Diversification and home bias in international investments:

Evidence from ADRs of Chinese firms in US markets

Abstract

This paper takes a close look at US institutional investors' investment behavior on foreign assets by studying the ownership after considering all the transaction costs, including capital control in the foreign countries, explicit transaction costs and implicit transaction costs, and confirms there is still clear home bias existing among US institutional investors. Further tests on the sources of such bias show that US investors fail to predict stock to earn excess returns from US stocks and thus the irrationality of investment behaviors, such as neglect of diversification benefits and choosing stocks by familiarity rather than information advantage, are the main causes for home bias.

1. Introduction

1.1 Background

1.1.1 Diversification effect and Transaction costs

According to the modern portfolio theories by Markowitz (1959), an investor can reduce portfolio risk simply by holding combinations of instruments which are not perfectly positively correlated. Such diversification should also be true for the countries, as long as the correlations among the returns of the markets are not equal to 1.

Even though globalization has progressed in the recent decades, international markets are still segmented to some extent. Most countries had restrictions on foreign exchange transactions that limited cross-border portfolio investment. The restrictions may be imposed by the laws, such as in China. Such barriers limit the capital flows around the world, which make the stocks with same cash flow and voting rights have different prices in the different markets (Bailey (1994), Bailey and Jagtiani (1994)), and thus lower the correlations among the markets. The segmentation among the markets should provide the potential diversification benefits in international investments according to the theory. On the other hand, such constraints prevent investors from directly participating financial market, and thus benefiting from the low correlations.

When considering investment decision and performance, the associated costs from investment reduce performance, and thus referred as transaction costs. All the investors should be concerned with transaction costs, as lower transaction costs automatically enable higher returns. According to D'Hondt and Giraud (2008), Transaction costs include all costs associated with trading, which are usually divided into explicit and implicit costs. Explicit costs do not rely

on the trade prices and can be determined before the execution of the trade, usually including brokerage commissions, market fees, clearing and settlement costs, and taxes/stamp duties. By contrast, implicit costs represent the invisible part of transaction costs, which cannot be known in advance because they are included in the trade price. These implicit costs can be broken down into three components: spread, market impact and opportunity costs. Opportunity costs are the costs between theoretical trade and actual trade, so it is impractical to capture in this paper. Market impact can be implied by the turnover, so as a control variable, turnover captures this part. The spread then is the representative of the implicit transaction cost in the paper. Lewis (1999) views transaction costs as the incompleteness of market. For example, the market is not free from government restrictions and other capital market impediments, which form a tendency to consume country-specific output rather than the rest of the world. Such segmentation of consumption is quite similar to the capital restrictions and other costs in financial markets around world, so the potential losses by this can be viewed as a kind of transaction costs. This paper takes capital constraints as transaction costs in global investment, together with the explicit and implicit transactions occurring in the specific markets.

1.1.2 An Overview of American Depositary Receipts (ADR)

American Depositary Receipts (ADRs) are negotiable U.S. securities representing a non-U.S. company's publicly traded equity. The benefits of global diversification lead the demands for ADRs to enhance the returns and reduce risk by invest internationally. ADRs are created when a broker purchases a non-U.S. company's shares on its home stock market and delivers the shares to the depositary's local custodian bank, and then instructs the depositary bank, such as BNY Mellon, to issue ADRs. They may trade freely after creation, just like any other security, either

on an exchange or in the over-the-counter market and can be used to raise capital. There several levels for ADRs. Level 1Depositary Receipts are traded in the over-the-counter market. Establishment of a Level 1program does not require full SEC registration and disclosure, and the majority of ADRs are Level 1facilities. If a company wants to list ADR on a US stock exchange, such as NASDAQ, AMEX or NYSE, it should use Sponsored Level 2or Sponsored Level 3ADRs. Level 2and Level 3 ADRs require SEC registration and adherence to applicable requirements for U.S. GAAP, like the exchange listed common stocks.

The primary reasons for a company to issue ADR include expanding market share to more diversified investor exposure internationally, and enhancing visibility and image for the company's products, services and financial instruments in a marketplace outside its home country. ADRs are denominated in U.S. dollars and their payments of dividends are also in U.S. dollars, so they help investors avoid costly currency conversions and lower exchange rate risks when investing internationally. ADRs can trade on US major stock exchanges upon compliance with SEC regulations, like common stocks, and thus offer US investors an environment of familiar trade, clearance and settlement procedures, which are the key obstacles on global investments as undependable settlements, unreliable custody services, and unfamiliar market practices. What’s more, Investing ADRs can save an investor up to 40 basis points annually of global custodian safekeeping charges, compared to the costs associated with trading and holding ordinary shares outside US.

In sum, ADRs overcome the restrictions on the capital flows globally and some custodial hurdles of international investment, and thus offer cost benefits and conveniences. It is one of most efficient manner possible for US investors to invest internationally, so this paper takes Level 2 and Level 3 ADRs as the sample of foreign assets in US.

1.1.3 Equity home bias

Even though the portfolio theory suggests substantial benefits from international diversification, many researches show that Individuals and institutions in most countries hold only modest amount of foreign equity (French and Poterba (1991), Tesar and Werner (1995) and Kang and Stulz (1997)). French and Poterba (1991) estimate the domestic ownership for the 5 industrial countries are more than 80% at the end of 1989. In the recent researches, Hau and Rey (2008) use fund level data to show that the bias exists in the fund level in US, UK, Canada, euro area countries and Switzerland. Lewis (1999) finds the minimum variance portfolio for the US investor should be about 40 percent of the portfolio to non-US assets, rather than the 10 percent that is actually invested in non-US equity, which results giving up 50 basis points per year in return together with lower risks. The similar cases happen in Europe: Schröder (2002) shows the overweighting home equity markets lead 2.2 percent lower return per year in UK and 3 percent in Germany. This deviation from optimal asset allocation globally is so called "Home Bias".

It is quite surprising that the high finance and sophisticated investors don't choose the optimal allocation and give up the gains in terms of return on a portfolio that is diversified internationally. So there are a lot of researches to study the reasons of such investment behavior. The extensive literatures on "home bias" survey the relationship between transactions costs and portfolio allocations; however, the conclusions are differing. Tesar and Warner (1995) consider barriers to invest globally and other explicit costs as transaction costs and study the turnovers of foreign equities in US portfolios and of domestic equities to conclude transactions costs associated with trading securities play a important role for US investors' asset allocations,

but cannot explain all the home bias. Domowitz and Steil (2001) and Domowitz, Glen, and Madhaven (2000) using detailed data from various investment managers, brokers and exchanges around the world between 1996 and 1998, to calculate the actual trading costs, including commissions, fees, and market impact costs, in the most markets globally, and argue that the US investors' home bias is the result of the preference to the lower transaction costs. On the other side, Lewis (1999) examines transactions costs in a board economic sense, which means all the restrictions to impede perfect market, and argues that the costs cannot be the definitive explanation for the biases. What's more, Warnock (2001) shows the data in Tesar and Warner (1995) not suitable and their results owe to the inaccurate holding data, which are published before reliable cross-border holdings data were available and thus the underestimation of residents' holdings of foreign equities leads to their results.

The other strand of explanations focus on familiarity or the information advantage, as the investors prefer the stocks they are familiar with or the domestic investors have informational advantage on the domestic assets. This strand follows the idea from Merton (1987), which proposes the investor recognition hypothesis that investors prefer the stocks they know about, based on the equilibrium model with incomplete information. Baily and Jagtiani (1994), Domowitz, Glen and Madhavan (1997) and Kang and Stulz (1997) show the investors prefer large firms, and the reason for this preference can be that the large firms are better known internationally. Similarly, export ratio (export to sales) is used in Kang and Stulz (1997), which represents the connections to the foreign countries, and thus makes the foreign more familiar with the firm. The other representative of familiarity could be media coverage of Wall Street Journal and Financial Times (Baker, Nofsinger and Weaver (2002)), because it means the visibility of the firm to the investors. However, the familiarity effect and information advantage effect is not distinguished in many researches. Huberman (2001) offers the difference between

the two as “Familiarity may represent information available to the investor, but not yet to the market”. He argues that familiarity could be investor’s illusion of information advantage, but not real, so he cannot make excess return. An simple example of this case could be that an investor tracks some news or recommendation about a stock, and he thinks he has more information than others, however, his investments based on the information fail to gain excess risk-adjusted return, and thus the information is not value-related, so his investment bases on familiarity rather than information advantage. Coval and Moskowize (2001) find that fund managers can earn abnormal returns in nearby investments, especially on small, old and remote firms which have high information asymmetry, and relate returns and information advantage. Ivkovic and Weisbenner (2005) and Zhu (2002) develop two different methods to tear familiarity and information advantage apart in the local biases in US, but they get different results with the similar data. However, the ideas to distinguish the two effects in the two papers are quite similar: the excess returns of the local stocks or portfolios to the non-local stocks or portfolios, as Ivkovic and Weisbenner (2005) confirm the existence of the excess returns, while Zhu (2002) does not.

