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INFORMATION IMMOBILITY, INDUSTRY CONCENTRATION, AND INSTITUTIONAL INVESTORS' PERFORMANCE

Mark Fedenia
School of Business, UW-Madision

Sherrill Shaffer
University of Wyoming
Centre for Applied Macroeconomic Analysis (CAMA), ANU

Hilla Skiba
University of Wyoming

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Information immobility, industry concentration, and institutional investors' performance

Mark Fedenia[a], Sherrill Shaffer[b,c], and Hilla Skiba[b,*]
[a]*School of Business, University of Wisconsin – Madison*
[b]*College of Business, University of Wyoming*
[c]*Centre for Applied Macroeconomic Analysis (CAMA), Australian National University*

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Abstract:
This paper examines foreign institutional investors' portfolio allocation and performance in US securities. We test how information immobility, proxied by cultural and geographical distance between the investors' home markets and the US, influences portfolio strategies. Consistent with theoretical predictions, foreign institutional investors' total investment in the US is negatively related to information immobility. Similarly, information immobility is a significant driver of portfolio under-diversification across industries. Industry concentration has declined over time, consistent with declining search costs. Industry-concentrated portfolios outperform more diversified portfolios for both foreign and US institutional investors. Concentration especially helps institutional investors with the easiest access to information.

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[*]Contact author: phone: 307-766-4199, email: hskiba@uwyo.edu

Investors do not diversify across international markets according to expected benchmark weights as suggested by portfolio theory. Instead, individuals and institutional investors tend to overweight their home markets. The so called home bias has been studied extensively since seminal work by French and Poterba (1991). In addition to home biased portfolio allocation, individual and institutional investors prefer to overweight certain types of international markets in investment portfolios compared to the markets' expected benchmark weights. International markets that attract foreign investors are often more transparent with better governance mechanisms, are geographically proximate, share a common language with the investor, and are culturally close (Chan, Covrig, Ng 2005; Leuz, Lins, Warnock 2008; Anderson, Fedenia, Hirschey, and Skiba 2010).

Portfolio diversification and security selection by individuals and institutional investors in international markets has been studied mainly in small sample sizes. In country specific studies that investigate security selection, most studies are limited to comparison of domestic versus foreign investors' decision making. For example, Kang and Stulz (1997) show that foreign investors in Japan prefer large, international manufacturing firms. Covrig, Lau, and Ng (2006) find that domestic managers typically prefer smaller, high market-to-book firms. Foreign ownership is also positively related to analyst coverage of firms, and overall the results provide support for foreigners' preference for stocks with lower degree of information asymmetry.

In this paper, we take the opposite approach to the typical under-diversification studies. Instead of focusing either purely on one countries' investors or on comparison of domestic versus foreign investors' decision making, where foreign investors are grouped together, we test

if portfolio allocation differs among foreign investors investing in one international market, the US. First, we test if foreigners' home country characteristics as well as their information distance from the US lead them to allocate different proportions of capital to the US market. Second, we test if the degree of portfolio diversification varies among the foreigners, where portfolio diversification is measured as the degree of industry concentration. Third, we test if the portfolio diversification by foreigners increases over time as technological advances reduce information barriers. Fourth, we test if the foreign investors' performance is enhanced by industry concentrated holdings.

Van Nieuwerburgh and Veldkamp (2009, 2010) provide a theoretical framework for studying portfolio under-diversification. According to the authors, when investors face a decision between acquiring noisy information about a large set of assets or more precise information about a narrow set of assets, specialization competes with benefits of diversification. Van Nieuwerburgh and Veldkamp's (2009) theory relates information cost to home bias and under-diversification of foreign investments. Following these theoretical predictions, we first hypothesize that the cost of information acquisition among foreign investors differs. For example, geographically and culturally proximate investors may find it easier and cheaper to acquire information about the US securities. This results in a relative information advantage among certain groups of foreign investors and in a relative information disadvantage among other foreign investors. We expect information disadvantage to be related to the degree of under-diversification among foreign investors' portfolios.

Second, we expect that during the time period of our sample, technological advances have reduced information cost to foreign investors. Because of the reduction in information cost and easier access to information, we expect the change in information barriers to be related to change in the degree of under-diversification among foreign investors' portfolios.

Third, we hypothesize that foreign investors who concentrate their holdings outperform diversified foreign investors. We predict that this outperformance is especially pronounced for those foreign investors who also benefit from proximity to the US market. In addition, we test if the foreign investors with industry concentrated holdings and with the largest relative informational disadvantage in the US market outperform industry diversified institutional investors from the same home markets by more compared to the performance differential between industry concentrated and industry diversified investors with the largest relative informational advantage, so that benefits of specialization increase with information immobility.

Empirical results provide support for our predictions. First, we document that foreign institutional investors from countries with informational advantage in the US invest more in the US as a percentage of their total portfolios. Also, investors with informational advantage invest in a more diversified set of securities compared to institutional investors with informational disadvantage, where diversification is measured with respect to industry benchmark portfolios. Second, we document that industry concentration declines during our sample period and the decline is especially pronounced among foreign institutional investors' portfolios. Third, we document that industry concentrated institutional investors outperform diversified institutional investors. This result is consistent with Kacperczyk, Sialm, Zheng's (2005) who document a

similar result among actively managed US mutual funds. In addition, we show that the foreign institutional investors with informational advantage and industry concentrated portfolios have the highest performance in the US, even outperforming US institutional investors by a statistically significant amount.

This paper makes several contributions to the existing literature on international portfolio allocation and under-diversification. First, this paper provides new insight to foreign institutional investors' ownership in US firms. The sample includes a large number of institutional investors from 35 countries with holdings in US securities from 2000 to 2009. Second, we enrich the international diversification literature by showing that investors' information advantage impacts security selection in addition to the total portfolio flows. Third, we show that investors' home country characteristics are related to security selection and performance. Instead of comparing domestic and foreign investors, we show that there are significant differences among foreign investors as well. Fourth, our performance study shows that as information becomes more difficult to obtain for foreign investors, the benefits of specialization become especially important. Industry concentrated foreign institutional investors from countries that are geographically and culturally closest to the US have an edge in US securities.

The rest of the paper is organized in the following way: Section I develops testable hypotheses while reviewing relevant literature, section II discusses data and methodology, section III shows the results, and section IV concludes.

I. Testable Hypotheses and Related Literature

There are two competing theories on how rational investors select securities. One possibility is that portfolio investment abroad is allocated to less correlated securities and markets so that the overall risk of the investment portfolio is reduced. In the traditional portfolio setting, there should be a large amount of diversification in foreigners' US holdings and as a result, the portfolios containing US securities should be mean-variance optimized.

Merton (1987) deviates from the traditional CAPM setting and argues that because of search costs investors focus on the familiar because they believe to know the stock return distribution. Therefore, if search costs are lower for investors from countries that are more familiar with the US, then those investors will have more diversified ownership in the US securities compared to less familiar countries' investors.

Similarly to Merton's theory on optimal, yet under-diversified portfolios, Van Nieuwerburgh and Veldkamp (2010) provide a theoretical model where investors face a decision between acquiring noisy information about a large set of assets, or more precise information about a narrow set of assets, and specialization competes with benefits of diversification. Van Nieuwerburgh and Veldkamp's (2009) theory relates information cost to home bias and under-diversification of foreign investments.

Empirical literature so far has shown that familiarity and perceived information advantage lead to unbalanced portfolios so that investors prefer nearby firms within countries (Coval, Moskowitz 1999). Empirical literature provides support for Merton's and Van Nieuwerburgh and Veldkamp's (2010) argument in international setting as well, because foreign

investors focus their holdings to selected few large, safe, and visible firms (Kang and Stulz 1997; Dahlquist and Robertsson 2001; Ferreira and Matos 2008). At the country level, investors overweight familiar markets compared to unfamiliar markets, perhaps due to higher search costs. Chan, Covrig and Ng, (2005) find that amount of capital allocated by mutual funds to markets around the world depends on investors' familiarity with the foreign markets. Familiarity traits in that study include common language, bilateral trade flows, and geographical proximity between the investor and the target countries.

This study focuses on portfolio allocation by institutional investors in US securities. Our sample contains both domestic and foreign investors. First, consistent with prior findings in Merton's (1987) and Nieuwerburgh and Veldkamp's (2009; 2010) framework, we expect to observe foreign institutional investors from countries with lower information costs in the US to invest a higher amount of their total portfolio in US securities. We formally test the following hypothesis:

> H 1: *Institutional investors from countries with informational advantage in the US invest a higher percentage of their portfolio in US securities.*

Security selection studies that compare domestic investors and foreign investors' preferences conclude that foreign investors prefer large, safe, and internationally visible firms. This finding is consistent with Merton's (1987) and Nieuwerburgh and Veldkamp's (2009; 2010) arguments because it might be true that search costs of foreign investors are higher away from their home markets and therefore investors prefer to focus on the firms about which they can most easily find information. Consistent with the argument about search costs, we expect to

observe differences in behavior among foreigners with respect to security selection. Investors who find it easier to acquire information about US securities realize lower search costs in the US compared to investors who find it harder to acquire information about the US securities. When search costs are lower, investors choose to learn about a larger set of securities and will have more diversified ownership in the US securities compared to investors from countries with high search costs. This leads to the second testable hypothesis:

> H 2: *Institutional investors from countries with lower search costs in the US have more diversified holdings in US securities.*

In this paper, we proxy search cost by geographical distance and cultural closeness. Geographically proximate markets are often followed more by the media, home country's relationship might be more special with nearby countries because of common border, trade union, or monetary union, and trade flows between nearby by countries are higher. All this increases familiarity with geographically proximate markets and this may result in lower search costs. Cultural closeness between an investor's home market and a target market may reduce search costs due to similar reporting requirements, power and control structures, and decision making (Hofstede 1980; Morosini, Shane, and Singh, 1998).

