped country firms is even weaker than that of matched U.S. firms.

In the second illiquidity-matched sample, the illiquidity proxy is the closing bid-ask spread. The second vertical panel in Panel A and B of Table 5 reports the results by matching on the closing bid-ask spread. The results are similar to those using Amihud as the liquidity measure except that now the coefficient, b, on the Non-U.S. firm dummy for Canadian firms and for developed country firms becomes more significant with a t-statistic of -3.40 for Canadian firms and -3.27 for developed country firms.

The third liquidity-matched sample uses turnover as the illiquidity proxy. Turnover is an incomplete measure of liquidity. It generally reflects investors' trading frequency in a particular stock. The results (reported in the third vertical panel in Panel A and B in Table 5) are very similar to the results reported in Table 2 and 3, except that the t-statistic on the coefficient on the Non-U.S. firm dummy for Canadian firms increases from 1.67 in Table 3 to 2.15 in Table 5.

Overall, the results show that after controlling for the illiquidity effect, the residual information effect measured by return continuation following high volume days is still significantly stronger for matched U.S. firms than for non-U.S. firms.

5.5 Multi-dimension match

In this subsection, I conduct multi-dimension matched comparisons. Specifically, each year, for each non-U.S. firm, I first identify all U.S. firms that have the same first two-digit SIC code. I then match based on market capitalization, price, illiquidity and the total risk of individual stocks.

[Insert Table 6 about here]

Table 6 reports the results using the Amihud illiquidity measure as the illiquidity proxy. Panel A (B) shows the categorical analysis where ADR's world market capitalization (U.S. market capitalization) is used in the matching procedure. Panel C reports the regression analysis. Although after applying the multi-dimension match criterion the sample sizes significantly shrink in the overall sample and in various subsamples, the results on the comparison of C2 are very similar to the single-dimension matched results in Table 2 and 3.[19]

The multi-dimension matched comparison further confirmed my finding that the relative strength of information-motivated trade in matched U.S. domestic stocks is stronger than in non-U.S. cross-listed stocks. It is stronger in regions where U.S. investors have less initial information disadvantage or can learn additional information more easily. On the other hand, non-informational, risk-sharing trade predominates the trading of stocks from regions where U.S. investors have high initial information disadvantage or can hardly learn additional information.

5.6 Understanding the magnitude of the difference in C2

To understand the magnitude of the difference in C2 between non-U.S. and U.S. stocks, I use the magnitude of the cross-sectional variation in the relative strength of informed trade across U.S. domestic stocks as a benchmark for comparison.

[19] In the overall sample and in a few subsamples, the average matched U.S. firms' market capitalization is smaller than non-U.S. firms' market capitalization. To check the robustness, I also try various tighter constraints on market capitalization, as well as on other matching variables, in the matching procedure. The results are similar.

Specifically, my first way of comparison is as follows. I compare the difference in C2 between non-U.S. and U.S. stocks with the magnitude of the cross-sectional difference in C2 across U.S. domestic stocks that can be captured by proxies of relative strength of information-motivated trade. Take size for example. I sort all U.S. domestic stocks on size and then calculate the cross-sectional average C2 coefficients for the top size quintile (biggest firms) and the bottom size quintile (smallest firms). The yearly average difference in C2 between the smallest firms and the biggest firms is 0.014. As suggested by LMSW and Lo and MacKinlay (1990), size is a proxy for the strength of private information motivated trading. If we assume that biggest U.S. firms have very little private informational trading and smallest U.S. firms have the strongest private informational trading among all U.S. stocks, 0.014 then roughly measures the magnitude of the cross-sectional difference in the relative strength of private information trading that can be captured by the information proxy - size.

On the other hand, from the multi-dimension match results that use ADR's world market capitalization (Panel A of Table 6), the absolute value of the difference in C2 between non-U.S. cross-listed stocks and multi-dimension matched U.S. domestic stocks is 0.021. It is even higher than 0.014. The smallest magnitude of the absolute value of the difference in C2 is between developed country stocks and multi-dimension matched U.S. domestic stocks (when ADRs U.S. market capitalization is used in the matching procedure), which is 0.011 (Panel B, Table 6). It is still 78.6% of 0.014. The biggest magnitude of the absolute value of the difference in C2 is between underdeveloped country stocks and matched U.S. domestic stocks, which is 0.032 in both Panel A and B of Table 6. It is more than twice the magnitude of 0.014. The comparison suggests that the difference in the relative strength of information-motivated trade between non-U.S. and matched U.S. stocks is no smaller than the magnitude of the cross-sectional difference in the relative strength of information-motivated trade across U.S. domestic stocks that can be captured by information proxies such as size.[20]

A second way to understand the magnitude is to look at the stand deviation of C2 across all U.S. domestic stocks. The value of the stand deviation is 0.100. This standard deviation can be understood as the cross-sectional variation across all U.S. domestic stocks in the relative strength of information motivated trade vs risk-sharing trade. This cross-sectional variation can be not only caused by all kinds of factors such as different firm size, industry, trading frequency, price, illiquidity, firm risk, level of insider trading, but can also be caused

[20]Using bid-ask spread to proxy for the level of relative strength of information motivated trade in U.S. domestic stocks yields similar results.

by the noise in the measurement of C2. The absolute value of the difference in C2 between non-U.S. cross-listed stocks and U.S. domestic stocks after controlling for industry, size, price and illiquidity is 0.021, which represents 21% of the cross-sectional standard deviation of C2 across U.S. domestic stocks. This suggests that the difference in the relative strength of information-motivated trade between non-U.S. and comparable U.S. stocks after controlling for industry, size, price, total risk and illiquidity is still important when using the cross-sectional standard deviation of C2 across U.S. domestic stocks as a benchmark.