Gompers and Metrick (2001) propose a good methodology to examine the return predictive power of institutional investors, which perform OLS regression of future returns on two separate parts: the lagged level of ownership and the change in ownership during the current period, and the former of which represents the holdings because of momentum effects, which is the demand change of the stocks, and the latter reflects the change for the holding, which is the result of identifying stocks that could outperform others. In other words, if the relation between stock future return and institutional ownership is driven by the previous holdings, the lagged level of ownership should be significant, while is the relationship is the result of stock picking, the change in ownership should count. Thus change in ownership during the current period

measures return predictive power of institutional investors, and such power should be attributed to the information advantage rather than simple familiarity, because it is directly related to future returns rather than simply holding preference, according to Coval and Moskowitz (2001), Zhu (2002) and Ivkovic and Weisbenner (2005). This paper will follow this method to test familiarity and information advantage effect.

1.2 Contributions

Based on the previous literatures mentioned above, this paper will study the two opposite effects, the diversification and home bias in US market, based on the behavior of the US institutional investors. Considering the two strands of literatures about home bias, this paper will control capital restrictions, explicit and implicit transaction costs at same time, and then distinguish the familiarity effect and information advantage effect in home bias. The contributions to the existing literature this paper makes also reply on those two points.

First, the paper controls all of the transaction costs, and thus provides the most suitable platform to study the investment behavior of US institutional investors. To control the capital restriction and other explicit transactions, The American Depository Receipts (ADRs) of Chinese firms are taken as sample to research the US investors' behavior on the foreign assets. They are suitable for the question of home bias controlling the transaction costs, because ADR is the only equity of foreign assets that the US institutional investors are required to disclose (Bradshaw, Bushee and Miller (2004)), and the exchange traded ADRs' data are recorded in CRSP and COMPSTAT, so the data quality is as high as the US stocks. Secondly, they are Chinese firms per se, and most of such companies operate in China, and their profits, cash flows and other important fundamental information are From China rather than US. Then they are foreign assets

for the US investors, and thus there should be diversification incentive for the US investors. Thirdly, they are listed in the US exchanges, and there is barely any restriction for US investors to hold them, which means the strict capital restrictions of Chinese financial markets are not barriers for this kind of Chinese assets. What' more, as exchange listed assets, the explicit transaction costs of ADRs are similar to the other equities in the US exchanges, and thus fees and commissions should not be important factors when constructing portfolios. The only part of transaction costs left is implicit costs. (Holden (2009), Goyenko, Holden and Trzcinka (2009) provide some high-quality-low-frequency measures of spreads, which make implicit costs easy to control. Next part will introduce more of those measures. Thus this paper construct a match sample of firms comes from the US common stocks, which have similar implicit costs as the ADRs. Then compared with the match sample firms, the ADRs traded in the US exchanges don't have capital restrictions to US investors, and share similar explicit and implicit transaction costs as the matched common stocks. This is the best platform so far to address behaviors of US investors' investment on foreign assets.

Second, the setting to control all the costs to invest foreign assets equip this paper to study the determinants of US institutional holdings of the foreign assets at firm level, and thus the home bias of US institutional investors. County level researches about the home bias find some determinants of home bias at country level, such as economic development, stock market development, language, geographical proximity, investor protections, accounting standards and cultures (Chan, Covrig and NG (2005) and Bradshaw, Bushee and Miller (2004) and Bell, Filatotchev and Rasheed (2012)). Some papers use accounting information of firms, but aggregate to country level (Bradshaw, Bushee and Miller (2004)). Baik, Kang, Kim and Lee (2012) use both country level information to form Liability of foreignness and firm level information of equities to study the determinants of difference in holdings, but their focus is on the foreign

investors' investment in US. As the foreign investors come from all over the world, with heterogeneous backgrounds and preferences, and the investment behavior should be less consistent than the US institutional investors, the most sophisticated group in the financial markets, so the group of US investors in this paper is the better sample to study the home bias, the irrational investment behavior. This paper will provide clear evidence to the debate about the familiarity effect and information effect on home bias that the irrational bias of US investors just come from familiarity rather than information advantage.

2. Hypothesis development

According to the portfolio theory, the key factor in diversification is the correlation between the assets: the lower the correlation, the larger benefit of diversification will be. Since the Chinese equity market is quite segmented from the US equity market, it is expected that the correlation between the two markets should be low. Chow,Liu and Niu (2011) find the upward trend of the correlation has been interrupted during the recent global financial crisis, but reaches the level of about 0.4-0.5 in 2010 . The ADRs of Chinese firms enjoy their earnings from China, so we can expect the high correlations between the ADRs and the Chinese markets. Combining the two, if the ADRs are highly correlated with Chinese market and lowly correlated with US market, the diversification benefits for the US investors to hold them are large. However, Wang and Jiang (2004) study the Chinese firms listed in Hong Kong market (H share) and show that these shares are closer to Hong Kong market than to Chinese mainland market. If it is the case for ADRs, the benefits would be decreased, and thus there are less US investors holding such ADRs. So this paper will test the relations between the ADRs and Chinese Market

and between ADRs and US market, and propose the following hypothesis about the diversification motivation of US institutional investors:

Hypothesis 1

If the ADRs have higher correlation with Chinese market, the US institutional ownership should be higher. The other side, if they are highly correlated with US market, the US institutional ownership should be lower.

The other consideration for investments of foreign assets should be the costs of diversification. Since the ADRs are listed in the US exchanges, the capital restrictions, the most severe problem to invest China, are eliminated. What's more, the taxes on ADRs are also subject to the US tax system, so the explicit costs would not be discrimination. However, the ADR market is quite limited, so the liquidity cost could be a prominent factor for the investments. If such costs are high enough to diminish the benefits from diversification, the US investors would leave these ADRs. ADRs of Chinese firms alone can only control capital restrictions and explicit transaction costs. In terms of implicit transaction costs, this paper follows the methods in Holden (2009) to construct the spread proxies: Effective Tick (ET), Extended Roll (Eroll), No Trade Quoted Spread (NTS), Multi-Factor (MF), and estimator from high-low ratio (S) from Corwin and Schultz (2012), however, the time interval is a quarter rather than a month in Holden (2009). Thus the hypothesis about transaction costs is:

Hypothesis 2

If the ADRs have lower implicit costs (proxies), the US institutional ownership should be higher.

There are two strands of explanations for home bias. If US institutional investors are less well informed about China than US, they will invest less in Chinese stocks because the variance of their predictive distribution is higher (Brennan and Cao (1996)). The other one is that investors invest in the securities they know about (Merton (1987)). The two hypotheses are proposed:

Hypothesis 3

The more familiarity of and/ or the more information available from the company, the higher the US institutional ownership should be.

The effects of familiarity and information are twisted, and empirically, Ivkovic and Weisbenner (2005) and Zhu (2002) use two different methods to tear the two effects apart in the local biases in US, but they generate different results with the similar data. To test about returns is a method to distinguish the familiarity and information. This paper will follow the methodology proposed by Gompers and Metrick (2001), and Yan and Zhang (2009) and Baik, Kang, Kim and Lee (2012) also follow this method to test the stock picking ability. Gompers and Metrick (2001) test US institutional holdings and future returns and find they are positively related. They then divide institutional holdings into institutional holdings in the last period and incremental institutional holdings in this period. The former indicates the return predictive

power of the investors, because the accumulated purchase of the stocks implies they are undervalued, and thus this ability to detect undervalued stocks should be related to information. The latter one just shows the investors preference to the stocks, so it is not related to information advantage. Based on this methodology, the hypothesis is:

Hypothesis 4

If the matching US stocks, which have similar implicit transaction costs, have higher and more significant positive relationship between future returns and incremental holdings, compared with the Chinese ADRs, the US investors have information advantage on the US stocks ,then the information advantage matters; if not, they just choose the investments they are familiar with, so the familiarity dominates.

3. Sample and transaction costs

3.1 Sample selection

Zhu (2002) and Dhar and Zhu (2002) find that investor sophistication influences the magnitude of individuals' local bias. To be specific, more sophisticated individuals, such as the ones work in professional occupations, show smaller local bias.US equity markets are the largest and most mature markets around the world, and institutional investors are the most experienced and sophisticated compared with their counterparts in the other countries, so US institutional investors can be a good representative of rational investors, and thus the study about their investment behavior should offer the best experiences to the other countries. At the same time, the data for the institutional holdings are also best in CDA/Spectrum dataset.