We also expect to observe a decline in search costs over the sample period. With technological advances, information travels faster and more cheaply to foreign markets. In the limit, traders all over the world can access the US market as easily as domestic investors. Due to declining search costs during the internet revolution, we then expect to observe a higher level of diversification in the foreign institutional investors' portfolios towards the end of the sample

period. We also expect to observe the diversification of foreign institutional investors' portfolios to converge to the US institutional investors' portfolios over time. Formally, we test the following hypotheses:

> H 3a: *The diversification of foreign investors' US holdings increases during the sample period.*
>
> H 3b: *The diversification of foreign investors' US holdings converges to the diversification of US investors' US holdings during the sample period.*

Our fourth hypothesis relates portfolio diversification to performance. In this paper, we measure diversification with respect to industries. Kacperczyk, Sialm, Zheng (2005) document a significant performance differential between industry concentrated and industry diversified mutual funds in US securities. The authors' main hypothesis is similar to ours: Investors who concentrate holdings are more likely to outperform a passive index, and that benefit of specialization enhances performance. In our study, foreign investors are expected to benefit from industry concentration of their US holdings. Formally, we test:

> H 4a: *Institutional investors' industry concentration is positively related to abnormal performance.*

In addition, we expect informational advantage, proxied by geographical distance and cultural distance, to enhance performance, consistent with Coval and Moskowitz's (2001) study of geographically concentrated investors in the US market, and more recently Choi, Fedenia, Skiba, and Sokolyk's (2011) study of foreign investors. We expect foreign investors to gain an edge on two dimensions simultaneously, so that both information advantage and industry

concentration enhance performance. As a result, we expect to observe the highest performance by institutional investors with the highest industry concentration in the US securities and by institutional investors whose home markets have the highest information advantage in the US. Formally:

> H 4b: *Abnormal performance is highest in industry concentrated and information advantaged portfolios.*

Finally, we expect industry concentration to improve performance, especially for those investors who are facing the greatest information disadvantage. So, not only do we expect industry concentrated institutional investors to outperform diversified investors, we also expect the performance differential to increase with information disadvantage. Formally, our fourth hypothesis states:

> H 4c: *Abnormal performance differential associated with industry concentration increases with information disadvantage.*

II. Data and Methodology

A. Data

Institutional investors' holdings data are from FactSet. Each of the institutional investors in the dataset can be identified with a unique holders' identifier, and the data include information on each security that the institutional investors hold in their portfolios on quarterly basis from 2000 to 2009. Data also include the institutional investors' domiciles, descriptions of the investment style, the total equity value of the institutional investor in US dollars, turnover, and identifiers for each of the securities held. Our sample includes only institutional investors that

report at least some ownership in the US securities that are listed on NYSE, AMEX, or NASDAQ with share codes 10 and 11 during the 2000 to 2009 period[1]. The total number of institutional investors in the sample that meet the criteria above is 5,029. Of these institutional investors, 3,201 are domiciled in the US. The remaining 1,828 institutional investors are from 59 different countries.

Since this study only focuses on US holdings, we use CRSP and Compustat to obtain exchange data and company-specific information. We also obtain market return information from CRSP. We use FactSet's security data for industry classifications at the two-digit SIC level.

The rest of the explanatory variables are collected from several different sources. International market index returns are from MSCI Barra. GDP, GDP per capita, projected GDP growth, exchange rate data, and inflation data for investor countries are obtained from United States Department of Agriculture.[2] Hofstede scores for investor countries' primary dimensions of culture are obtained from Geert Hofstede's website.[3] Bilateral trade flows are from NBER world trade database maintained by Feenstra.[4] Our familiarity variable, geographical distance, is from Jon Haveman's international trade data source.[5]

[1]CRSP share codes 10 and 11 are those securities that are classified as ordinary common shares (this excludes certificates, ADRs, SBIs, and Units) and securities which have not been further defined or need not be further defined (this excludes companies incorporated outside the US, Americus Trust Components, Closed-end funds, closed-end funds incorporated outside the US, and REITs.
[2]United States Department of Agriculture: http://www.usda.gov/wps/portal/usdahome
[3]Geert Hofstede's dimensions of culture: http://www.geert-hofstede.com/
[4]NBER World trade database: http://www.econ.ucdavis.edu/faculty/fzfeens/
[5]Jon Haveman's International Trade data source: http://www.haveman.org/

B. Methodology

B.1. Measuring Total US Investment

First, we compute the institutional investors' total market values of equity from all the companies' market values (in USD) that the institutional investors hold quarterly from 2000 to 2009. Next, we compute the total US allocation of each institutional investor to all NYSE, NASDAQ, and AMEX securities trading with share codes 10 and 11 in a given year by adding up the reported market values of each of the holdings as reported by FactSet:

$$TOTAL_{USA,j} = \sum_{i=1}^{N} value_i \qquad (1)$$

where $Total_{USA,j}$ is the aggregate value of all institutional investor *j*'s holdings in *N* US securities that are traded on NASDAQ, AMEX, or NYSE with share codes 10 or 11.

B.2. Measuring Industry Concentration

There are several ways to measure portfolio concentration. A diversified institutional investor is not necessarily one that has ownership in the largest number of securities, but one that has diversified ownership across different categories of firms. In a large market such as the US, an investor has substitute firms available along many categories of firms. In this paper, we focus on diversification with respect to industries. The importance of industry diversification has been widely documented in prior literature. First, Roll (1992) suggests that industry structure varies significantly across countries' stock market indexes and, because of that, volatilities vary significantly across markets. A low industry Herfindahl is positively related to high stock

volatility, so that country indexes that are less diversified are also more volatile. Roll also finds that industrial structure explains almost 50% of the volatility, so that countries with similar industry structures tend to be highly correlated.

Some authors find a recent trend that industry diversification is increasing in importance over country diversification. For example, Bai and Green (2010) study country and industry effects in determining cross-sectional variation in security risks. The authors find that industry effects in diversification began dominating country effects of diversification in emerging market securities from the late 1990s, coinciding with several liberalization events that took place during that time. Similarly, Moerman (2008) shows that diversification across industries yields superior results in the Eurozone after 1999, coinciding with the birth of the monetary union. Ehling and Ramos (2006) compare the benefits of two diversification strategies – geographic diversification and industry diversification – and find that both the strategies are statistically equivalent in most scenarios.

Our hypotheses are developed based on the idea of costly search, and thus becoming an expert in few industries is one way for smaller, information disadvantaged investors to compete. Some prior studies establish a link between information availability and industry concentration. Levy and Livingston (1995) show that fund managers with superior information hold concentrated portfolios. In addition, Van Nieuwerburgh and Veldkamp (2010) document that in the presence of costly information, benefits of diversification compete with the benefits of specialization and that optimal portfolios may be under-diversified. Since there are barriers to

learning, especially when moving from one industry to another, we expect to observe actively managed portfolios to be industry concentrated.

We construct several industry concentration measures, and all of our analyses are replicated with these measures, although not always reported. The idea is to measure institutional investors' average under- and overweighting of industry benchmark portfolios. Our first measure aggregates institutional investors' deviations from their expected industry benchmarks. First, the expected allocation to each industry benchmark portfolio is the total share of market values of all securities that belong to the benchmark portfolio as a percent of the total US market capitalization:

$$Exp_p = \frac{\sum_{i=1}^{p} MV_i}{\sum_{i=1}^{N} MV_i} \qquad (2)$$

where the Exp_p is each of the benchmark portfolio p's shares of the total US market capitalization, or the total market value of the N securities in the NASDAQ, AMEX, and NYSE trading with share codes 10 or 11. The actual allocation to each benchmark portfolio by the investor is calculated as a share of capital in each portfolio as a portion of the institutional investor's total US investment:

$$Act_{p,j} = \frac{\sum_{i=1}^{p} value_{i,j}}{Total_{USA,j}} \qquad (3)$$

where institutional investor j's actual investment, $Act_{p,j}$, to each portfolio p is the total value of securities that the institutional investor j holds in portfolio p as a share of institutional investor j's

US holdings. The benchmark portfolios are constructed using FactSet's industry classifications that are the same as two-digit SIC codes.