5.7 Comparison of cross-listed stocks and their home country counterparts

Information-motivated trade and risk-sharing trade observed on U.S. stock exchanges is not the complete picture of the trading of cross-listed stocks.Another way to examine the impact of cross-country trading/arbitrage activities on the volume-return dynamics of non-U.S. cross-listed stocks is to compare the volume-return dynamics between cross-listed stocks and their home country counterparts. At least two possibilities can arise in the comparison. First, if cross-country trading/arbitrage activities eliminate any difference in volume dynamics between cross-listed stocks and their home country counterparts, we should see no significant difference in C2 between them.

On the other hand, although daily returns of cross-listed stocks must comove with the returns of cross-listed stocks' home country counterparts to some degree because of the restriction of the law of one price, many studies find large and systematic price parity deviations of dual-listed companies from their home market counterparts [see, e.g., Rosenthal and Young (1990), Froot and Dabora (1999), Bedi, Richards and Tennant (2003), and de Jong, Rosenthal and van Dijk (2003)]. Using a large sample of almost 600 pairs of cross-listed/home-market shares of stocks from 39 countries, Gagnon and Karolyi (2004) also provide evidence that large price deviations exist for many of the pairs in their sample and that the price deviations can persist for at least up to five days.[21] TThey also show that returns on cross-listed stocks have significantly higher systematic comovements with U.S. market indexes and significantly lower systematic comovements with home market indexes than their equivalent home-market shares. These "excess" comovements are related with location of trading and with institutional and information-based barriers that impede cross-country arbitrage activities. All the

[21] There are articles in the popular press that identified significant deviations from price parity in the ADR market. For example, "American Depositary Receipts: Over the Odds" The Economist, January 13, 2000, and "ADRs: Unexpected Spreads" Financial Times, March 3, 2003.

above evidence suggest that the dynamics of returns of ADRs and that of their home country shares are not necessarily the same at daily level due to the difference in trading between home and U.S. exchanges and due to the barriers to cross-country trading and arbitrage activities at short horizon. In addition, daily volume in home countries and daily volume in U.S. are not restricted by the law of one price and therefore have more freedom to deviate from each other.

Therefore, if the volume-return dynamics of cross-listed stocks on U.S. exchanges are on average more affected by U.S. investors' trading while the volume-return dynamics of cross-listed stocks' home country shares are on average more affected by cross-listed stocks' home country investors' trading due to barriers to cross-country trading and arbitrage activities at short horizon, a second possibility arises. Specifically, we may see cross-listed stocks' home country counterparts have weaker return reversal or stronger return continuation following high volume days (higher C2) than cross-listed stocks if information is a less important trading motive in U.S. investors' trading of cross-listed stocks than in local investors' trading of cross-listed stocks' home country counterparts.

Admittedly, liquidity provision difference across international stock exchanges may blur the comparison of C2 across international stock exchanges. The pure illiquidity effect shown in Campbell, Grossman and Wang (1993) may lead to stronger return reversal following high volume days for stocks traded on stock exchanges with less liquidity provision. However, given the existence of this illiquidity effect, in countries where overall local informed investors' information-motivated speculative trade is particularly strong while the difficulty or cost for U.S. investors to learn additional information is also particularly big, the difference in the importance of informational trading motive between U.S. and local investors may still dominate the noise in liquidity provision across international stock exchanges. We may still observe stronger information-motivated trade (higher C2) in cross-listed stocks' home country counterparts than in cross-listed stocks. Natural candidates of this type of countries/regions are again underdeveloped countries.

[Insert Table 7 about here]

Through the firm identifier information in CRSP, COMPUSTAT North America, COMPUSTAT Global, and Datastream, I identify all the cross-listed stocks in my sample that have home country counterparts (cross-listed stocks with valid home-country stock code in

Datastream). I then obtain the data on daily return, volume, and shares outstanding for cross-listed stocks' home country counterparts from Datastream. Cross-listed stocks and their home country shares were excluded in a particular year if there are missing data or no valid daily data available in that year. After applying the screens, there are on average 173 cross-listed/home country pairs each year. Table 7 reports the comparison of the cross-sectional average C2 coefficients between cross-listed stocks and their home country counterparts in the overall sample and in developed and underdeveloped country subsamples. Panel A provides the categorization analysis and Panel B provides the regression analysis. The regression analysis uses the same regression analysis as in equation (3) except that the NonUS dummy in equation (3) is replaced with CrossListed dummy as follows:

$$C2_i^y = a + b \cdot CrossListed_i + c \cdot Year + Error_i^y \tag{6}$$

where CrossListed equals to 1 if the stock is a cross-listed stock traded on U.S. exchanges and 0 if the stock is a cross-listed stock's home country counterpart.