Researchers have investigated US data on holdings of assets to fact of home bias of US investors and to determine causes of home bias. Among these studies, the ones focus on the US investors' investments on the foreign assets suffer more flaws than the ones on the local bias in US, because of the transaction costs. The different policies, restrictions make the holdings and costs to direct invest in the foreign countries hard to measure. Bradshaw, Bushee and Miller (2004) agree that there is no rule to require investors to disclose their securities traded on the markets outside of US, so the holdings of foreign assets may be underestimated in their paper. Domowitz and Steil (2001), Domowitz, Glen, and Madhaven (2002) calculate the Execution costs, including implicit and explicit costs and liquidity, across economic regions and markets, however, they don't consider capital restrictions, so it cannot determine the total costs from perspective of US investors. Their sample period is from September 1996 to December 1998, which is too short to make convincing investment behaviors.

In the foreign assets part, this paper chooses American Depository Receipts (ADRs) of Chinese firms as sample. Firstly, Chinese firms are good targets as foreign assets to study, because China is the second largest economy around the world and keeps a high growth rate for several years. It is not surprise that there are many good companies worth investing in such economy. The capital market in China constitutes around 7% to the total world capital market and ranks number 2 in size internationally, above Japan, UK, Hong Kong and Canada. The investment opportunities make China to be a very hot investment target. However, the Chinese market is quite segmented: the foreign investors can only invest B shares without limits, but B share market just contributes 0.7% of the Chinese stock market. The severe illiquidity in such market makes huge discount (Bailey (1994), Sun and Tong (2000), Chen, Lee and Rui (2001)), and thus decrease the attraction for the foreign investors. The A share market is the real equity market in China, however, for foreign investors, only Qualified Foreign Institutional Investors

(QFII) can participate in it, and there are only 150 foreign institutions with quota of 80 billion USD, which is 2.3% in the total market. It obvious doesn't match the weight of Chinese market in the world, so the Chinese firms listed in the foreign countries should be good substitute for the Chinese market to invest, as they also enjoy the fast growth in earning in the economy. Besides the high growth, the Chinese market has low correlation with the markets in the developed countries, which provides the potential diversification benefits according to the portfolio theories. These two reasons make the Chinese ADRs the attractive investments for foreign investors.

Secondly, ADRs give U.S. investors the ability to easily purchase shares in foreign firms, and they are typically much more convenient and cost effective for domestic investors (versus purchasing stocks in overseas markets). And because many foreign firms are involved in industries and geographical markets where US multinationals don't have a presence, investors can use ADRs to help diversify their portfolios on a much more global scale. In academia, ADR is also the most widely studied vehicle for the foreign firms listing in US (Bradshaw, Bushee and Miller (2004), Doidge (2005)). So this paper will take these ADRs of Chinese firms as the sample, which are suitable for the question we want to study: they are Chinese firms, so the correlation with the US market should be lower than US stocks, and thus there should be diversification incentive for the investors; on the other hand, they are listed in the US exchanges, so there is barely no restrictions for US investors to hold them, and thus it is good to study home bias.

3.2 Implicit transaction costs

The sample of ADRs of Chinese firms alone can only control capital restrictions and explicit transaction costs, but due to the limited size of ADR market, the implicit transaction costs, such

as illiquidity, still worth noting. If such costs are high enough to diminish the benefits from diversification, the US investors would leave these ADRs. Percent effective spread and percent quoted spread are the best measures and usually serve as benchmarks (Holden (2009), Goyenko, Holden and Trzcinka (2009)), but both of them are computed from the NYSE's Trade and Quote (TAQ), the first problem of which is that the data are not available until 1993. Given the problems of these spreads, this paper use several high performing low-frequency spread proxies proposed by Holden (2009) and Goyenko, Holden and Trzcinka (2009). These proxies are highly correlated with percent effective spread and percent quoted spread (over 80%), but just require daily data, which is available for a long period. The advantages make them suitable to study investment behavior in this paper. The following part will briefly introduce these proxies.

Holden (2009) argues the spreads capture three main attributes of the daily data: price clustering, serial covariance accounting for midpoint prices on no-trade days and the quoted spread that is available on no-trade-days, and Effective Tick, Extended Roll and No Trade Quoted Spread proxy them respectively, and Multi-factor, which is linear combinations of simpler one-attribute or two-attribute models. He shows theoretically that Multi-Factor models have the potential to diversify away some imperfectly-correlated error terms, and test the new, low-frequency spread measures, together with the existing liquidity proxies, to the benchmark spreads, which are percent effective spread and percent quoted spread, on three dimensions, which are the correlations with benchmarks, the pure time-series correlation between the aggregate proxy spreads of an equally weighted portfolio of the sample firms and the aggregate benchmarks and the average root mean squared error for each spread proxy compared to the benchmarks. The results show that on all three performance dimensions with regard to both benchmarks the new combined model Multi-Factor2 does significantly better than existing low-

frequency spread proxies, and the combined model Multi-Factor2 does significantly better than the other integrated model Holden2 in that paper.

The Effective Tick measure comes from a pure price clustering model, which is from the negotiation cost theory of Harris (1991). Following Christie and Schutlz (1994), they assume that price clustering is completely determined by spread size, and thus focus on the connection between observed price clusters and the spread, and set that if trade prices are exclusively on even eighths increments, then the bid–ask spread must be \$1/4 or larger, while if trade prices are half of the time on odd eighths increments, then the likely bid–ask spread is \$1/8. In Holden (2009), the frequency with which closing prices occur in clusters of prices, which are odd \$1/8s, odd \$1/4s, odd \$1/2s, and whole dollars, are used to infer the effective spread. For the years after 2001, the ticks in NYSE, NASDAQ and AMEX switched from 1/8th to \$0.01, which means the decimal price grid should be applied, so the clusters of special prices are pennies, nickels, dimes, quarters, whole dollars. The first step to calculate Effect Tick is to get the probabilities of trades on prices corresponding to the specific spreads by the number of trades on prices corresponding to that spread:

$$F_{\mathrm{j}} = \frac{N_j}{\sum_{j=1}^{J} N_j}$$

To distinguish the odd and even increments for each spread, the unconstrained probability of the spreads are:

$$U_i = \begin{cases} 2F_j, & \mathrm{j=1} \\ 2F_j - F_{j-1}, & \mathrm{j=2,3,...,J\text{-}1} \\ F_j - F_{j-1}, & \mathrm{j=J} \end{cases}$$

Goyenko, Holden and Trizcinka (2009) point out that it is possible that reverse price clustering may be realized in small samples, such as lower frequency on rounder increments, which unintentionally causes the unconstrained probability of one or more effective spread sizes to go above one or below zero. This paper uses daily data to calculate quarterly effective tick, which means there are only about 60 trading days in each calculation, so this step is necessary in this paper. Such constrained probability is calculated as

$$\gamma_j = \begin{cases} \min[Max(U_j, 0), 1] & \text{j=1} \\ \min[Max(U_j, 0), 1 - \sum_{k=1}^{j-1} \gamma_k] & \text{j=2,3,...,J} \end{cases}$$

The effective tick measure a probability-weighted average of each effective spread size divided by the average closing price during the period.

$$\text{Effective tick} = \frac{\sum_{\text{j=1}}^{\text{J}} \gamma_j s_j}{\overline{P}}$$

The second attribute is pure serial covariance model including no-trade midpoints. This is an extension for the traditional Roll measure (1984) by considering the possibility of a no-trade day where the reported price is the closing midpoint. Holden (2009) let μ be the probability of a trading day and $1-\mu$ be the probability of a no- trade day, and follow Roll (1984) assumption to calculate serial covariance of the joint distribution as

$$Cov(\Delta P_t, \Delta P_{t+1}) = -\frac{\mu S^2}{4}$$

Then $S = 2\sqrt{\frac{-Cov(\Delta P_t, \Delta P_{t+1})}{\mu}}$

This is identical to Roll's formula, except for the μ instead 1 in traditional Roll's measure. Another important issue in this measure is to make price changes generated by systematic rather than idiosyncratic forces, because only the bid/ask/midpoint bounce is the signal to keep and the systematic value innovations and idiosyncratic value innovations are both noise terms and need to be removed. Holden (2009) use market model regression to extract idiosyncratic adjusted price change as

$$ar_t - r_f = \alpha + \beta(r_{mf} - r_f) + z_t$$

Then idiosyncratic adjusted price change is

$$\Delta P_t^{**} = z_t \cdot P_{t-1}$$

Taking this adjusted price to the modified Roll model above, Extended Roll is

$$Extended\ \ Roll = \begin{cases} 2\sqrt{\dfrac{-Cov(\Delta P_t^{**}, \Delta P^{**}{}_{t+1})}{\mu}} / P & \text{when } Cov(\Delta P_t^{**}, \Delta P^{**}{}_{t+1}) < 0 \\ \text{Effecitve tick} & \text{when } Cov(\Delta P_t^{**}, \Delta P^{**}{}_{t+1}) > 0 \end{cases}$$