Next, we calculate the institutional investor's deviation from the expected allocation from each of the benchmark portfolios:

$$BIAS_{p,j} = Act_{p,j} - Exp_p \tag{4}$$

where $BIAS_{p,j}$ is the difference between institutional investor j's actual allocation to portfolio p and expected investment to portfolio p. Finally, we generate a concentration measure based on the biases computed for each of the benchmark portfolios:

$$concentration_j = \frac{\sum_{p=1}^{P} \left| BIAS_{p,j} \right|}{2} \tag{5}$$

where $concentration_j$ is the summation of absolute values of the biases in each of the benchmark portfolios. The interpretation of the concentration measure is that an institutional investor that is fully diversified in the industry benchmark portfolios will have a *concentration* measure of zero. The *concentration* measure is a percentage value that shows what percent of the institutional investor's portfolio should be reallocated to achieve full diversification.

Our second measure of industry concentration used as a robustness check throughout the paper is from Kacperczyk, Sialm, Zheng (2005). It is similar to equation 5:

$$ICI_j = \sum_{p=1}^{P} BIAS_{p,j}^2 \tag{6}$$

where ICI_j is each institutional investor's deviation from market portfolio's industry composition. This measure assigns more weight to relatively large deviations from the fully diversified benchmark portfolio. We also compute the Herfindahl index and Gini index for each institutional investor and use the results as a robustness check in our analyses. ICI, Herfindahl index and Gini index are especially highly correlated (correlation coefficient >0.9).

<<<insert table I here>>>

Table I shows the most under-weighted and over-weighted US industries in foreign investors' portfolios in 2000 and 2009 (panel A and panel B respectively). The bias is computed as the actual allocation to each industry as a percent of institutional investors' US portfolio minus the expected allocation, as per equation 4. We also show the dollar amount invested in each industry by foreigners. The last two columns show the average industry bias and market value of US institutional investors' in each industry.

According to panel A of table I, the most over-weighted industry in foreign institutional investors' portfolios in 2000 was Telecommunications (8.3% over-weight), followed by Industrial Conglomerates (2.8% over-weight) and Biotechnology (2.3% over-weight). The most under-weighted industries in 2000 were Media Conglomerates, Computer Communications, and Discount Stores (with 2.4%, 1.6% and 1.6% under-weights respectively). In 2009, the ranking is very different compared with 2000. The most over-weighted industries by foreigners include: Pharmaceuticals, Food: Major Diversified, and Packaged Software, each with about 1.2% over-weight. The most under-weighted industries are Major Banks, Integrated Oil, and Oil and Gas Pipelines (3.1%, 1.4% and 1.2% under-weights respectively). Table I also reveals that US

institutional investors' average weight seems to be different in the industries that the foreigners' over-weight in both 2000 and 2009: US institutional investors are not heavily over-weighting the same industries. However, on the downside, both the US and foreign institutional investors are heavily under-weighting the same, perhaps out-of-favor or poorly performing industries.

<<<insert table II here>>>

Table II provides more summary statistics on our sample of institutional investors based on their home market averages. Columns 1 and 2 show the country average investment in the US based on institutional investors' portfolio holdings in US securities, measured as per equation 1, both as a share of the institutional investors' total portfolio and as a share of institutional investors' foreign portfolio. The last four columns show the country average industry concentration measures from equations 5 and 6 as well as the Herfindahl and Gini indexes. The countries in table II are ranked according to their total US holdings as a percent of total portfolio from smallest to largest. There exists large heterogeneity in the amount of US investment across countries. The highest percent invested in US securities is by US institutional investors, (65%), followed by Brazil (37.5%), Ireland (31.6%), Netherlands (25.0%), and the UK (23.8%). The lowest US percentage is in institutional investors from Thailand (0.3%), India (0.6%), and Poland (0.7%). The industry concentration measure from equation 5 ranges from the low of 44.2% (Thailand) to a high of 99.5% (Mexico). As a comparison, the US institutional investors' average industry concentration measure is 62.6%, so that 62.6% of the holdings would have to be reallocated to achieve perfect diversification. The other industry concentration measures exhibit different magnitudes than equation 5's measure, but the rank orders are similar within our

sample. In particular, the lowest measures based on equation 5 are also lowest based on equation 6, Herfindahl and Gini indexes.

B.3. Information Advantage Proxies and Other Control Variables

In our regression analyses, the independent variables of interest include information advantage proxies. We also include some macroeconomic and security market controls. Information advantage is proxied by geographical distance and cultural distance. Geographical distance is calculated as the logarithm of distance in miles between capital cities. Cultural distance between the investor country and the US is measured by an index due to Kogut and Singh (1988), based on Hofstede's primary dimensions of culture. The index is constructed in the following way:

$$CD_J = \sum_{n=1}^{N} \left(\frac{C_{n,J} - C_{n,I}}{V_n} \right) / N \qquad (7)$$

where CD_J is the cultural distance of investor country J from target country I. $C_{n,I}$ is the index for the n^{th} cultural dimension of country I, V_n is the variance of the n^{th} index, and $C_{n,J}$ is the index for the n^{th} cultural dimension of country J.

Geert Hofstede's *Culture Consequences* (1980, 2001) establishes five primary dimensions of culture. These dimensions have been widely used in business and economics research, and Hofstede's study is one of the most cited works in the Social Science Citations Index. Hofstede's survey-based measures categorize culture as:

1. *Uncertainty avoidance* deals with a society's tolerance for uncertainty and ambiguity.

2. *Individualism* is the degree to which individuals are integrated into groups.
3. *Power distance* is the extent to which less powerful members of organizations and institutional investors accept and expect that power is distributed unequally.
4. *Masculinity* refers to the distribution of roles between the genders.
5. *Long-term orientation* relates to values of thrift and perseverance.

The topic of culture and finance is still new, and only a few papers have studied how cross-cultural differences impact investment decisions. Grinblatt and Keloharju (2001) document that investors prefer firms with CEOs from the same ethnic background. Anderson, Fedenia, Hirschey, and Skiba (2010) show that investor countries' cultural traits are significant determinants of home bias and global diversification. Beugelsdijk and Frijns (2010) find that culture and cultural distance play an important role in explaining foreign bias in portfolio allocations. Choi, Fedenia, Skiba, and Sokolyk (2011) show that cultural distance is related to investors' performance in a foreign market.

The rest of the control variables include macroeconomic and security market controls. The signs of some variables are not clear ex ante, and some are included primarily to ensure that our other independent variables are not correlated with an omitted macroeconomic characteristic of investor countries. We include the real exchange rate differential between the investor and the US from the prior three years. We include a measure of market correlation between the investor's securities market and that of the US, measured over the prior three year period. We also include a portfolio size as a control variable. Portfolio size is the total value of institutional investors' equity. In the diversification analyses we also control for institutional investors' total US investment; due to economies of scale, we expect larger institutional investors' search costs

to be lower on average, which may lead to more diversification. Similarly, we expect institutional investors with large amounts of US investment to have higher economies of scale when investing in US securities.

B.4. Measuring Performance

In our performance analysis, we are interested in measuring institutional investors' performance in the US securities, which comprise only a subset of each institutional investor's total portfolio. We have data on institutional investors' quarterly holdings of the US securities and we compute quarterly returns based on the end of quarter holdings returns in the following three months. Specifically, we first compute the value weighted return to each institutional investor's US security holdings on a quarterly basis and benchmark the portfolio performance of the US share in calendar time using the Carhart 4-factor model. We compute the quarterly performance for each institutional investor's portfolio of US stocks as a value-weighted average return to US stocks in the following three months that each institutional investor holds at the end of each quarter as:

$$\mathrm{R}_{j,t} = \sum_{i=1}^{I} w_{i,j,t} \times \mathrm{R}_{i,t} \qquad (8)$$

where $R_{j,t}$ is the value weighted return to I US securities that institutional investor j holds at the end of quarter t. $w_{i,j,t}$ is the market value weight of security i in institutional investor j's portfolio at the end of quarter t as a share of the market value of all institutional investor j's US holdings,

and $R_{i,t}$ is the quarterly return to security *i,* computed based on its three month split-adjusted return following quarter *t*:

$$R_{i,t} = \prod_{n=t+1}^{t+3} (1 + R_{n,i}) - 1 \qquad (9)$$

Once we obtain raw returns for each institutional investor's US securities, we compute calendar time abnormal returns for the US portfolios. The abnormal return is the alpha from the regression where the dependent variable is the institutional investor's quarterly return to US securities from equation (5) in excess of the risk free rate, and the dependent variables include the market premium, Fama-French risk factors *SMB* and *HML*, and Carhart's momentum factor *MOM.*

$$R_{j,t} - R_{f,t} = \alpha_j + \beta_j (R_{MKT,t} - R_f) + \lambda_j (SMB_t) + \gamma_j (HML_t) + \theta_j (MOM_t) + \varepsilon_j \qquad (10)$$

III. Results

A. US Investment by Foreign Institutional Investors

First, we test for the determinants of total US allocation by foreign institutional investors. We test what determines the total allocation to the US as a percent of institutional investors' portfolio, as well as the US allocation as a percent of institutional investors' total international portfolio. According to hypothesis 1, we expect institutional investors with information advantage, proxied by geographical and cultural distance, to invest a higher percent of their

portfolio in the US and also over-weight the US market as a share of their international portfolios.