In Panel A, the results for the overall sample show that the cross-sectional average C2 of cross-listed stocks is more negative than that of their home country counterparts. The difference in C2 between cross-listed stocks and their home country counterparts is -0.008. In Panel B, the panel regression analysis shows that the difference is significant with a t statistic of -1.99. This suggests that return continuation (reversal) is stronger (weaker) following high volume days in the trading of cross-listed stocks' home country counterparts than in the trading of cross-listed stocks.

The picture becomes clearer, when we look at subsamples. There are 57 underdeveloped country stocks on average in each year. The cross-sectional average C2 of underdeveloped country cross-listed stocks is substantially more negative than that of their home country counterparts. The difference in C2 is -0.024, and it is highly statistically significant with a t statistic of -3.83. On the other hand, the difference of C2 between developed country cross-listed stocks and their home country counterparts are small with the difference in C2 being -0.001 and statistically insignificant.

Overall, the results suggest that stronger information-motivated trade in LMSW's perspective is observed in cross-listed stocks' home country counterparts than in cross-listed stocks. The results are particularly driven by underdeveloped country cross-listed stocks. The results are in favor of the second possibility. These results also provide evidence that information-motivated trade in cross-listed stocks on U.S. stock exchanges are not as strong as that in cross-listed stocks' home country counterparts traded at home.

6 Conclusion and Discussion

Using an approach developed based on Llorente, Michaely, Saar, and Wang (LMSW, 2002), I compare the volume-return dynamics between non-U.S. stocks and comparable U.S. domestic stocks traded on NYSE and AMEX. I find that in the 1993 to 2006 sample period, there is significantly stronger (weaker) return continuation (reversal) following high volume days in U.S. domestic stocks than in comparable non-U.S. stocks. The pattern exists in both ADRs and foreign ordinary listings. The result suggests that the relative strength of information-motivated trade is stronger in U.S. domestic stocks than in comparable non-U.S. cross-listed stocks, while risk-sharing trade predominates the trading of cross-listed stocks. I further partition the non-U.S. stocks into Canada, non-Canadian developed country and underdeveloped country stocks. I find that the relative strength of information-motivated trade in developed country stocks is closer to that of matched U.S. domestic stocks than that of underdeveloped country stocks is. There is some evidence that the difference in the relative strength of information-motivated trade between Canadian firms and matched U.S. firms is only marginally significant. The level and significance of the difference in the relative strength of information-motivated trade between underdeveloped country stocks and matched U.S. stocks is substantially larger than between developed country stocks and matched U.S. stocks. An unmatched comparison of the relative strength of information-motivated trade between developed country firms and underdeveloped country firms also indicates that information-motivated trade on U.S. stock exchanges is stronger for developed country stocks than for underdeveloped country stocks. The overall results are robust after controlling for firms' differences in market capitalization, industry, stock price, frequency of trading, total risk, illiquidity, and the bid-ask bounce effect. On the other hand, the comparison of the volume-return dynamics between cross-listed stocks and their home country counterparts indicate that information-motivated trade is stronger in the trading of cross-listed stocks' counterparts at home than in cross-listed stocks on U.S. stock exchanges.

All information-based explanations of the home bias puzzle assume that investors have information advantage about home assets. However, empirical studies provide mixed results in testing the information-based home bias theories. In addition, if information asymmetry is important, with the fast development of investment vehicles such as ADRs, home bias should have significantly reduced on at least a subset of foreign stocks because investors' initial informational disadvantage about cross-listed stocks should be small. Empirical studies did not document dramatical change in U.S. investors' home bias although the number of ADR programs dramatically increased in the past two decades. This paper contributes to the understanding of home bias from the information perspective. The results provide consistent evidence for information-based home bias theories. Since I focus on cross-listings, the results are therefore especially consistent with the argument in Nieuwerburgh and Veldkamp (2008) that investors' information precision about domestic assets versus foreign assets can be substantially different, even when the initial informational disadvantage about foreign assets is very small. On the other hand, the question that whether investors are, on average, better informed about domestic stocks is very controversial in empirical studies. This paper's results shed light on this controversy. By applying the approach in the volume-return dynamics literature [particularly Llorente, Michaely, Saar, and Wang (2002)] to examining investors' trading difference between non-U.S. cross-listed stocks and matched U.S. domestic stocks, this paper provides a different perspective to understanding the difference in informed investors' relative informedness on foreign assets versus domestic assets. Last, the paper's findings also contributes to the literature on understanding cross-listings by showing the difference in the relative importance of informational vs risk-sharing trading motive in cross-listed stocks vs U.S. domestic stocks. The results may have implications for market participants and policy makers as better risk-sharing and less information asymmetry are the two major goals of introducing cross-listings to foreign investors (particularly U.S. investors).