The third attribute comes from a pure no-trade quoted spread model, which relates to the low-frequency high/ask and low/bid variables Eckbo and Norli (2002). Holden (2009) define No-Trade Quoted Spread as

$$\text{No Trade Quoted Spread} = \begin{cases} (\dfrac{1}{NTD}) \sum_{t=1}^{NTD} QS_t / P & \text{when NTD>0} \\ 0 & \text{when NTD=0} \end{cases}$$

After defining the three proxies to capture the three attributes of spread, Holden (2009) introduces multi-factor models, a combined model that is linear combinations of the previous

models. The advantage of a multi-factor model is to diversify away some of the imperfectly correlated error terms created from the previous proxies. That paper proposes a simple 50-50% combination of the previous proxies:

$$Multi\text{-}Factor = (1/2)\cdot \text{Extended Roll} + (1/2)\cdot \text{No Trade Quoted Spread}$$

The empirical tests in Holden (2009) show that among all the proxies, Multi-Factor measure has highest correlation with the benchmark spreads, which is more than 0.8, and both correlations of Effective Tick and Extended Roll is around 0.7, and No Trade Quoted Spread's correlation is around 0.6. So this paper follows the methods in Holden (2009) to construct the spread proxies: Effective Tick (ET), Extended Roll (Eroll), No Trade Quoted Spread (NTS) and Multi-Factor (MF), however, the time interval is a quarter rather than a month in Holden (2009).

Corwin and Schultz (2012) propose a spread estimator from daily high and low prices. The idea is that the high–low ratio reflects both the stock's variance and its bid-ask spread, and the variance component of the high–low ratio is proportional to the return interval, while the spread component is not, so the a spread estimator can be derived from the comparison between one day and two day periods. The two one-day periods high-low ratio is:

$$[\ln(\frac{\mathrm{H}_{\mathrm{t}}^{0}}{L_{\mathrm{t}}^{0}})]^{2} = [\ln(\frac{\mathrm{H}_{\mathrm{t}}^{\mathrm{A}}(1+S/2)}{L_{\mathrm{t}}^{\mathrm{A}}(1-S/2)})]^{2} = [\ln(\frac{\mathrm{H}_{\mathrm{t}}^{\mathrm{A}}}{L_{\mathrm{t}}^{\mathrm{A}}})]^{2} + 2[\ln(\frac{\mathrm{H}_{\mathrm{t}}^{\mathrm{A}}}{L_{\mathrm{t}}^{\mathrm{A}}})][\ln(\frac{2+S}{2-S})] + [\ln(\frac{2+S}{2-S})]^{2}$$

Similarly, for two-day period,

$$[\ln(\frac{\mathrm{H}_{\mathrm{t,t+1}}^{0}}{L_{\mathrm{t,t+1}}^{0}})]^{2} = [\ln(\frac{\mathrm{H}_{\mathrm{t,t+1}}^{\mathrm{A}}}{L_{\mathrm{t,t+1}}^{\mathrm{A}}})]^{2} + 2[\ln(\frac{\mathrm{H}_{\mathrm{t,t+1}}^{\mathrm{A}}}{L_{\mathrm{t,t+1}}^{\mathrm{A}}})][\ln(\frac{2+S}{2-S})] + [\ln(\frac{2+S}{2-S})]^{2}$$

where *Ht,t*+1 is the high price over the 2 days *t* and *t*+1 and *Lt,t*+1 is the low price over days *t* and *t*+1. Assuming the natural log of the ratio of high to low prices is proportional to the stock's

variance, and thus proportional to the time period, if stock prices follow the usual geometric Brownian motion. From the two equations, the spread estimator can be solved:

$$S = \frac{\sqrt{2\beta} - \sqrt{\beta}}{3 - 2\sqrt{2}} - \sqrt{\frac{\gamma}{3 - 2\sqrt{2}}}$$

Where

$$\beta = E\{\sum_{j=0}^{1}[\ln(\frac{H_{t+j}^{0}}{L_{t+j}^{0}})]^2\}$$

$$\gamma = [\ln(\frac{H_{t,t+1}^{0}}{L_{t,t+1}^{0}})]^2$$

Corwin and Schultz (2012) further show the estimator has correlation with benchmark spreads of more than 0.8, and outperform the other existing proxies except Multi-Factor in Holden (2009), even though they don't include Multi-Factor in their tests. So this paper also includes this estimator as HL. In sum, the four implicit transaction costs described above will be applied in this paper.

4. Data and Summary statistics

4.1. Data

This paper takes ADRs of Chinese firms in US markets as initial sample of the foreign assets. The ADR list comes from Bank of New York Depositary Receipt Web site. There are 3 levels of ADRs: level 1 ADRs trade over-the-counter as pink sheet issues; Level 2 ADRs are securities that trade on a US exchanges, which must register with SEC; Level 3 ADRs are similar to Level 2 ADRs, but include a capital-raising element. This paper will focus on Level 2 and Level 3 ADRs, because they are traded in the exchanges, and thus they have similar explicit costs as the exchange

traded stocks and better data quality than OTC securities (Bradshaw, Bushee and Miller (2004), Doidge (2005)). The ownership data are from CDA/Spectrum dataset based on the rule 13(f) quarterly holding information filed with the SEC, which requires institutions managing more than $100 million in equity to file a quarterly report with the SEC of all equity holding greater than 10,000 shares or $200,000 in market value. So the investors in this paper will be the institutional investors.

To study the diversification effect and home bias effect, this paper chooses all the common stocks traded in NYSE, AMEX and NASDAQ exchanges as comparing group, because they share similar properties as ADRs and most of they are covered by CDA/spectrum, and thus quite good data quality. They are called US stocks in the following paper. The third group, match sample of firms, comes from those US stocks, and the match criterion is that they have similar implicit costs as the ADRs. Then the ADRs traded in the US exchanges don't have capital restrictions to US investors, and share similar explicit and implicit transaction costs as the matched common stocks.

Market, financial and accounting data of ADRs and the US common stocks come from Center for Research in Securities Prices (CRSP) and Compustat. The data of Chinese markets and US markets are from DataStream. To test the effect of familiarity, the number of recommendations from I/B/E/S for all both ADRs and US stocks are collected.

4.2 Descriptive Statistics

Since this paper focuses on the US institutional ownerships, the holdings of ADRs and holdings of US stocks over time are shown in Figure 1. The means of the percentage of the

shares outstanding held by the institutional investors are plotted according to the groups of ADRs and US common stocks. It is quite obvious that the ownerships of US stocks are consistently higher than those of ADRs. The holdings of ADRs are less than 10% for about first 10 years and increase steadily after that to more than 20%, while the holdings of US stocks are always higher than 30% during all the sample period, and also increase over time, to more than 50% after 2005.

[Insert Figure 1 here]

[Insert Table 1 here]

Table 1 provides the correlations between ADRs returns and Chinese markets and US markets. The returns of ADRs are the quarterly returns, which are calculated by the daily returns from CRSP. The returns of Chinese markets and US markets are from DataStream database, and also transformed to quarterly. Here lists three Chinese markets: China total, China A share, and China B share. The A shares are open only to Chinese citizens and B shares are available for all the investors. However, A shares have much more market values and listed firms than B shares, so they are closer to Chinese economy and thus more attractive for the foreign investors. The US markets here include US total, S&P 500 returns and NASDAQ returns. Panel A shows the data summary for ADR samples, Chinese markets and US markets. The average returns from ADRs is lower than Chinese total and A share markets, which are the main investment targets in China, but higher than US total and S&P 500 returns. Investing in ADRs should bring slightly higher returns during the sample period from this point.

Panel B is the correlations among the ADR quarterly returns and the market quarterly returns. Consistent with the prediction in last part, the ADR returns enjoy the highest correlation with Chinese total market, as they are Chinese firms. However, they are not so correlated with

Chinese exchange traded stocks, which could attribute to listing in US exchanges, because they are even closer to US equity markets. Panel C offers another way to look at the correlation. Since the holding data are quarterly, so the information from returns can be aggregated to quarterly to capture the relation. In Panel C, the returns are quarterly return, and correlations are calculated by the firm and by quarter separately. The table shows the averages of the correlations from the two methods. The results are similar to the daily result in Panel B, which is the ADRs have highest correlation with China Total market. In sum, the high correlation with Chinese total market and low correlation with US markets can offer US investors investing ADRs diversification benefit. Together with higher average returns than those in US markets, ADRs should be good investment targets for US investors.