<<<insert table III here>>>

Table III shows results from OLS regressions where the dependent variable is the total US allocation by each institutional investor as a percent of their total portfolio (specifications 1-3) or as a percent of their foreign portfolio (specifications 4-6). Results are consistent with hypothesis 1, so that institutional investors from culturally distant countries invest a smaller portion of their total portfolio in the US. Cultural distance is significant or marginally significant in all specifications and large in magnitude. A one-standard-deviation increase in cultural distance corresponds to roughly 2.7%-3.2% decrease in US investment as a share of total portfolio or as a share of foreign portfolio. Geographical distance is not significant in most specifications, opposite to our prediction, even when it is included without cultural distance. Also, market correlation is not significant. Institutional investors' size is significantly negative in all specifications, so that larger investors invest less in the US.

B. Industry Concentration in the US Market by Foreign Institutional Investors

Next, we test hypothesis 2 on how information advantage affects diversification. According to hypothesis 2, we expect institutional investors with information disadvantage, proxied by home markets' geographical and cultural distance from the US, to diversify less across industries compared to institutional investors with information advantage in the US market. Table IV shows the results from OLS and TOBIT regressions where the dependent

variables include several industry concentration measures for institutional investors' US holdings or deviations from industry benchmark portfolios. In panel A, we compute the industry concentration measure based on equation 5, or the percentage of foreign institutional investors' portfolio that should be reallocated for perfect diversification. In panel B, the dependent variables include the industry concentration based on Gini index, ICI measure, and Herfindahl (HHI) index. The first set of independent variables includes proxies for information advantage between the investor and the US: geographical distance and cultural distance between the investor's home country and the US (measured by equation 7). Independent variables also include a logarithm of investors' market value of equity, percent of the institutional investor's holdings in US securities, in some specifications the predicted allocation to US securities estimated in table III, real exchange rate differential, market correlation between the investor and the US, logarithms of an investor's home market's GDP per capita, and GDP.

<<<insert table IV here>>>

Overall, the results provide support for hypothesis 2. Institutional investors from geographically distant countries are significantly less diversified across industries. Geographical distance is thus positive and significant in all but one specification in panel A. Given the strong result for geographical distance, it is surprising that cultural distance is not significant in many of the specifications in panel A, even when cultural distance is included without the geographical distance. Not surprisingly, investors' size is negative and significant in all specifications, so that larger portfolios, although investing less in the US, are more diversified across all benchmark portfolios. This finding is predicted by the economies of scale argument, such that large

institutional investors and institutional investors with larger amounts of US holdings realize lower search costs on average and are therefore able to invest in a larger set of securities.

The results in panel B provide more support for hypothesis 2. The results are even more robust in panel B, where the dependent variables include the ICI measure from equation 6 in specifications 1-2, Herfindahl in specifications 3-4, and Gini in specifications 5-6. Both geographical and cultural distances are positive and significant in all specifications. The magnitude of the coefficients is also large. A one-standard-deviation increase in geographical distance corresponds to about 2.9% increase in industry concentration measure from equation 5. A one standard deviation increase in geographical distance corresponds to about 4.5% increase in the rest of the industry concentration measures in panel B. One standard deviation increase in cultural distance corresponds to 2.9-3.4% increase in the industry concentration measures in panel B.

C. Change in Industry Concentration

Next, we investigate the change in US and foreign institutional investors' industry concentration over the sample period. Hypothesis 3 a states that due to technological advances, the industry diversification by foreign institutional investors increases over time as information becomes easier and faster to access. Hypothesis 3 b states that because of technological advances foreign institutional investors' portfolio diversification is converging to US institutional investors' portfolio diversification. We test hypothesis 3 a and b with a series of panel regressions. The dependent variable in these analyses is the institutional investors' industry

concentration in a given quarter from 4:1999 to 4:2009. The independent variables include either the time dimension of the panel variable or the common trend, so that the earliest date is equal to one and the last date is equal to 41. In some specifications, we also include interaction terms between the time dimension and geographical or cultural distance to test whether the increase in industry diversification has been more significant in culturally and geographically distant markets.

<<<insert table V here>>>

Table V shows results from the panel regressions. First, the results show that both the *Date* variable, which is the time dimension of the panel, and the common *trend* are negative and significant in specifications that include US institutional investors (specifications 1-2) and foreign institutional investors (specifications 3-4). This finding supports hypothesis 3 a, so that the industry concentration is declining during the sample period in the portfolios of foreign institutional investors and also in the portfolios of US institutional investors. The magnitude of the decline in foreign institutional investors' portfolios is also higher compared to the US institutional investors. However, when we include the interaction terms between time and information proxies in specifications 5-7, we do not find that the decline is higher in information disadvantaged markets, as none of the terms are significant in these analyses. So, overall, the industry concentration declines over time and the speed of decline is faster in the foreign institutional investors' portfolios. Nevertheless, we cannot conclude that informationally disadvantaged investors would have benefited from the change in information environment by more. Instead, the trend has been similar to all foreign investors.

In fact, the rate of decline in foreign institutional investors' industry concentration is so large in magnitude that we test whether the foreign institutional investors' industry concentration is converging to the US institutional investors' industry concentration. Specification 8 of table 5 sheds more light on this question. The trend variable remains negative when we include an interaction term with foreign investor indicator variable and the common trend. Consistent with hypothesis 3 b, the result suggests that the industry concentrations of foreign and US institutional investors are indeed converging, as we should expect if technological change has reduced the asymmetry of information between foreign and domestic investors. Finally, figure 1 shows the effect of the time dimension of the panel on industry concentration in a sample of foreign institutional investors (panel A) and US institutional investors (in panel B). The *Date* variable's estimated coefficients are declining in both panels that are drawn to the same scale, but the effect of *Date* is clearly larger on the foreign institutional investors' industry concentration measure compared to the US institutional investors' industry concentration.

<<<insert figure 1 here>>>

D. Performance and Industry Concentration

We begin the performance analysis and testing of hypotheses 4 a, b, and c with portfolio approach. In this portfolio approach, similar to Kacperczyk, Sialm, Zheng's (2005), we sort the foreign institutional investors into industry concentration quintiles to test hypothesis 4 a.[6] According to 4 a, we expect to observe higher abnormal performance in industry concentrated

[6] Kacperczyk, Sialm, Zheng's (2005) sort the investors in their analyses into deciles, but to keep the number of investors in each portfolio sufficiently high, we limit ourselves to quintiles.

quintiles compared to industry diversified quintiles. In addition, we sort the investors into quintiles based on the information advantage proxies cultural and geographical distance. By sorting the institutional investors into 25 portfolios based on industry concentration and information proxies, we can also test hypotheses 4 b and 4 c. According to 4 b, we expect to observe the highest abnormal performance in portfolios that are both industry concentrated and information advantaged. According to hypothesis 4 c, we expect the performance differential between industry concentrated and industry diversified portfolios to monotonically increase from the most to the least information advantaged quintiles. In panel A of table VI, we divide the sample into 25 portfolios based on geographical distance between institutional investors' home country and the US and based on the industry concentration of institutional investors' US holdings (from equation 5). Panel B of table VI repeats the analysis while using cultural distance as a proxy for information. The portfolio returns are computed on quarterly basis. First, we compute each institutional investor's value-weighted performance of its US holdings from time t+1 to t+3 of those stocks that the institutional investor holds in time t (see equation 9). After the institutional investors are sorted into the 25 portfolios, each portfolio's performance is the equally weighted average of the institutional investors' excess returns that belong to that portfolio. The reported figures in all panels are the Carhart 4-factor alphas from equation 10.

<<<insert table VI here>>>

In both panels A and B of table VI, industry concentrated institutional investors outperform all other institutional investors, consistent with Kacperczyk, Sialm, and Zheng (2005). The industry concentrated foreign institutional investors outperform the diversified

foreign institutional investors across geographical (panel A) and cultural (panel B) distance portfolios. The difference in alphas from the most to the least industry concentrated portfolios is always positive. The finding in the table supports hypotheses 4 a and 4 b. Industry concentrated institutional investors outperform diversified institutional investors. Also, the abnormal performance is the highest and the most significant in portfolios that are both industry concentrated and geographically (and culturally) closer to the US. These portfolios actually outperform US portfolios as well. Although the result that foreign industry concentrated institutional investors outperform even the US institutional investors is surprising, it does not necessarily contradict existing evidence. Most performance studies conducted in the literature find evidence that domestic investors outperform foreign investors. However, in these studies the foreigners are grouped together. In aggregate our results would be consistent with this finding as well. Also, it is possible that foreign institutional investors on average are a more sophisticated group compared to the US investors. Our sample includes all institutional investors that hold US securities, which includes almost 100% of the US institutional investors but only a small set of foreign investors, who are all investing in the global environment.