Finally, I note that this paper's focus is on the short-term (daily) trading behavior for the following reasons. First, LMSW's theory is meant for short-term returns where private information is assumed to become public in the next period. Therefore, by relying on LMSW's theory, we focus on short-lived information and the short-term informational advantage arising from it because home investors are more close to the source of the information. Second, the focus of short-term trading behavior is consistent with the argument that local investors' inside information is more likely to create short-term information asymmetry than long-term ones; Davorak (2005) provides evidence consistent with this view by showing local investors only have a short-lived informational advantage in Indonesia from 1998 to 2001. Third, there are more factors (both information-related and noninformational factors) could affect the volume-return relationship in longer horizons. A separate strand of the volume-return literature reveals a different pattern in the volume-return relationship over intermediate and longer returns horizons [see, e.g., Datar, Naik, and Radcliffe (1998) and Lee and Swaminathan (2000)]. Therefore, how the long-term trading behavior reflects overall informed investors' informedness on non-U.S. stocks versus U.S. stocks may not be able to be addressed by an approach based on short-term volume-return dynamics but is interesting to be further explored.

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Table 1: Summary Statistics

This table shows descriptive statistics for the main sample and for various subsamples. The sample period spans the period starting on January 1, 1993, and ending on December 31, 2006. Avg. #. of Firms denotes the average number of eligible stocks each year. Eligible stocks in a particular year must have a minimum of 200 non-zero daily trading volume observations in that year. I report the cross-sectional average, median, and standard deviation of the yearly time-series averages of market capitalization, price, Amihud illiquidity measure, turnover, bid-ask spread and total return volatility for each group. Mkt Cap denotes market capitalization which is the market value of each firm's common shares outstanding (in million $). For ADRs, two versions of market capitalization are used alternatively. One is World Mkt Cap, which is the total value of equity securities issued at home country and abroad. The other is US Mkt Cap, which is the dollar value of ADR shares outstanding on U.S. stock exchanges. Price is the stock price (in $). Amihud corresponds to the Amihud (2002) illiquidity measure for individual stocks. Turnover is the stock's turnover measure, which is calculated by dividing the number of common shares traded on a given day by the total number of shares outstanding (in %). Spread is the daily closing bid-ask spread (in %). Total Volatility is the annualized total daily return volatility (in %).

		Avg. #. of Firms	**Mkt Cap (in millions $)**		**Price (in $)**	**Amihud**	**Turnover (in %)**	**Spread (in %)**	**Total Volatility (in %)**
			Using ADR's World Mkt Cap	Using ADR's U.S. Mkt Cap					
U.S. domestic stocks	Mean	1866	---	4503.50	26.83	0.54	0.46	2.15	42.02
	Median		---	706.90	22.24	0.01	0.33	1.29	35.57
	Std Dev		---	17034.63	24.14	2.68	0.46	3.19	25.01
Non-U.S. cross-listed stocks	Mean	337	11214.25	2881.68	27.71	0.43	0.75	1.84	41.14
	Median		1465.84	458.79	20.95	0.02	0.44	1.09	35.81
	Std Dev		26568.69	8553.51	25.7	3.06	3.16	2.69	21.69
ADRs	Mean	204	15133.74	1552.68	30.21	0.33	0.98	1.67	38.88
	Median		2157.82	281.66	22.94	0.02	0.56	1.05	34.69
	Std Dev		32022.75	5316.29	26.01	1.65	3.94	2.11	19.14
Foreign Ordinary listings	Mean	133	---	4911.74	23.9	0.60	0.40	2.09	44.6
	Median		---	1035.22	17.89	0.02	0.24	1.14	38.05
	Std Dev		---	11617.77	24.74	4.41	1.13	3.37	24.7
Canadian Ordinary Listings	Mean	80	---	3739.12	18.49	0.61	0.35	2.34	45.59
	Median		---	937.49	13.57	0.03	0.18	1.28	39.44
	Std Dev		---	8328.34	17.05	2.90	1.40	3.73	24.00
Developed (excluding Canada)	Mean	154	19196.88	3190.14	35.36	0.26	0.87	1.46	36.55
	Median		4065.12	421.82	27.51	0.02	0.47	0.98	32.31
	Std Dev		35515.06	10023.19	30.54	0.98	4.44	1.84	18.39
Underdeveloped	Mean	103	5110.84	1749.23	23.49	0.56	0.88	2.00	44.53
	Median		1102.01	316.03	18.59	0.02	0.62	1.14	38.98
	Std Dev		14212.04	5778.70	19.28	4.75	1.21	2.69	22.98

Table 2: Size-matched comparison

This table compares the cross-sectional average C2 coefficients between non-U.S. firms and size-matched U.S. firms. Panel A (B) reports the mean value of the market capitalization and the C2 coefficient for non-U.S. firms and matched U.S. firms where ADR firms' world market capitalization (U.S. market capitalization) is used in the matching procedure. Mkt Cap denotes market capitalization. T-stat in Panel A and B denotes the t- statistics of the difference of C2 coefficients between non-U.S. and U.S. firms. Panel C provides a panel regression analysis of the sample that includes non-U.S. firms and their size-matched U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y$$

where NonUS denotes a dummy variable that equals to 1 if the firm is a non-U.S. firm and 0 if it is a non-U.S. firm's matched U.S. domestic firm; Year are year dummies. t-statistics in parentheses of Panel C are calculated using standard errors clustered by firm.