[Insert Table 2 here]

Table 2 provides descriptive statistics on the variables of ADRs and US stocks, including institutional ownership, implicit cost proxies, the recommendations from I/B/E/S, and other firm characteristics. The calculations are based on the quarterly firm information, and there are 1495 firm-quarter observations for ADRs and 320924 observations for the US stocks. For each group, time-series mean, standard deviation, maximum value and minimum value are reported.

Number of block holders is number of institutional block ownerships whose holdings are more than 5% of the number of shares outstanding. *Block percent* is the percentage of shares held by block holders to the total number of shares outstanding. Similarly, *number of institutional investors* is number of institutional owners if the form 13-F and institutional ownership percent is the percentage of shares held by these institutional owners. *Herfindahl-Hirschman Index of ownership concentration* measures the degree of concentration of the institutional ownership. *Top1 percent, Top5 percent and Top10 percent* are the percentage of

shares held by top1, top5, and top10 largest holders for this stock to the total shares outstanding. Consistent with the Figure 1, all kinds of the percentage of holdings of US stocks are higher than those of ADRs, except Herfindahl-Hirschman Index of ownership concentration.

The proxies of implicit transaction costs are the *extended roll, no trade spread, effective tick, multi-factor* and *high-low spread* as mentioned in the last part. It is quite surprising that all kinds of implicit costs are smaller for ADRs than US stocks, which means the average transaction costs should be lower than those of US stocks. The average *number of recommendations* of ADRs is less than that of US stocks, implying ADRs attract less focus of analysts in US, and thus could lead less familiar to the US investors.

The other firm characteristics are defined as below: *Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price from Compustat. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter, or say, the preceding 3-month cumulative return. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database.

5. Determinants of Institutional Ownership

This part examines the effects of the new variables in the paper to the US institutional investors, controlling the variables recognized in the previous literatures.

Following Gompers and Metrick (2001), this paper include stocks characteristics as potential determinants of institutional ownership: *Market-to-Book, Price, Market value, Net income, Dividend yield, Momentum, Turnover, Age,* which serve as control variables in this paper. To test the effect of the variables, the paper applies Fama-Macbeth method to run the following cross-sectional regression of institutional ownership:

$$INSTOWN\_PERC = \alpha_0 + \alpha_1 MB + \alpha_2 MKV + \alpha_3 TURNOVERQ + \alpha_4 NIQ + \alpha_5 PRC + \alpha_6 RETQ + \alpha_7 DY + \alpha_8 AGE$$

Where the dependent variable the percentage of shares held by the institutional owners. The second step is to calculate the time-series average of the coefficient estimates. Table3 shows the results of the regression on the above variables. The first column is for ADR samples and the second column is for US common stocks. The results for US common stocks are quite consistent with the results for total US domestic institutional ownership in Yan and Zhang (2009) and Baik, Kang, Kim and Lee (2012): *Market-to-Book ratio, Market value, Turnover, Price, Momentum, Dividend Yield* and *Age* are significantly positive related to the institutional ownership, except *Market-to-Book* is slightly weaker in this paper, suggesting institutional investors prefer large, active firms, which Baik, Kang, Kim and Lee (2012) argue are firms with low information asymmetry. However, the determinants of institutional ownership in ADR sample are different: only *Market-to-Book ratio, Market value,* and *Net income* are significantly related to ownership, while *Turnover, Price, Momentum, Dividend Yield* and *Age* lose their significance. In sum, the results of two samples suggest that US institutional investors prefer large firms, especially when they invest the foreign assets, which is consistent with the previous literatures on those large foreign firms are better known or have more information on the markets, and thus more attractive for the US investors (Baily and Jagtiani (1994), Kang and Stulz (1997)) .

[Insert Table 3 here]

To test the hypotheses proposed in the last part, this paper adds three kinds of variables into the base model from the previous literatures: Correlation, Implicit transaction costs and the number of recommendation. Table 4 shows the results of tests on these variables. The regression method is the same as the one in the base model (Fama-Macbeth method), but add the new variables to the right hand side of the equation.

[Insert Table 4 here]

The first test is for Hypothesis 1, which is according to the modern portfolio theory (Markowitz (1959)), if the ADRs have higher correlation with Chinese market, the higher US institutional ownership should be higher, while if they are highly correlated with US market, the lower US institutional ownership should be. Since the institutional holding information is quarterly, so the other variables are also quarterly. Panel A shows the results for the test results for correlation. The average coefficient for the correlations with Chinese total market is significant, but negative, means the ADRs with higher correlation with Chinese market have lower US institutional ownership. On the other hand, the average coefficient for the correlations with US total market is significant, but positive, indicating the US investors prefer the ADRs with high correlation with US markets. The total results about correlation are against the hypothesis of diversification (Hypothesis 1), so the US investors don't have much desire to diversify their investments by ADRs.

Panel B is the result for implicit transaction costs. The first 4 columns are for ADR samples, and the last 4 columns are for the US stocks. For the all four proxies included in the paper, Multifactor (MF), Effective Tick (ET), Extended Roll (Eroll) and High-low spread (HL), the coefficients are not significant for ADR samples, but quite significant for the US common stocks. Further, they are positive for ADRs, while negative for US stocks. The results for US stocks are consistent with Baik, Kang, Kim and Lee (2012), where their illiquidity measure is significantly

negative related with the institutional holdings. One explanation is the US institutional investors prefer high liquid common stocks, but when they invest ADRs, the liquidity loses the importance. The phenomenon also provide the necessity to control implicit transaction costs when considering comparison between ADRs and US stocks (e.g. study of home bias in next part). Thus the hypothesis 2 is supported in the US sample, but not in ADRs.

Panel C shows the result of the number of recommendations from the analysts. The method is the same as previous part (Fama-Macbeth). The first column is for the ADRs and the second is for US stocks. The recommendation is significantly positively related to the institutional ownership, which means the investors prefer the stocks with more analysts covering, or say, they are more familiar with.

6. Sources of Home Bias

Figure1 and Table 1 clearly show that home bias exists in the US institutional investors, so the remaining question is why. This part will discuss the sources of this bias. There are two strands of explanations for home bias: information asymmetry and familiarity**.** To distinguish two effects, this paper constructs a match sample of firms comes from the US common stocks, which have similar implicit costs as the ADRs. Then the ADRs traded in the US exchanges don't have capital restrictions to US investors, and have similar explicit and implicit transaction costs as the matching stocks.

6.1 Effect of Information asymmetry

To test the effect of information, this paper follows Gompers and Metrick (2001) method to examine the return predictive power of institutional investors. The idea is that the power to

predict future returns implies the information advantage. The first part of the method is to use Fama-Macbeth (1973) to test the time-series average of the coefficients. As in the last, first step is to make cross-sectional regression for each quarter of one-quarter-ahead returns on the current levels of institutional ownership and the control variables to make sure the predictive power is not driven by those firm characteristics. The structure equation is:

$$RETQ_{t+1} = \alpha_0 + \alpha_1 INSTOWN\_PERC_t + \alpha_2 MF_t + \alpha_3 MB_t + \alpha_4 MKV_t$$
$$+\alpha_5 TURNOVERQ_t + \alpha_6 NIQ_t + \alpha_7 PRC_t + \alpha_8 DY_t + \alpha_9 AGE_t + \alpha_{10} NUMREC_t + e_t$$

Then the results shown in Table 5 Panel A are the time-series average of the coefficients. Both institutional ownership coefficients of ADR sample and matching sample are not significant, meaning that there are not obvious predictive powers of returns in the samples, and thus there is not significant information asymmetry. If the criterion is a little loose, the coefficient of institutional holdings of the matching sample is marginally significant negative at 10% level, indicating poor productivity of returns, so it is safe to conclude at this level that there is not any information advantage in the matching sample.

[Insert Table 5 here]

The second part of Gompers and Metrick (2001) method is to decompose the current level of total institutional ownership into lagged ownership and incremental of ownership, and the former indicates persistent demand shocks and latter is the stock-picking ability. The test method is still Fama-Macbeth (1973) and the structure equation in this part is:

$$RETQ_{t+1} = \alpha_0 + \alpha_1 INSTOWN\_PERC_{t-1} + \alpha_2 \Delta INSTOWN\_PERC_t + \alpha_2 MB_t + \alpha_3 MKV_t$$
$$+\alpha_4 TURNOVERQ_t + \alpha_5 NIQ_t + \alpha_6 PRC_t + \alpha_7 DY_t + \alpha_8 AGE_t + \alpha_9 MF_t + \alpha_{10} NUMREC_t + e_t$$

Table 5 Panel B shows the results of the average coefficients. The lagged institutional ownership is the key variable here and both of coefficients for ADRs and matching sample are marginal

significant, but negative, indicating poor stock-picking ability, which is consistent with Baik, Kang, Kim and Lee (2012). Together with the results from the first part, these results confirmed that the institutional investors don't present superior ability to predict future returns or to pick better stocks, and thus they don't have information advantage in the investments.