According to table VI, we do not find evidence supporting hypothesis 4 c, that the performance differential between concentrated and diversified investors increases with information disadvantage. It seems based on the results in panel A and B that the industry diversified institutional investors roughly match market performance and the industry concentrated institutional investors with information disadvantage do not outperform the market. On the other hand, in portfolios that contain institutional investors with information advantage,

the industry diversified institutional investors, not surprisingly, about match market performance, but now the industry concentrated institutional investors are able to outperform the market.

To test if table VI's result is capturing a pattern that geographically and culturally nearby investors may just be investors with more holdings and weight in the US market, and therefore larger economies of scale in US securities, we form 25 portfolios that are first sorted based on industry concentration and based on US portfolio weight. Table VI's panel C shows the results of this analysis. There is no evidence in panel C supporting the alternative explanation that US weight positively correlates with performance. Institutional investors with high US weight do not exhibit greater performance in industry concentrated portfolios. In fact, the institutional investors with larger US weight do worse in most industry concentration quintiles. The only exception is the quintile that contains the most US focused portfolios where the most industry concentrated portfolio outperforms the least industry concentrated portfolio by a significant amount. Otherwise the performance differentials are not significant and this strengthens our conclusions from the results in panels A and B.

Table VII shows results from OLS regressions that test for determinants of institutional investors' abnormal performance in US securities from 1999:4 to 2010:1. Abnormal return is the Carhart 4-factor regression alpha for each institutional investor. In panels A and B, we first test for the determinants of performance with institutional investor level variables. The independent variables include our main variable of interest, the industry concentration measure from equation 5 or the alternative industry concentration measures, institutional investors' weight of the US securities as a share of their total portfolio value, institutional investors' total market value, and

an interaction term between the industry concentration measure and the US weight. In panel A, we include the foreign institutional investors and in panel B, we repeat the analysis in a sample of US institutional investors.

The results in table VII support hypothesis 4 a. Industry concentration is positive and significant in all regressions of foreign institutional investors and US institutional investors, so that industry concentrated institutional investors outperform the industry diversified institutional investors. The economic significance of industry concentration measure is quite large in both panels A and B. Across specifications, a one-standard-deviation increase in the industry concentration measure corresponds to about 0.6% increase in the quarterly alpha of foreign institutional investors and 0.3% increase in the quarterly alpha of US institutional investors. So interestingly, industry concentration enhances foreign institutional investors' performance more than US institutional investors' performance. Specifications 5 in panels A and B that include the interaction term show that the positive effect of industry concentration on performance declines with US weight. Other independent variables mostly have their predicted signs. Portfolio size has a positive and significant sign in most of the specifications, contrary to what we expect.

In panel C of table VII, we test for the determinants of foreign institutional investors' abnormal performance with both institutional investor controls that include the industry concentration measure, and also investors' home country and home country-US control variables. The home country-US controls include our proxies for information advantage. Panel C's results provide further support for hypotheses 4 a and 4 b. First, the industry concentration measure is positive and significant in all specifications. Cultural distance and geographical

distance both have a negative effect on abnormal performance, consistent with prior literature (Choi, Fedenia, Skiba and Sokolyk 2011). Second, the coefficient of the interaction term in specifications 4 and 5 is negative. The net effect of industry concentration is positive, but the positive effect declines as geographical distance and cultural distance increase. The decline is more significant with respect to geographical distance. This finding supports hypothesis 4 b, that investors' performance increases with industry concentration and information advantage, when information advantage is proxied by geographical and cultural distance. The other explanatory variables mostly have their predicted signs. Portfolio size continues to be positive, contrary to prior literature's findings. Also market correlation is not significant.

Overall, the results of the performance studies provide support for hypotheses 4 a and b, but not for 4 c. Industry concentration enhances foreign investors' performance. Investors with both industry concentrated portfolios and who are located in markets with information advantage in the US outperform other investors. However, we do not find that industry concentration is especially beneficial for information disadvantaged investors; rather, industry diversified institutional investors roughly match market performance and the industry concentrated institutional investors with information disadvantage do not outperform the market.

IV. Conclusion

The literature on international portfolio allocation has established that familiarity and cultural traits, which may be related to investors' information cost, affect investors' decision making processes. Most studies in this literature have been limited to comparison between

domestic versus foreign investors' behaviour in security selection. This paper enriches that knowledge by showing that information cost also affects security selection among foreign countries, so that international institutional investors with information disadvantage in one foreign market, the US, tend to invest in a different set of securities than institutional investors from countries with an information advantage.

We proxy investors' information advantage in the US market by geographical and cultural distances between the investors' home market and the US. The results show that foreign institutional investors from geographically and culturally distant markets invest less in the US, and the amount that is invested in the US is less diversified with respect to benchmark portfolios formed according to securities' industry. We also document that the diversification increases over time as information becomes cheaper and easier to access. Our results provide support for Merton's (1987) theory of under-diversification due to search costs and for Van Nieuwerburgh and Veldkamp's (2009; 2010) theories about costly information and investors' specialization in a narrower set of securities. In the prior literature these theories have been used to explain home bias, overweighting of familiar international markets, and preference for large visible firms by foreign investors. We expand this theory to apply also to diversification decisions within a country.

Finally, we show that performance is significantly related to industry concentration among foreign institutional investors. Industry concentrated foreign institutional investors outperform their diversified counterparts. The economic magnitude of this effect is actually larger for foreign investors than for US institutional investors. The performance differential is

especially large among foreign investors that benefit from both industry concentration and information advantage.

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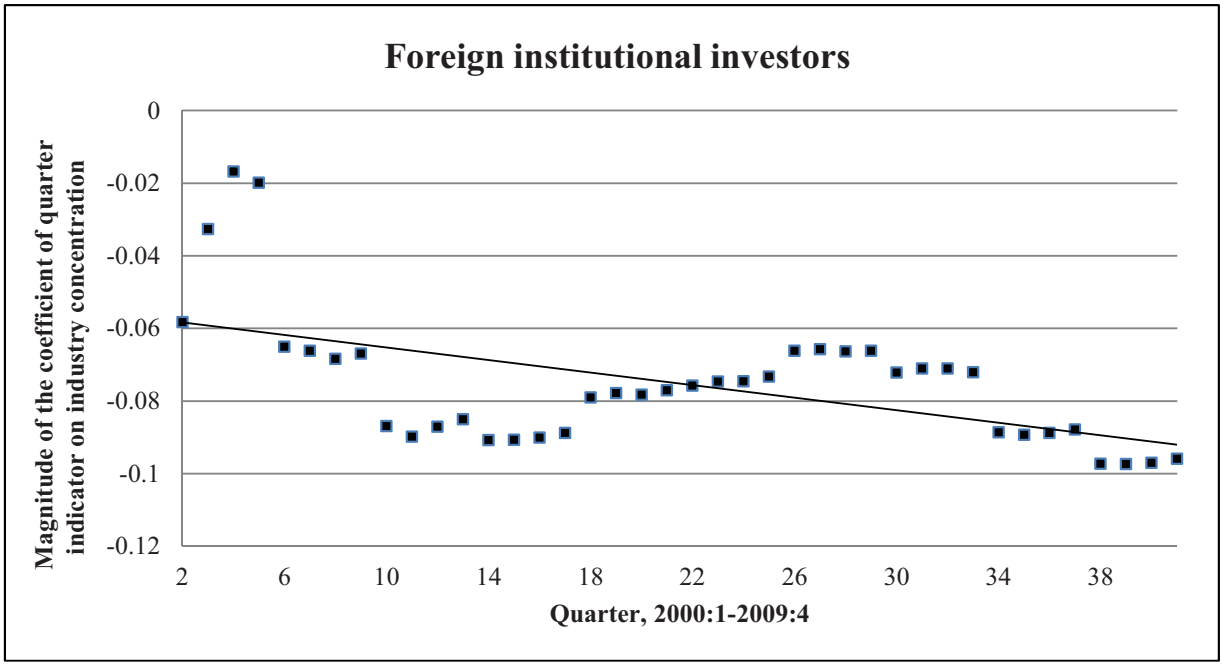
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Figure 1. Change in industry concentration

Figures 1 shows the magnitude of the coefficient *Date* on industry concentration in a sample of foreign institutional investors in panel A, and in a sample of US institutional investors in panel B. The plotted coefficients are from panel regressions, where the dependent variable is each institutional investors' quarterly industry concentration and the *Date* contains the time dimension of the panel variable. The quarterly observations are from 4:1999 to 4:2009, so that on the figures, the first quarter with available estimate is 1:2000. The figures are drawn on same scale and the trend line is also shown in both figures.