Panel A: Categorical analysis where ADRs' world market capitalization is used in the matching procedure

Year	**# of firms**	**Non-U.S.**		**U.S. domestic**			
		Mkt Cap (in million $)	C2	Mkt Cap (in million $)	C2	Difference in C2	T-stat
1993	150	4426.09	0.006	4426.84	0.013	-0.007	-0.73
1994	191	4500.60	-0.007	4477.30	0.003	-0.009	-0.98
1995	225	5820.72	-0.017	5144.11	0.004	-0.021	-2.16
1996	241	5860.39	-0.001	5831.06	-0.007	0.005	0.60
1997	294	6528.63	-0.033	6532.29	-0.012	-0.021	-2.36
1998	342	7938.62	-0.032	7982.63	-0.028	-0.004	-0.47
1999	345	10595.03	-0.001	10584.77	-0.016	0.015	1.92
2000	343	13533.38	-0.020	13189.78	0.000	-0.020	-2.46
2001	359	10754.99	-0.011	10717.41	-0.030	0.018	2.39
2002	386	8950.40	0.004	8936.07	0.022	-0.019	-2.27
2003	417	10495.49	-0.012	10420.47	0.040	-0.052	-6.71
2004	439	12561.63	-0.012	12514.45	0.011	-0.023	-3.04
2005	448	13925.53	-0.011	13968.49	0.016	-0.027	-3.55
2006	454	15863.30	-0.022	15903.65	0.008	-0.029	-4.09
All Years		11214.25	-0.011	11166.97	0.007	-0.017	

Panel B: Categorical analysis where ADRs' U.S. market capitalization is used in the matching procedure

Year	**# of firms**	**Non-U.S.**		**U.S. domestic**			
		Mkt Cap (in million $)	C2	Mkt Cap (in million $)	C2	Difference in C2	t-stat
1993	150	1426.09	0.006	1426.84	0.013	-0.007	-0.73
1994	191	1392.90	-0.007	1393.82	0.000	-0.007	-0.77
1995	225	1238.32	-0.017	1241.12	0.014	-0.031	-3.32
1996	241	1452.72	-0.001	1450.92	-0.008	0.007	0.90
1997	294	1701.24	-0.033	1701.12	-0.010	-0.022	-2.79
1998	342	1800.12	-0.032	1800.83	-0.033	0.001	0.07
1999	345	2567.02	-0.001	2570.66	-0.022	0.021	3.00
2000	343	3353.60	-0.020	3349.39	-0.005	-0.014	-1.91
2001	359	2814.29	-0.011	2825.98	-0.026	0.015	1.99
2002	386	2285.53	0.004	2289.05	0.022	-0.019	-2.24
2003	417	2398.49	-0.012	2402.63	0.030	-0.042	-5.77
2004	439	2993.65	-0.012	2980.20	0.016	-0.028	-3.87
2005	448	3622.11	-0.011	3609.73	0.009	-0.020	-2.97
2006	454	4416.70	-0.022	4408.05	0.005	-0.026	-3.80
All Years		2881.68	-0.011	2878.22	0.004	-0.015	

Panel C: Regression analysis

Using ADRs' World Mkt Cap				**Using ADRs' U.S. Mkt Cap**			
a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)
0.01	-0.02	No	0.61	0.00	-0.01	No	0.49
(3.29)	(-6.47)			(2.46)	(-6.13)		
0.04	-0.02	Yes	2.73	0.04	-0.01	Yes	2.61
(7.02)	(-6.51)			(7.74)	(-6.16)		

Table 3: Size-matched subsample comparison

This table compares the cross-sectional average C2 coefficients between non-U.S. firms and size-matched U.S. firms in various subsamples. Panel A reports the mean value of the market capitalization and the C2 coefficients for non-U.S. firms and matched U.S. firms. Panel B provides a panel regression analysis of the sample that includes non-U.S. firms in a specific subsample and their size-matched U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y$$

where NonUS denotes a dummy variable that equals to 1 if the firm is a non-U.S. firm in a specific subsample and 0 if it is a non-U.S. firm's size-matched U.S firm; Year are year dummies. The first (second) vertical panel in Panel A and B report the comparison when ADR firms' world market capitalization (U.S. market capitalization) is used in the matching procedure. Mkt Cap denotes the market capitalization. t-statistics in parentheses are calculated using standard errors clustered by firm.