6.2 Effect of Familiarity

The number of analysts' recommendations in I/B/E/S is a proxy of attention of the stock in the market, which is similar to the news coverage by Wall Street Journal and Financial Times. For investors, the more coverage of the stock means higher visibility, and thus indicates more familiarity (Baker, Nofsinger and Weaver (2002)). Table 4 Panel C has shown that the number of recommendations is significantly positive related to the institutional ownership, indicating the investors prefer familiar stocks. This part provides more direct evidence the effect of familiarity causes home bias.

The first method is following Baik, Kang, Kim and Lee (2012) to compare the coefficients of structure model with all of the variables for ADRs and Matching sample and see which of them significantly differ to cause holding difference. To be specific, the first step is to run the cross-sectional regression for each quarter for the two samples respectively:

$$INSTOWN\_PERC = \alpha_0 + \alpha_1 NUMREC + \alpha_2 MF + \alpha_3 MB + \alpha_4 MKV + \alpha_5 TURNOVERQ + \alpha_6 NIQ + \alpha_7 PRC + \alpha_8 RETQ + \alpha_9 DY + \alpha_{10} AGE$$

The second step is to calculate the difference between the same variables in the two samples for each quarter, and then get the time-series average of each variable. The result is shown in Table 6 Panel A. The first two columns are for ADRs and matching samples, and the definitions of the variables are exactly same as the ones in determining the effects of variables to institutional ownership. The third column is the averages of differences in coefficients between

ADRs and matching sample. The number of recommendations is significantly positive for both ADRs and matching samples again, and thus confirms that the investors prefer the familiar stocks. The number of recommendations is also significant in the third column, indicating the different number of recommendations between ADRs and matching sample result different holdings, and thus the effect of familiarity can help to explain home bias.

[Insert Table 6 here]

The second method is to directly use the differences in variables between ADRs and matching sample to explain the difference in ownership. The first step is to form equally weighted portfolio of matching stocks for each ADR on each quarter, and calculate the average of each variable for the current quarter. The second step is to get the difference between ADRs and the matching portfolio for each variable on each quarter, and run a cross-sectional regress the difference in holdings on the differences in the variables for each quarter. Finally, the time-series averages of the variables show their effects on the institutional holdings. Table 6 Panel B is the result. The only difference in the number of recommendations significantly affects the difference in holdings, and the coefficient is positive, indicating the more number of recommendations lead higher institutional ownership, and thus the investors prefer the stocks that they are familiar with. The proxy for familiarity, the number of recommendations, is the only significant survived variable in the both method, while the other determinants can affect the holding levels, but not strong enough to explain home bias.

In sum, this part compare ADRs and matching US common stocks under a prefect transaction costs controlled setting, to distinguish and test separately on the two strands of explanations to the observed home bias in US institutional investors: information asymmetry and familiarity.

The results don't support the hypothesis of information advantage, while point out that familiarity is the only factor which can significantly decide the home bias.

7. Additional tests

7.1 Robustness for the test method

The most tests in this paper use quarterly data at firm level. The method to test the effects of the factors follow Fama-Macbeth (1973), which is run cross-sectional regression for each quarter, and then calculate the time-series average of the coefficient estimates. The other possible test method is to run time-series regression for each firm, and then calculate the averages of these coefficients through all the firms. Most of the results are consistent with the ones listed in the paper, except the ADRs' correlation with Chinese and US markets as determinant of the institutional holdings. In contrast to the results in this paper, which is the US investors marginally prefer stocks with high correlation with US market and low correlation with Chinese market, the result from the alternative method shows that the investors marginal prefer high correlation with Chinese market and low correlation with US market, which consistent with diversification hypothesis. However, the relationships are just marginal, and they don't change the effects of the other factors, especially the familiarity effect on home bias. So the conclusion about the irrationality of US investors still holds.

7.2 Robustness for correlation between ADRs and markets

The relationship of ADRs with Chinese market and US market is one of the key issues in this paper, so an alternative method to test the relation is offered here. Wang and Jiang (2004) study the Chinese firms listed in Hong Kong market (H share) and show that these shares are closer to

Hong Kong market than to Chinese mainland market. To be specific, the empirical model specification in this paper is below:

$$r_{it} = \alpha_{i0} + \sum_{-k}^{+k} \beta_{USik} US_{t-k} + \sum_{-k}^{+k} \beta_{CHik} CH_{t-k} + u_{it}$$

where k is the k-period led and lag, Δx is the percentage change in the exchange rate between USD and RMB. $\beta_{US} = \sum_{-k}^{+k} \beta_{USik} US_{t-k}$, $\beta_{CH} = \sum_{-k}^{+k} \beta_{CHik} US_{t-k}$ are the betas for US market and Chinese market. This paper tests three periods, which are k=1, 3, 5 quarters. The results are marginally significant and similar to the results before in part 3, so the tables are not displayed.

7.3 Robustness for implicit transaction costs

As mentioned in part 3, there are several quite good proxies of implicit costs according to Holden (2009), and Table 4 Panel B test and confirm the effects of them. Table 5 and Table 6, including the matching criterion in part 4 in the paper, just use Multifactor measure as the only proxy, because the measures are correlated to each other, and then if all of them are included in the regressions, the multicollinearity would affect the significance of the variables. However, the alternative proxies are also tested, and get the similar results, so the conclusion of the tests hold regardless which measure is used.

7.4 Robustness for information advantage

Ivkovic and Weisbenner (2005) propose that if the local portfolio has positive additional returns than the other portfolios for the local investors, the local investors should have the information advantage than the non-local investors about the local stocks; otherwise, the higher

ownership is because of familiarity. Based on their method, it is predicted that, if the US investors' counterpart US stocks have higher additional returns, compared with the Chinese ADRs, the US investors have information advantage on the US stocks; otherwise, they just choose the investments they are familiar with. The empirical results show that there is insignificant negative additional return for the matching group, so the test doesn't change the conclusion that the information asymmetry cannot explain home bias in US institutional investors.

8. Conclusion

This paper takes a close look at US institutional investors' investment behavior on foreign assets by studying the institutional ownership, and confirms there is clear home bias existing among US institutional investors.

The three groups are constructed in the paper: ADRs of Chinese firms, US common stocks and the matching samples from the common stock with similar implicit transaction costs, and thus a good platform to control capital restrictions in the foreign countries, explicit transaction costs and implicit transaction costs.

There are several hypotheses tested under this setting. The empirical results first reject the diversification effect, predicting the US investors prefer the stocks with high correlation with Chinese market and low correlation with US markets. Secondly, the results confirm the US investors prefer the stocks with high liquidity in US common samples, but not in ADRs. Finally,

this paper provides clear evidences that home bias come from familiarity effect rather than information asymmetry effect.

The neglect of diversification benefits and choosing stocks by familiarity show that the investors' investment behaviors are not completely rational, even though for US institutional investors, which are the most sophisticated group in the world.

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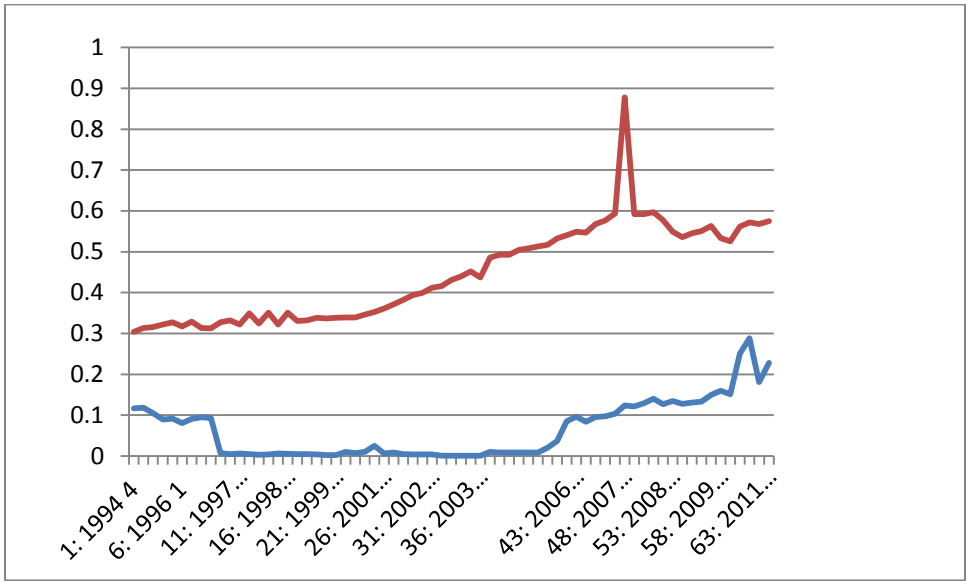
Figure 1 Mean percentage of market value of equity held by institutional investors over time



This figure reports mean percentage of market value of equity held by institutional investors over time for ADRs and US common stocks. The percentage is quarterly computed as the ratio of a firm's market value of equity held by institutional investors to its total market value. The samples consist of firm-quarters with institutional ownership from CDA/Spectrum institutional (13f) Holdings. The red line is the holdings for US common stocks and blue line is for ADRs.