Panel A



Panel B

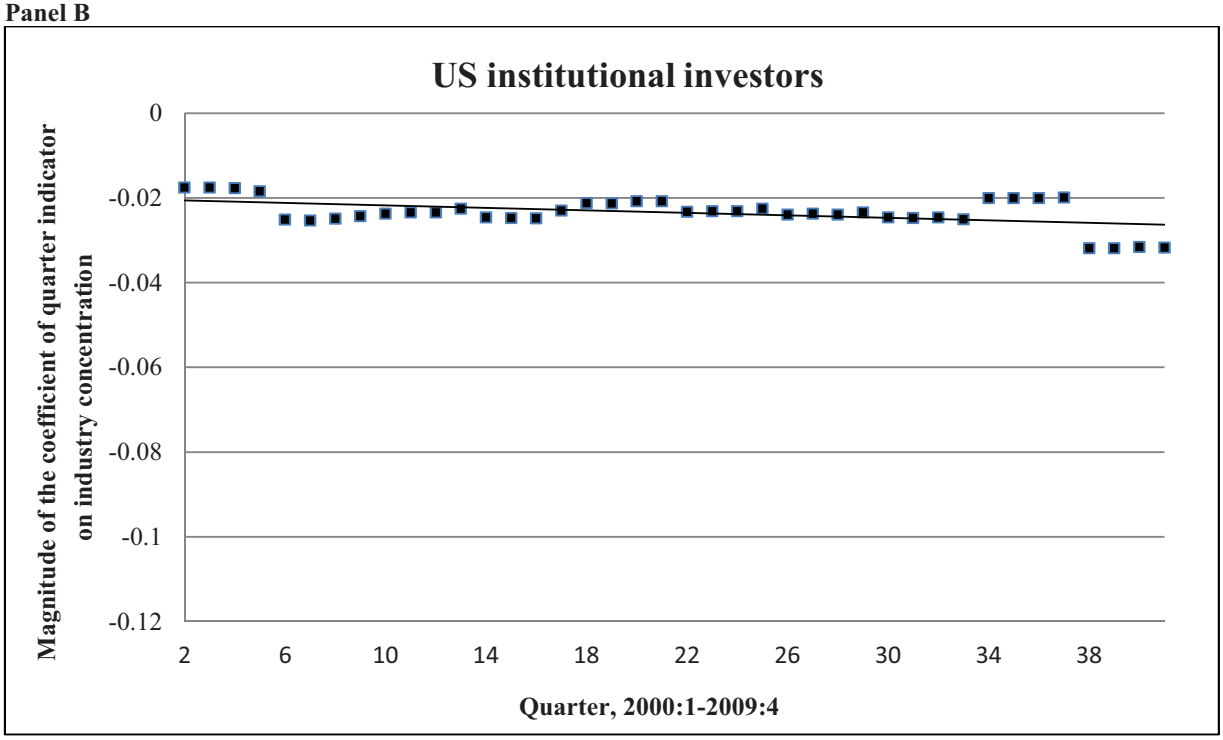


Table I. Average industry under- and over-weight in 2000 and 2009

Table I shows the most under-weighted and over-weighted US industries in foreign investors' portfolios in 2000 and 2009 (panel A and panel B respectively). Expected allocation is computed as the percent of industry's market value in the year-end of 2000 and 2009. The bias is computed as the actual allocation to each industry as a percent of institutional investors' US portfolio minus the expected allocation (equation 4). We also show the dollar amount invested in each industry by the foreigners. In the last two columns we show the average industry bias of US investors in each of the industries as well and the US institutional investors' market value in each industry.

Panel A: Most under- and over-weighted industries by foreign institutional investors, 2000

Industry	Expected Weight	Bias, Foreign	Market value invested, Foreign	Bias, US	Market value invested, US
Most over-weighted					
Major Telecommunications	0.03073	0.08278	7,718	0.00879	246,800
Industrial Conglomerates	0.05966	0.02785	8,830	-0.01110	258,200
Biotechnology	0.01416	0.02290	5,259	0.00709	85,870
Financial Conglomerates	0.04151	0.02075	8,096	-0.00331	232,600
Pharmaceuticals: Major	0.08131	0.01810	16,820	-0.00300	495,900
Telecommunications Equipment	0.01599	0.01396	2,514	0.00389	84,360
Internet Software/Services	0.00889	0.01311	697	-0.00338	22,430
Electronic Components	0.01052	0.01026	1,291	0.00008	53,030
Medical Specialties	0.01433	0.00704	3,405	0.00819	97,330
Beverages: Alcoholic	0.00070	0.00551	103	-0.00026	1,682
Investment Trusts/Mutual Funds	0.00027	0.00471	1	-0.00023	36
Information Technology Services	0.01581	0.00409	2,941	0.00139	91,580
Computer Peripherals	0.01396	0.00348	3,010	0.00312	89,270
Finance/Rental/Leasing	0.00352	0.00269	1,615	0.00714	34,180
Managed Health Care	0.00249	0.00262	720	0.00339	37,990
Miscellaneous Commercial Services	0.00202	0.00237	135	0.00292	11,290
Electronics/Appliance Stores	0.00141	0.00197	132	-0.00032	6,772
Pulp & Paper	0.00202	0.00160	262	-0.00059	10,150
Tobacco	0.00864	0.00156	2,657	-0.00266	42,800
Precious Metals	0.00134	0.00093	334	-0.00028	3,477
Drugstore Chains	0.00489	0.00086	1,381	0.00534	41,770
Forest Products	0.00107	0.00069	204	-0.00011	5,426
Food Distributors	0.00124	0.00050	631	0.00184	10,990
Tools & Hardware	0.00043	0.00043	187	0.00120	4,878
Metal Fabrication	0.00048	0.00036	25	0.00089	2,471
Most under-weighted					
Aerospace & Defense	0.01061	-0.00317	1,748	0.00172	59,600
Specialty Telecommunications	0.01078	-0.00325	1,557	-0.00260	52,130
Movies/Entertainment	0.00363	-0.00358	8	-0.00292	900
Chemicals: Major Diversified	0.00712	-0.00393	907	0.00031	41,770
Gas Distributors	0.00447	-0.00410	110	-0.00085	12,350
Apparel/Footwear Retail	0.00603	-0.00417	447	0.00068	26,080
Data Processing Services	0.00640	-0.00435	661	0.00345	39,590
Home Improvement Chains	0.01160	-0.00454	1,609	-0.00060	56,460
Oilfield Services/Equipment	0.00915	-0.00521	1,000	-0.00227	34,590
Multi-Line Insurance	0.01982	-0.00528	3,466	0.00147	128,800
Air Freight/Couriers	0.00737	-0.00557	407	-0.00514	8,043
Electric Utilities	0.02567	-0.00568	3,313	-0.00500	120,200
Life/Health Insurance	0.00828	-0.00594	610	-0.00054	30,650
Semiconductors	0.04611	-0.00608	8,103	-0.00613	221,800
Real Estate Investment Trusts	0.00612	-0.00612	1	-0.00585	739
Packaged Software	0.05262	-0.00641	6,499	-0.02485	169,000
Beverages: Non-Alcoholic	0.01940	-0.00722	3,255	-0.00157	116,200
Electronic Equipment/Instruments	0.01296	-0.00726	1,081	-0.00217	41,820
Cable/Satellite TV	0.00863	-0.00787	211	-0.00659	8,534
Computer Processing Hardware	0.01444	-0.00806	835	-0.01108	20,780
Integrated Oil	0.03442	-0.01447	4,545	-0.00884	146,700
Major Banks	0.03651	-0.01531	4,691	-0.00078	180,300
Discount Stores	0.02724	-0.01559	2,796	-0.01294	94,710
Computer Communications	0.04626	-0.01623	4,613	-0.02534	151,900
Media Conglomerates	0.02733	-0.02387	742	-0.02254	23,650

Panel B: Most under- and over-weighted industries by foreign institutional investors, 2009