Panel A: Categorical analysis

		ADRs' World Mkt Cap		**ADRs' U.S Mkt Cap**	
	Avg. #. of Firms	Mkt Cap (in million $)	C2	Mkt Cap (in million $)	C2
ADRs	204	15133.74	-0.011	1552.68	-0.011
matched U.S.		15057.26	0.008	1550.11	0.004
Difference in C2			-0.019		-0.014
Foreign Ordinary Listings	133			4366.75	-0.011
matched U.S.				4364.16	0.005
Difference in C2					-0.015
Canadian Ordinary Listings	81			3739.12	-0.005
matched U.S.				3741.17	0.002
Difference in C2					-0.008
Developed (excluding Canada)	154	19196.88	-0.006	3190.14	-0.006
matched U.S.		19075.95	0.007	3179.99	0.006
Difference in C2			-0.013		-0.012
Underdeveloped	103	5110.84	-0.022	1552.81	-0.022
matched U.S.		5135.07	0.010	1555.61	0.003
Difference in C2			-0.032		-0.025

Panel B: Regression analysis

	ADRs' World Mkt Cap				ADRs' U.S. Mkt Cap			
	a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)
ADRs V.S. matched U.S	0.05	-0.02	Yes	3.71	0.04	-0.01	Yes	3.45
	(5.99)	(-5.53)			(6.25)	(-4.86)		
Foreign Ordinary listings V.S. matched U.S					0.03	-0.02		1.99
					(4.98)	(-4.05)		
Canadian Ordinary listings V.S. matched U.S					0.03	-0.01		1.85
					(3.41)	(-1.67)		
Developed (excluding Canada) V.S. matched U.S.	0.06	-0.01	Yes	3.35	0.04	-0.01	Yes	3.30
	(5.29)	(-3.28)			(5.97)	(-3.42)		
Underdeveloped V.S. matched U.S.	0.04	-0.03	Yes	4.17	0.03	-0.02	Yes	3.76
	(4.84)	(-7.19)			(4.60)	(-6.02)		

Table 4: Size-matched comparison after controlling for the bid-ask bounce effect

This table compares the cross-sectional average C2 coefficients between non-U.S. firms and size-matched U.S. firms in the overall sample and in various subsamples, where the C2 coefficient is estimated using returns calculated from end-of-day bid-ask midquotes. The first (second) vertical panel reports the comparison when ADR firms' world market capitalization (U.S. market capitalization) is used in the matching procedure. Panel A reports the mean value of the market capitalization and the C2 coefficient for non-U.S. firms and matched U.S. firms. Panel B provides a panel regression analysis of the sample that includes non-U.S. firms of the overall sample or of a specific subsample and the corresponding size-matched U.S. firms of these non-U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y$$

where NonUS denotes a dummy variable that equals to 1 if the firm is a non-U.S. firm and 0 if it is a non-U.S. firm's size-matched U.S firm; Year are year dummies. t-statistics in parentheses are calculated using standard errors clustered by firm.

Panel A: Categorical analysis

		ADRs' World Mkt Cap		**ADRs' U.S. Mkt Cap**	
	Avg. #. of Firms	Mkt Cap (in million $)	C2	Mkt Cap (in million $)	C2
Non-U.S.	285	11888.45	-0.015	3090.27	-0.015
U.S.		11863.01	0.005	3084.87	0.004
Diff in C2			-0.020		-0.018
ADRs	172	16016.86	-0.012	1625.55	-0.012
U.S.		15978.50	0.006	1622.49	0.004
Difference in C2			-0.018		-0.016
Foreign Ordinary Listings	114			5307.55	-0.019
matched U.S.				5298.62	0.004
Difference in C2					-0.022
Canadian Ordinary Listings	68			4067.25	-0.015
matched U.S.				4069.06	0.000
Difference in C2					-0.015
Developed (excluding Canada)	132	20005.30	-0.008	3340.21	-0.008
matched U.S.		19932.09	0.005	3328.32	0.006
Difference in C2			-0.013		-0.014
Underdeveloped	85	5614.87	-0.025	1919.82	-0.025
matched U.S.		5641.31	0.010	1918.67	0.003
Difference in C2			-0.034		-0.028

Panel B: Regression analysis

	ADRs' World Mkt Cap				ADRs' U.S. Mkt Cap			
	a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)
Non-U.S. V.S. matched U.S	0.04 (6.67)	-0.02 (-6.68)	Yes	2.73	0.04 (7.46)	-0.02 (-6.97)	Yes	2.75
ADRs V.S. matched U.S	0.05 (5.57)	-0.02 (-4.69)	Yes	3.49	0.04 (5.99)	-0.02 (-4.76)	Yes	3.58
Foreign Ordinary listings V.S. matched U.S					0.03 (4.88)	-0.02 (-5.44)	Yes	2.42
Canadian Ordinary listings V.S. matched U.S					0.03 (3.15)	-0.01 (-2.88)	Yes	1.85
Developed (excluding Canada) V.S. matched U.S.	0.05 (5.24)	-0.01 (-2.93)	Yes	3.23	0.05 (6.09)	-0.01 (-3.75)	Yes	3.53
Underdeveloped (excluding Canada) V.S. matched U.S.	0.04 (4.43)	-0.03 (-6.93)	Yes	4.45	0.03 (4.23)	-0.03 (-6.10)	Yes	3.93

Table 5: Residual information effect in C2 after controlling for illiquidity

This table compares the cross-sectional average C2 coefficients between non-U.S. firms and liquidity-matched U.S. firms in the overall sample and in various subsamples. The first, second, and third vertical panel report the comparison where Amihud illiquidity measure, the closing bid-ask spread, and turnover is used as a illiquidity proxy, respectively. Panel A reports the mean value of the liquidity proxy and the C2 coefficients for non-U.S. firms and matched U.S. firms. Panel B provides a panel regression analysis of the sample that includes non-U.S. firms of the overall sample or of a specific subsample and the corresponding size-matched U.S. firms of these non-U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y$$

where NonUS denotes a dummy variable that equals to 1 if the firm is a non-U.S. firm and 0 if it is a non-U.S. firm's size-matched U.S firm; Year are year dummies. t-statistics in parentheses are calculated using standard errors clustered by firm.