Table 1 Descriptive Statistics on markets

This table provides the statistics about the relations between ADRs returns and Chinese markets and US markets. The returns of ADRs are the quarterly returns, which are calculated by the daily returns from CRSP and the returns of Chinese markets and US markets are from DataStream, and also transformed to quarterly. Panel A shows the data summary for ADR samples, Chinese markets and US markets, including mean (MEAN), standard deviation (STD) and the number of observations (N). Panel B is the correlations among the ADR quarterly returns and the market quarterly returns. Panel C shows the correlations of quarterly returns of ADRs, Chinese market and US market, which are averaged by the firm (cross-sectional) and by quarter (time-series) separately.

Panel A

	retq	chinaq	chinaaq	chinabq	usq	spq	nasq
MEAN	0.010755	0.011923	0.012639	0.007037	0.006728	0.00638	0.012987
STD	0.334909	0.156815	0.179422	0.19704	0.095864	0.095234	0.115746
N	2117	2123	1995	1771	2123	2123	2123

Panel B

	retq	chinaq	chinaaq	chinabq	usq	spq	nasq
retq	1	0.533424	0.368121	0.391623	0.402658	0.402744	0.404158
chinaq	0.533424	1	0.687462	0.677582	0.625892	0.626486	0.610577
chinaaq	0.368121	0.687462	1	0.805894	0.370418	0.366848	0.397132
chinabq	0.391623	0.677582	0.805894	1	0.465034	0.457963	0.539727
usq	0.402658	0.625892	0.370418	0.465034	1	0.99951	0.920882
spq	0.402744	0.626486	0.366848	0.457963	0.99951	1	0.917051
nasq	0.404158	0.610577	0.397132	0.539727	0.920882	0.917051	1

Panel C

by firm		by quarter	
chinaq	0.516225	chinaq	0.061677
chinaaq	0.407409	chinaaq	0.045366
chinabq	0.467194	chinabq	0.053009
usq	0.450727	usq	0.034418
spq	0.449653	spq	0.034279
nasq	0.479144	nasq	0.051618

Table 2 Descriptive Statistics on the variables of ADRs and US stocks

This table provides descriptive statistics on the variables of ADRs and US stocks. The calculations are based on the quarterly firm information, and there are 1495 firm-quarter observations for ADRs and 320924 observations for the US stocks. *Number of block holders* is number of institutional block ownerships whose holdings are more than 5% of the number of shares outstanding. *Block percent* is the percentage of shares held by block holders to the total number of shares outstanding. *Number of institutional investors* is number of institutional owners. Institutional ownership percent is the percentage of shares held by these institutional owners. *Herfindahl-Hirschman Index of ownership concentration* measures the degree of concentration of the institutional ownership. *Top1 percent, Top5 percent and Top10 percent* are the percentage of shares held by top1, top5, and top10 largest holders for this stock to the total shares outstanding. *Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database.

	ADRs				US stocks			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
numblock	0.41	1.52	0.00	31.00	1.53	1.52	0.00	45.00
numinst	56.06	56.88	1.00	437.00	84.62	133.68	1.00	1706.00
instown_hhi	0.22	0.20	0.02	1.00	0.20	0.22	0.01	1.00
instown_perc	0.12	0.34	0.00	6.71	0.41	1.93	0.00	1079.03
top1_perc	0.03	0.07	0.00	0.98	0.08	0.19	0.00	100.86
top5_perc	0.07	0.16	0.00	2.73	0.21	0.66	0.00	365.26
top10_perc	0.09	0.20	0.00	3.65	0.28	1.00	0.00	559.45
block_per	0.04	0.23	0.00	5.21	0.13	0.15	0.00	16.13
eroll	0.0118	0.0280	0.0000	0.9138	0.0236	0.0385	0.0000	2.7128
nts	0.0057	0.0653	0.0000	1.8716	0.0219	0.0601	0.0000	5.1254
et	0.0029	0.0049	0.0000	0.0834	0.0141	0.0334	0.0000	1.0000
mf	0.0094	0.0433	0.0000	1.3927	0.0245	0.0488	0.0000	3.9191
zero	0.0291	0.0448	0.0000	0.2857	0.1254	0.1372	0.0000	1.0000
zero1	0.0296	0.0458	0.0000	0.2857	0.1868	0.8994	0.0000	62.0000
hl	0.0087	0.0061	0.0001	0.0341	0.0156	0.0301	0.0000	1.2000
mean_numrec	5.90	5.90	1.00	43.67	6.58	6.23	1.00	53.67
mean_meanrec	2.40	0.73	1.00	5.00	2.19	0.63	1.00	5.00
niq	339.80	1099.05	-2212.41	10092.32	23.48	273.52	-31764.00	14830.00
prccq	28.31	40.04	0.60	597.00	19.92	28.49	0.00	2418.00
mkv	13573.69	40389.45	22.76	348034.30	2209.93	12332.84	0.00	604414.80
mb	3.04	4.14	-2.35	48.01	5.14	957.41	-5757.90	523074.80
dy	0.00	0.01	0.00	0.21	0.00	0.71	0.00	400.00
retq	0.04	0.32	-0.76	2.82	0.04	0.33	-0.99	18.33
turnoverq	1.45	2.08	0.01	21.99	0.38	0.59	0.00	67.41
aged	2184.85	1180.40	192.00	4646.00	5204.14	4046.40	52.00	22821.00

Table 3 **Determinants of Institutional Ownership**

This table summarizes the results of cross-sectional regressions of institutional ownership and institutional trading on stock characteristics. Institutional holdings are obtained from Thomson Financial. Stock characteristics are from the CRSP and COMPUSTAT database. *Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database. The method is to estimate a cross-sectional regression each quarter, and report the average regression coefficient. The number is shade is the standard error of the mean. ***,**,* denote significance at the 1%, 5% and 10% levels, respectively.

	ADRs		US common stocks	
intercept	0.013734		0.342654	***
	0.028503		0.014976	
mb	0.0489	***	5.26E-05	*
	0.014556		3.25E-05	
mkv	2.23E-05	**	4.83E-07	**
	0.000012		2.76E-07	
turnoverq	0.01286		0.192328	***
	0.01162		0.018306	
prccq	-0.00133		0.001704	***
	0.001041		0.000139	
retq	-0.04853	*	-0.05419	*
	0.029409		0.0385	
niq	-0.00109	**	-1.3E-05	*
	0.000598		7.96E-06	
aged	-1.5E-05		1.21E-05	***
	1.28E-05		2.67E-06	
dy	3.043718	*	-1.75492	***
	2.226722		0.373092	
rsq	0.698317		0.208121	

Table 4 **Determinants of Institutional Ownership with new variables**

Panel A Correlation effect

This table summarizes the results of cross-sectional regressions of institutional ownership and institutional trading on stock characteristics. Institutional holdings are obtained from Thomson Financial. Stock characteristics are from the CRSP and COMPUSTAT database. *Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database. In Panal A, Chinaret is the quarterly correlation of ADRs and Chinese total market. usret is the quarterly correlation of ADRs and US total market. In Panel B, mf, et, eroll, hl are the multifactor, effective tick, extended roll and spread from high-low ratio, respectively. In Panel C, mean_numrec is the average number of recommendation of analysts from I/B/E/S per month. The method is to estimate a cross-sectional regression each quarter, and report the average regression coefficient. The number is shade is the standard error of the mean. ***,**,* denote significance at the 1%, 5% and 10% levels, respectively.