Industry	Expected Weight	Bias, Foreign	Market value invested, Foreign	Bias, US	Market value invested, US
Most over-weighted					
Pharmaceuticals: Major	0.04680	0.01227	49,250	-0.00675	333,500
Food: Major Diversified	0.01006	0.01220	10,030	-0.00180	75,690
Packaged Software	0.03507	0.01171	38,870	-0.00267	300,000
Precious Metals	0.01600	0.01017	8,125	-0.00888	39,370
Beverages: Alcoholic	0.00176	0.01001	2,201	-0.00006	9,701
Investment Banks/Brokers	0.00354	0.00993	16,070	0.01066	138,200
Internet Software/Services	0.02149	0.00983	15,730	-0.00203	153,500
Property/Casualty Insurance	0.00476	0.00903	9,920	0.01151	90,970
Industrial Conglomerates	0.02876	0.00779	23,260	-0.00577	169,500
Computer Processing Hardware	0.02369	0.00742	27,270	-0.00252	211,400
Biotechnology	0.01988	0.00716	23,070	0.00489	182,500
Auto Parts: OEM	0.00365	0.00576	2,333	0.00090	27,040
Finance/Rental/Leasing	0.00462	0.00574	9,621	0.00987	102,100
Managed Health Care	0.00176	0.00523	8,108	0.00548	77,160
Financial Conglomerates	0.02113	0.00460	27,300	-0.00375	178,100
Computer Communications	0.01241	0.00439	14,990	0.00051	106,400
Oil Refining/Marketing	0.00167	0.00319	1,349	0.00005	10,240
Beverages: Non-Alcoholic	0.01907	0.00315	17,590	-0.00164	139,500
Life/Health Insurance	0.00262	0.00308	6,593	0.00417	51,330
Investment Managers	0.00301	0.00307	5,642	0.00486	59,170
Aluminum	0.00138	0.00296	1,659	0.00018	9,329
Household/Personal Care	0.02023	0.00244	22,190	0.00285	152,300
Electronic Equipment/Instruments	0.00330	0.00220	3,218	0.00409	33,240
Services to the Health Industry	0.00895	0.00218	8,089	0.00337	81,970
Coal	0.00353	0.00217	4,373	0.00090	28,860
Most under-weighted					
Hotels/Resorts/Cruiselines	0.00469	-0.00187	1,410	0.00018	18,900
Containers/Packaging	0.00328	-0.00188	2,000	0.00081	29,240
Internet Retail	0.00515	-0.00191	5,060	-0.00171	37,060
Real Estate Investment Trusts	0.00222	-0.00203	7	-0.00076	377
Savings Banks	0.00376	-0.00217	1,780	0.00252	22,140
Wireless Telecommunications	0.00397	-0.00219	1,313	0.00051	14,950
Miscellaneous Commercial Services	0.00509	-0.00240	3,537	0.00718	61,580
Financial Publishing/Services	0.00471	-0.00243	2,812	-0.00165	25,570
Information Technology Services	0.02129	-0.00269	15,620	-0.00298	127,100
Gas Distributors	0.00743	-0.00420	3,889	-0.00144	47,050
Railroads	0.00862	-0.00422	6,439	-0.00348	49,010
Oil & Gas Production	0.03776	-0.00427	28,570	-0.00336	248,600
Medical Specialties	0.02874	-0.00464	22,800	0.00353	210,400
Air Freight/Couriers	0.00815	-0.00522	3,251	-0.00448	34,300
Cable/Satellite TV	0.00998	-0.00565	8,522	-0.00328	70,900
Oilfield Services/Equipment	0.01648	-0.00594	9,070	-0.00607	86,870
Regional Banks	0.01009	-0.00634	5,143	0.00453	80,760
Aerospace & Defense	0.01733	-0.00765	11,450	-0.00152	127,100
Telecommunications Equipment	0.01441	-0.00801	6,573	-0.00398	80,710
Major Telecommunications	0.02347	-0.00802	17,780	-0.01000	127,900
Discount Stores	0.02266	-0.00979	13,030	-0.00846	124,000
Electric Utilities	0.02833	-0.01031	24,930	-0.01088	184,900
Oil & Gas Pipelines	0.01391	-0.01191	2,730	-0.00956	14,650
Integrated Oil	0.05382	-0.01371	38,040	-0.01850	283,000
Major Banks	0.05303	-0.03075	31,440	-0.02637	254,100

Table II. Average industry concentration in portfolio allocation by country

Table II's first column shows the average weight of US stocks as a portion of institutional investors' total market value. In addition we show the average industry concentration measures in the sample for 2009 for all investor countries' institutional investors. The industry concentration measure is described in detail in section 3.2.2 and equation 5.

Country	US % of MV	US % of foreign MV	Industry Bias	ICI	HHI	Gini
THAILAND	0.3%	44.0%	44.2%	1.6%	4.0%	4.5%
INDIA	0.6%	28.6%	82.4%	13.1%	13.8%	20.0%
POLAND	0.7%	10.4%	94.4%	77.4%	76.5%	79.4%
MEXICO	1.4%	100.0%	99.5%	101.2%	100.0%	99.5%
MALAYSIA	1.9%	9.7%	66.4%	22.9%	24.9%	31.5%
CHILE	2.1%	9.4%	97.7%	97.6%	100.0%	97.7%
ARGENTINA	2.3%	3.1%	80.5%	60.8%	62.5%	62.6%
SINGAPORE	3.7%	8.5%	83.1%	45.2%	47.1%	53.4%
SPAIN	4.7%	10.7%	68.6%	18.7%	21.2%	26.8%
HONG KONG	5.5%	2.6%	73.7%	45.2%	47.0%	50.3%
PORTUGAL	6.8%	14.0%	61.6%	13.9%	15.4%	20.7%
FINLAND	7.3%	14.6%	75.5%	30.0%	31.2%	37.5%
HUNGARY	8.0%	14.1%	67.9%	14.1%	16.4%	23.6%
NORWAY	8.1%	26.6%	64.5%	19.8%	22.0%	26.1%
FRANCE	11.1%	23.2%	68.0%	22.6%	24.9%	30.2%
NEW ZEALAND	11.1%	21.5%	63.2%	50.9%	51.1%	51.9%
SOUTH AFRICA	11.4%	24.0%	77.0%	23.1%	25.6%	31.9%
AUSTRALIA	11.7%	36.8%	83.0%	30.6%	32.6%	39.1%
SWEDEN	12.7%	32.6%	64.4%	30.1%	32.0%	35.1%
ITALY	13.6%	23.5%	57.4%	9.4%	11.6%	14.8%
GERMANY	13.6%	25.6%	73.0%	21.3%	23.1%	28.6%
CZECH REPUBLIC	13.7%	21.2%	60.1%	5.4%	7.7%	10.6%
BELGIUM	14.4%	20.7%	67.9%	16.6%	18.6%	23.6%
TAIWAN	14.8%	87.6%	71.3%	8.0%	9.7%	15.5%
GREECE	15.7%	22.2%	73.8%	25.2%	28.3%	30.9%
AUSTRIA	15.8%	24.2%	67.4%	15.1%	16.3%	22.0%
DENMARK	16.2%	26.3%	60.3%	13.6%	15.8%	19.8%
JAPAN	16.8%	45.9%	46.9%	7.5%	9.4%	13.3%
CANADA	18.4%	32.2%	66.1%	15.7%	17.3%	23.0%
ISRAEL	18.4%	37.8%	92.2%	66.3%	66.3%	76.7%
SWITZERLAND	20.3%	30.4%	72.8%	21.3%	23.2%	28.3%
UNITED KINGDOM	23.8%	23.3%	69.7%	23.4%	24.8%	30.3%
NETHERLANDS	25.0%	38.1%	60.1%	17.9%	19.3%	22.8%
IRELAND	31.6%	38.2%	51.1%	6.5%	8.3%	11.1%
BRAZIL	37.5%	83.1%	83.1%	10.6%	11.3%	15.5%
UNITED STATES	65.2%	N/A	62.6%	13.2%	14.5%	19.7%
Average	13.5%	29.0%	70.9%	28.2%	29.8%	34.1%

Table III. Determinants of US allocation

Table III shows results from OLS regression where the dependent variable is the total US allocation by an institutional investor as a percent of the institutional investor's total portfolio in the first three specifications and the total US allocation by the institutional investor as a percent of the institutional investor's total portfolio that is allocated outside the institutional investor's home country in specifications 4,5, and 6. The dependent variable is constructed from portfolio holdings in the institutional investors in the year-end of 2009. The first set of independent variables includes proxies for information advantage between the investor and the US: geographical distance, and cultural distance between the investor's home country and the US (measure from equation 6). Other independent variables also include market correlation between the investor and the US, logarithm of an institutional investor's market value of equity, real exchange rate differential, logarithms of an investor's home market's GDP per capita and GDP, as well as predicted GDP growth rate from 2007 to 2017. All specifications also include indicator variables for institutional investors' investment style, institutional investor type, and self-reported turnover category. Regressions are run with country clustered standard errors. Absolute values of T-statistics are reported in below the coefficient. (*10% level, ** 5% level, *** 1% level).