Panel A: Categorical analysis

		Match by Amihud		**Match by Spread**		**Match by Turnover**	
	Avg. #. of Firms	Amihud	C2	Spread (in %)	C2	Turnover (in %)	C2
Non-U.S.	337	0.434	-0.011	1.8364	-0.011	0.75	-0.011
matched U.S.		0.433	0.004	1.8353	0.006	0.65	0.006
Difference in C2			-0.015		-0.017		-0.016
ADRs	204	0.326	-0.011	1.6728	-0.010	0.98	-0.010
matched U.S.		0.326	0.004	1.6725	0.004	0.82	0.005
Difference in C2			-0.014		-0.015		-0.015
Foreign Ordinary Listings	133	0.600	-0.011	2.0858	-0.011	0.40	-0.011
matched U.S.		0.596	0.005	2.0834	0.009	0.38	0.007
Difference in C2			-0.016		-0.019		-0.018
Canadian Ordinary Listings	80	0.614	-0.005	2.3381	-0.005	0.35	-0.005
matched U.S.		0.612	0.001	2.3335	0.010	0.31	0.005
Difference in C2			-0.007		-0.015		-0.011
Developed (excluding Canada)	154	0.258	-0.006	1.4623	-0.006	0.87	-0.006
matched U.S.		0.259	0.002	1.4623	0.006	0.69	0.008
Difference in C2			-0.008		-0.011		-0.014
Underdeveloped	103	0.558	-0.022	2.0012	-0.022	0.88	-0.022
matched U.S.		0.552	0.010	2.0011	0.004	0.85	0.003
Difference in C2			-0.032		-0.026		-0.024

Panel B: Regression analysis

	Match by Amihud				Match by Spread				Match by Turnover			
	a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)
Non-U.S. V.S. matched U.S	0.03 (6.46)	-0.01 (-6.06)	Yes	2.73	0.03 (7.15)	-0.02 (-6.89)	Yes	2.49	0.04 (7.90)	-0.02 (-6.25)	Yes	2.58
ADRs V.S. matched U.S	0.03 (5.01)	-0.01 (-4.73)	Yes	3.53	0.03 (5.11)	-0.02 (-4.97)	Yes	3.10	0.04 (5.63)	-0.02 (-4.76)	Yes	3.54
Foreign Ordinary listings V.S. matched U.S	0.03 (4.92)	-0.02 (-4.11)	Yes	2.08	0.03 (5.57)	-0.02 (-5.17)	Yes	2.30	0.04 (5.88)	-0.02 (-4.36)	Yes	2.00
Canadian Ordinary listings V.S. matched U.S	0.03 (3.23)	-0.01 (-1.51)	Yes	1.62	0.03 (4.59)	-0.02 (-3.40)	Yes	2.65	0.03 (4.50)	-0.01 (-2.15)	Yes	1.94
Developed (excluding Canada) V.S. matched U.S.	0.04 (4.80)	-0.01 (-2.52)	Yes	3.50	0.04 (5.28)	-0.01 (-3.27)	Yes	3.40	0.05 (6.80)	-0.01 (-4.02)	Yes	3.40
Underdeveloped V.S. matched U.S.	0.04 (4.48)	-0.03 (-7.43)	Yes	4.61	0.03 (3.57)	-0.03 (-6.05)	Yes	3.04	0.03 (3.19)	-0.02 (-5.15)	Yes	4.13

Table 6: Multi-dimension matched comparison

This table compares the cross-sectional average C2 coefficients between non-U.S. firms and multi-dimension matched U.S. firms in the overall sample and in various subsamples. Non-U.S. firms and U.S. Firms with the same first two digits SIC code are matched on the basis of market capitalization, stock price, Amihud illiquidity measure, and firms' annualized total volatility (%). Panel A (B) reports the mean values of the matching variables and the C2 coefficients for non-U.S. firms and matched U.S. firms, where ADR firms' world market capitalization (U.S. market capitalization) is used in the matching procedure. Mkt Cap denotes the market capitalization. Panel C provides a panel regression analysis of the sample that includes non-U.S. firms of the overall sample or of a specific subsample and the corresponding size-matched U.S. firms of these non-U.S. firms:

$$C2_i^y = a + b \cdot NonUS_i + c \cdot Year + Error_i^y$$

where NonUS denotes a dummy variable that equals to 1 if the firm is a non-U.S. firm and 0 if it is a non-U.S. firm's multi-dimension matched U.S firm; Year are year dummies. t-statistics in parentheses are calculated using standard errors clustered by firm.