	China total & US total		China A share & US total		China B share & US total
intercept	-0.01253		-0.32706		0.753056
	0.025188		0.307315		0.738286
chinaret	-0.11988	**	-0.15092		-0.8204
	0.05946		0.230098		0.839749
usret	0.094067	**	0.096552	**	2.012737
	0.049171		0.050514		1.870009
mb	0.049708	***	0.069525	***	0.033093
	0.014208		0.018533		0.046508
mkv	8.52E-06		-0.00023		0.00113
	1.22E-05		0.00023		0.00112
turnover					
q	0.011273		0.004209		-0.00628
	0.012389		0.0081		0.012478
prccq	-0.00079		0.003152		-0.04272
	0.001441		0.005		0.040459
retq	-0.04207	*	-0.03928		-0.4698
	0.032597		0.059864		0.38428
niq	-0.00043		0.011265		-0.06341
	0.000619		0.011318		0.063163
aged	-7.8E-06		0.00011		-0.00028
	7.04E-06		0.000135		0.00024
dy	1.972242		1.683718	*	1.442393
	1.663355		1.220032		1.980513
rsq	0.729583		0.725409		0.653908

Table 4

Panel B

	ADRs								US Common Stocks							
mf	0.730								-6.29	***						
	1.028								0.651							
et			11.575								-0.834	***				
			13.950								0.956					
eroll					0.617								-0.48	***		
					0.518								0.447			
s							4.234	*							-12.46	***
							2.719								1.064	
mb	0.050	***	0.049	***	0.050	***	0.052	***	0.000		0.000	*	0.000		0.000	**
	0.014		0.015		0.014		0.014		0.000		0.000		0.000		0.000	
mkv	0.000	**	0.000	**	0.000		0.000	***	0.000		0.000		0.000		0.000	
	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
turnoverq	0.014		0.011		0.014		0.007		0.168	***	0.172	***	0.181	***	0.198	***
	0.013		0.011		0.013		0.007		0.016		0.017		0.016		0.018	
niq	0.000	*	-0.001	**	0.000		-0.00	***	0.000	*	0.000	*	0.000		0.000	
	0.000		0.001		0.000		0.000		0.000		0.000		0.000		0.000	
prccq	-0.00		-0.001		-0.00		-0.00		0.001	***	0.001	***	0.001	***	0.001	***
	0.001		0.001		0.001		0.001		0.000		0.000		0.000		0.000	
retq	-0.03		-0.053	**	-0.03		-0.05		-0.06	*	-0.072	**	-0.07	**	-0.066	**
	0.030		0.031		0.029		0.032		0.039		0.038		0.039		0.039	
dy	3.356		3.313	*	3.606		2.660		-1.99	***	-2.244	***	-2.05	***	-2.490	***
	2.886		2.402		2.831		3.276		0.426		0.430		0.442		0.458	
aged	0.000		0.000		0.000		0.000		0.000	***	0.000	***	0.000	***	0.000	***
	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
rsq	0.713		0.712		0.712		0.716		0.312		0.289		0.277		0.271	

Table 4
Panel C

	ADRS		US common stocks	
mean_numrec	0.007	***	0.012	***
	0.002		0.002	
mb	0.045	***	0.000	
	0.015		0.000	
mkv	0.000	*	0.000	***
	0.000		0.000	
turnoverq	0.009		0.126	***
	0.012		0.018	
niq	-0.001	*	0.000	***
	0.001		0.000	
prccq	-0.002	*	0.001	***
	0.001		0.000	
retq	-0.032		-0.033	
	0.028		0.050	
dy	4.799	*	-3.350	***
	3.551		0.659	
aged	0.000		0.000	***
	0.000		0.000	
rsq	0.741		0.276	

Table 5 Regression of future returns on level and changes in institutional ownership

This table summarizes the results of cross-sectional regressions of one-quarter-ahead or one-year-ahead returns on institutional ownership and other stock characteristics. Institutional holdings are obtained from Thomson Financial. Stock characteristics are from the CRSP and COMPUSTAT database. *Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database. In Panel A, instown_perc is the percentage of shares held by institutional owners. In Panel B, laginstown_perc is the lagged percentage of shares held by institutional owners. diffinstown_perc is the incremental of percentage of shares held by institutional owners. The method is Fama and MacBeth (1973) methodology and report the time-series average regression coefficients. The number is shade is the standard error of the mean. ***,**,* denote significance at the 1%, 5% and 10% levels, respectively.

Panel A

	ADRs	Match sample	
intercept	1.490654	0.034752	*
	1.360252	0.025413	
instown_perc	-74.7049	-0.01819	*
	67.29081	0.011015	
mf	47.46487	0.146374	
	51.25503	0.245036	
mb	0.3069	4.55E-06	
	0.29893	3.22E-05	
mkv	6.42E-05	-4.28E-07	***
	0.000111	1.13E-07	
turnoverq	0.044498	-0.00037	
	0.157384	0.006587	
niq	-0.00302	2.19E-05	***
	0.005585	5.92E-06	
prccq	-0.01605	-0.00015	
	0.01583	0.000197	
retq	4.070403	0.002056	
	3.821621	0.018872	
dy	35.90366	-0.42006	
	28.39173	0.450929	
aged	-0.00045	7.93E-08	
	0.000384	4.66E-07	
mean_numrec	-0.35656	-5.19E-06	
	0.358024	0.000407	
rsq	0.595527	0.042992	

Table 5
Panel B

	ADRs		Match sample	
intercept	-0.1231		0.033051	*
	0.100196		0.024893	
laginstown_perc	7.964066		-0.01567	*
	56.2982		0.010821	
diffinstown_perc	-95.4544	*	-0.08155	*
	71.41307		0.054208	
mf	8.373494	**	0.149765	
	4.225527		0.243017	
mb	0.020764		5.02E-06	
	0.017362		3.21E-05	
mkv	-0.00011		-4.3E-07	***
	0.000102		1.12E-07	
turnoverq	-0.05872		-0.00108	
	0.046858		0.006419	
niq	0.007329		2.19E-05	***
	0.00598		5.89E-06	
prccq	0.00611	*	-0.00014	
	0.004124		0.00019	
retq	0.128298		0.004028	
	0.154382		0.018507	
dy	7.059681	**	-0.40666	
	4.047417		0.449417	
aged	-2.5E-05		8.21E-08	
	2.94E-05		4.64E-07	
mean_numrec	0.000577		1.24E-05	
	0.004043		0.000408	
rsq	0.616218		0.044379	

Table 6 Tests on Familiarity

This table summarizes the effect of familiarity.*Market-to-Book* is the ratio of the market capitalization to the book value of equity for the current quarter. *Price* is the quarter-end share price. *Market value* is the quarter-end market capitalization. *Net income* is the net income occurred in the current quarter. *Dividend yield* is cash dividend divided by share price. *Momentum* is the cumulative return occurred in the current quarter. *Turnover* is the ratio of the total trading volume in the current quarter to the number of share outstanding. *Age* is the number of days since the first appearance of the firm's information in CRSP database. mean_numrec is the average number of recommendation of analysts from I/B/E/S per month. Panel A uses the method to compare the coefficients of ADRs and Matching sample for each quarter. Panel B uses the method to directly test the differences in variables between ADRs and matching sample The number is shade is the standard error of the mean. ***,**,* denote significance at the 1%, 5% and 10% levels, respectively.

Panel A

	ADRs		Matching Sample		Difference	
mean_numrec	0.007	***	0.010	***	-0.0067	***
	0.002		0.002		0.002823	
mf	1.298	*	-7.096	***	-11.0786	
	0.844		0.981		10.71694	
mb	0.045	***	0.000		-0.01494	
	0.015		0.000		0.015579	
mkv	0.000	**	0.000	***	-0.00001	**
	0.000		0.000		5.71E-06	
turnoverq	0.011		0.123	***	0.187015	***
	0.013		0.016		0.065189	
niq	-0.001	***	0.000	***	-0.00027	
	0.000		0.000		0.000542	
prccq	-0.002	*	0.001	***	0.00083	
	0.001		0.000		0.000851	
retq	-0.025		-0.046		0.061567	
	0.029		0.052		0.102598	
dy	5.132	*	-3.626	***	-7.35785	
	3.887		0.734		3.120052	
aged	0.000		0.000	***	3.17E-05	*
	0.000		0.000		2.46E-05	
rsq	0.754		0.316			

Table 6
Panel B

	Differences	
intercept	0.523727	***
	0.053784	
diff_mean_numrec	0.006497	***
	0.001309	
diff_mf	-2.16133	
	2.429366	
diff_mb	0.012791	*
	0.007757	
diff_mkv	0.001009	*
	0.000751	
diff_turnoverq	-0.00014	
	0.029482	
diff_prccq	0.001414	*
	0.000929	
diff_retq	0.028567	
	0.043339	
diff_niq	-0.00046	
	0.000515	
diff_aged	3.09E-07	
	1.17E-05	
diff_dy	-0.76859	
	12.66967	
rsq	0.695181	