Panel A: Categorical analysis where ADRs' world market capitalization is used in the matching procedure

	Avg. #. of Firms	**Mkt Cap (in millions $)**	**Price (in $)**	**Amihud**	**Total Volatility**	**C2**
Non-U.S.	181	3775.09	25.02	0.23	46.76	-0.016
matched U.S.		3307.90	23.75	0.23	45.84	0.005
Difference in C2						-0.021
ADRs	79	4286.05	25.78	0.19	43.88	-0.020
matched U.S.		3703.47	23.62	0.20	43.01	0.001
Difference in C2						-0.021
Developed (excluding Canada)	72	4764.35	29.21	0.28	44.50	-0.010
matched U.S.		3780.56	25.59	0.26	43.79	0.004
Difference in C2						-0.014
Underdeveloped	52	3008.06	25.56	0.12	44.19	-0.027
matched U.S.		2935.23	25.53	0.14	42.13	0.005
Difference in C2						-0.032

Panel B: Categorical analysis where ADRs' U.S. market capitalization is used in the matching procedure

	Avg. #. of Firms	Mkt Cap (in millions $)	Price (in $)	Amihud	Total Volatility	C2
Non-U.S.	270	2360.05	27.53	0.20	43.77	-0.011
matched U.S.		2276.13	24.40	0.21	43.74	0.006
Difference in C2						-0.017
ADRs	168	1685.13	29.13	0.16	40.40	-0.011
matched U.S.		1788.89	24.64	0.18	41.07	0.005
Difference in C2						-0.015
Foreign Ordinary Listings	102	3514.69	25.05	0.27	48.79	-0.012
matched U.S.		3130.09	24.12	0.26	47.81	0.008
Difference in C2						-0.021
Canadian Ordinary Listings	57	3150.40	20.24	0.31	51.82	-0.009
matched U.S.		2750.08	20.13	0.31	51.85	0.007
Difference in C2						-0.016
Developed (excluding Canada)	126	2644.12	33.68	0.20	39.66	-0.007
matched U.S.		2333.96	26.98	0.21	40.25	0.004
Difference in C2						-0.011
Underdeveloped	86	1777.81	24.35	0.14	44.38	-0.024
matched U.S.		1814.71	23.23	0.16	43.31	0.008
Difference in C2						-0.032

Panel C: Regression analysis

	ADRs' World Mkt Cap				ADRs' U.S. Mkt Cap			
	a	Non-U.S. Dummy	Year Dummy	R^2 (%)	a	Non-U.S. Dummy	Year Dummy	R^2 (%)
Non-U.S. V.S. matched U.S	0.03 (-0.02)	3.54 (-6.13)	Yes	2.72	0.04 (-0.02)	5.95 (-6.33)	Yes	3.11
ADRs V.S. matched U.S	0.02 (-0.02)	2.15 (-4.60)	Yes	4.15	0.04 (-0.02)	5.38 (-4.68)	Yes	4.01
Foreign Ordinary listings V.S. matched U.S					0.03 (-0.02)	3.26 (-4.52)	Yes	2.43
Canadian Ordinary listings V.S. matched U.S					0.03 (-0.01)	2.11 (-2.23)	Yes	3.01
Developed (excluding Canada) V.S. matched U.S.	0.05 (-0.01)	3.98 (-2.80)	Yes	4.27	0.05 (-0.01)	6.01 (-2.88)	Yes	4.12
Underdeveloped V.S. matched U.S.	0.02 (-0.03)	1.61 (-6.02)	Yes	4.36	0.03 (-0.03)	3.30 (-6.51)	Yes	4.53

Table 7: Comparison of cross-listed stocks and their home country counterparts

This table compares the C2 coefficients of cross-listed stocks with those of their home country counterparts. Panel A reports the mean values of the C2 coefficients for cross-listed stocks and cross-listed stocks' home country shares. Panel B provides a panel regression analysis:

$$C2_i^y = a + b \cdot CrossListed_i + c \cdot Year + Error_i^y$$

where CrossListed denotes a dummy variable that equals to 1 if the firm is a cross-listed stock traded on U.S. stock exchanges and 0 if the firm is a cross-listed stock's home country counterpart; Year are year dummies. t-statistics in parentheses are calculated using standard errors clustered by firm.

Panel A: Categorical analysis

	Avg. #. of Firms	**C2**
Cross-listed Stocks	173	-0.015
Home Country Shares		-0.007
Difference in C2		-0.008
Developed Market Cross-listed Stocks	116	-0.009
Home Country Shares		-0.008
Difference in C2		-0.001
Underdeveloped Market Cross-listed Stocks	57	-0.030
Home Country Shares		-0.006
Difference in C2		-0.024

Panel B: Regression analysis

	a	**CrossListed Dummy**	**Year Dummy**	**R^2 (%)**
Cross-listed Stocks	-0.01	-0.01	Yes	1.97
VS	(-0.65)	(-1.99)		
Home Country Shares				
Developed Market Cross-listed Stocks	-0.00	-0.00	Yes	1.94
VS	(-0.45)	(-0.34)		
Home Country Shares				
Underdeveloped Market Cross-listed Stocks	-0.06	-0.03	Yes	3.83
VS	(-3.16)	(-4.37)		
Home Country Shares				