Dependent variable	US % of total portfolio	US % of total portfolio	US % of total portfolio	US% of foreign portfolio	US% of foreign portfolio	US% of foreign portfolio
Distance between capitals	0.0101	0.0033		-0.0163	-0.0222	
	2.05**	0.58		0.95	1.31	
Cultural Distance	-0.0313		-0.0296	-0.0274		-0.0302
	3.76***		3.66***	1.66		2.14**
Investor size, log of market value	-0.0319	-0.0326	-0.0316	-0.0257	-0.0263	-0.0261
	2.85***	2.94***	2.84***	5.61***	5.97***	5.46***
Market correlation	-0.1128	-0.1622	-0.0846	0.1813	0.1382	0.1356
	1.16	1.31	0.87	1.33	0.89	1.02
Real exchange rate differential	-0.0007	0.0005	-0.0009	-0.0051	-0.0041	-0.0049
	1.24	0.69	1.47	7.59***	5.25***	5.89***
Investor GDP per capita	0.0330	0.0439	0.0311	-0.0142	-0.0047	-0.0111
	2.04**	1.83*	1.87*	0.56	0.15	0.43
Investor GDP	-0.0168	-0.0026	-0.0183	-0.0393	-0.0268	-0.0370
	1.99*	0.31	2.04**	3.82***	3.28***	2.96***
GDP growth	-0.0052	-0.0091	-0.0047	-0.0160	-0.0194	-0.0168
	0.42	0.57	0.38	0.98	0.97	1.00
Constant	0.7427	0.5962	0.8231	1.5832	1.4551	1.4530
	4.52***	2.51**	4.73***	4.47***	3.46***	4.37***
Observations	1,187	1,187	1,187	1,187	1,187	1,187
Adjusted R^2	0.1813	0.1775	0.1817	0.2323	0.2258	0.2310

Table IV. Determinants of industry concentration in US securities

Table IV shows the results from OLS and TOBIT regressions where the dependent variables include several industry concentration measures for institutional investors' US holdings or deviations from in industry benchmark portfolios. In panel A, we compute the industry concentration measure based on equation 5, or as the percentage of non US institutional investors' portfolio that should be reallocated for perfect diversification. In panel B, the dependent variables include the industry concentration based on Gini index, ICI measure, and Herfindahl (HHI) index. The first set of independent variables includes proxies for information advantage between the investor and the US: The geographical distance, and cultural distance between the investor's home country and the US (measure from equation 7). Independent variables also include a logarithm of an institutional investor's market value of equity, percent of the institutional investor's holdings in US securities, in some specifications the predicted allocation to US securities estimated in table 3, real exchange rate differential, logarithms of an investor's home market's GDP per capita and GDP as well as the predicted GDP growth from 2007 to 2017. All specifications also include indicator variables for institutional investors' investment style, institutional investor type, self-reported turnover category and years. Regressions are run with country clustered standard errors. Absolute values of T-statistics are reported in parentheses below the coefficient. (*10% level, ** 5% level, *** 1% level).

Panel A: Industry concentration measure

Geog. Distance	0.0277	0.0271	0.0277	0.0271			0.0278	0.0109	0.0277	0.0102		
	4.04***	3.90***	4.22***	4.07***			4.05***	1.49	4.24***	1.48		
Cult. Distance	-0.0001	-0.0003			0.0051	0.0048	-0.0002	-0.0033			0.0051	-0.0012
	0.01	0.03			0.46	0.43	0.01	0.32			0.46	0.10
% in the US	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
	0.71		0.71		0.61		0.70		0.70		0.60	
Est. % in the US		0.0031		0.0031		0.0042		0.0869		0.0869		0.0867
		1.80*		1.83*		2.09**		3.30***		3.29***		3.21***
Investor size	-0.0415	-0.0398	-0.0415	-0.0398	-0.0406	-0.0385	-0.0415	0.0032	-0.0415	0.0032	-0.0406	0.0034
	14.29***	12.33***	14.33***	12.18***	12.58***	10.39***	14.33***	0.26	14.37***	0.26	12.61***	0.28
Market correlation	-0.0759	-0.0672	-0.0761	-0.0676	-0.0003	0.0090	-0.0762	0.1648	-0.0764	0.1595	-0.0005	0.1940
	0.81	0.71	0.83	0.73	0.00	0.09	0.81	1.49	0.83	1.46	0.00	1.91*
Real X change diff.	0.0024	0.0023	0.0024	0.0024	0.0020	0.0019	0.0024	-0.0002	0.0025	0.0000	0.0020	-0.0003
	3.56***	3.42***	4.46***	4.22***	2.78***	2.60**	3.58***	0.16	4.48***	0.03	2.80***	0.34
GDP per cap	0.0659	0.0640	0.0659	0.0641	0.0614	0.0590	0.0659	0.0138	0.0659	0.0151	0.0613	0.0122
	3.22***	3.05***	3.06***	2.92***	2.87***	2.68**	3.23***	0.55	3.07***	0.58	2.88***	0.49
GDP	0.0314	0.0306	0.0315	0.0307	0.0282	0.0272	0.0315	0.0086	0.0316	0.0102	0.0283	0.0074
	3.21***	3.15***	4.31***	4.20***	2.61**	2.52**	3.22***	0.87	4.32***	1.31	2.62***	0.70
GDP growth	0.0624	0.0612	0.0624	0.0612	0.0630	0.0614	0.0624	0.0305	0.0623	0.0301	0.0630	0.0308
	5.01***	4.85***	5.13***	4.97***	5.10***	4.89***	5.02***	1.99**	5.14***	2.00**	5.11***	2.13**
Constant	0.3151	0.3255	0.3143	0.3242	0.5299	0.5375	0.3839	-0.9843	0.3833	-0.9957	0.6100	-0.8907
	1.34	1.37	1.27	1.30	2.17**	2.19**	1.55	2.03**	1.50	2.04**	2.42**	1.74*
Observations	8,281	8,281	8,281	8,281	8,281	8,281	8,281	8,281	8,281	8,281	8,281	8,281
OLS/TOBIT	OLS	OLS	OLS	OLS	OLS	OLS	TOBIT	TOBIT	TOBIT	TOBIT	TOBIT	TOBIT
Adjusted R^2	0.3940	0.3941	0.3941	0.3942	0.3889	0.3889						

Panel B: Alternate industry concentration measures

Dependent variable	ICI	ICI	HHI	HHI	Gini	Gini
Geographical Distance	0.0662		0.0662		0.0604	
	9.85***		9.94***		9.42***	
Cultural Distance		0.0319		0.0340		0.0289
		1.91*		2.07**		1.82*
% in the US	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003
	7.25***	9.06***	6.68***	8.39***	5.66***	7.13***
Investor size	-0.0254	-0.0237	-0.0252	-0.0235	-0.0256	-0.0240
	6.97***	5.77***	7.07***	5.84***	7.47***	6.16***
Market correlation	-0.1156	0.0199	-0.1092	0.0214	-0.1142	0.0100
	0.87	0.10	0.85	0.11	0.92	0.06
Real X change diff.	0.0025	0.0024	0.0024	0.0024	0.0026	0.0025
	3.02***	1.94*	3.01***	1.97*	3.41***	2.13**
Investor GDP per cap	0.1002	0.0981	0.0972	0.0961	0.1005	0.0985
	2.56**	2.48**	2.58**	2.53**	2.87***	2.78***
Investor GDP	0.0373	0.0403	0.0353	0.0394	0.0386	0.0412
	3.60***	2.02*	3.47***	2.03*	3.82***	2.18**
Investor GDP growth	0.1007	0.0993	0.0983	0.0967	0.0985	0.0973
	6.03***	5.37***	6.04***	5.33***	6.17***	5.70***
Constant	-1.0655	-0.6996	-0.9908	-0.6406	-0.9665	-0.6307
	2.84***	1.92*	2.73***	1.83*	2.84***	1.92*
Observations	8,281	8,281	8,281	8,281	8,281	8,281
OLS/TOBIT	OLS	OLS	OLS	OLS	OLS	OLS
Adjusted R^2	0.2049	0.1924	0.2002	0.1880	0.2165	0.2053

Table V. Change in industry concentration

Table V shows results of several panel regressions, where the dependent variable is institutional investors' industry concentration in given quarter from 4:1999 to 4:2009. We repeat the analysis separately for US institutional investors (specifications 1 and 2), for foreign institutional investors (specifications 3-7), and for all institutional investors (specification 8). The *Date* contains the time dimension of the panel variable and *Trend* is the common trend, i.e. the earlier date is equal 1 and the last date equal to 41. In specifications 5-7 we also include interaction terms between *Date* and both cultural and geographical distance as well as geographical distance quintile. In the interaction terms, *Distance* is the geographical distance in logarithm between the institutional investors' home market and the US and the *Cultural Distance* is the cultural distance between institutional investors' home market and the US. In specification 8, we include an interaction variable between foreign investor indicator variable that takes in value of one for all foreign institutional investors and zero otherwise and the common trend. All regressions are run with investor fixed effects and with investor clustered errors. (* significant at 10%, ** significant at 5%, *** significant at 1% level).

	US institutions		Foreign institutions					All
	1	2	3	4	5	6	7	8
Date	-0.0002		-0.0006		0.0001	-0.0001	-0.0005	
	2.38**		2.32**		0.04	0.17	1.53	
Trend		-0.0002		-0.0005				-0.0002
		9.92***		8.82***				2.34**
Date * Distance					-0.0001			
					0.24			
Date * Distance qt						-0.0001		
						0.75		
Date * Cultural Dist.							-0.0001	
							0.19	
Foreign * Trend								-0.0003
								1.18
Constant	0.6147	0.6132	0.69	0.6824	0.6901	0.6903	0.69	0.6319
	282.68***	1418.32***	104.19***	671.70***	104.17***	104.54***	104.40***	413.96***
Observations	81,288	81,288	30,037	30,037	30,037	30,037	30,037	111,325
Number of groups	2,897	2,897	1,366	1,366	1,366	1,366	1,366	4,263
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Errors	clustered		clustered		clustered	clustered	clustered	clustered

Table VI. Returns to 25 portfolios sorted on industry concentration and distance

Table VI summarizes the abnormal returns from the Carhart four-factor model for portfolios of institutional investors from 1999:4 to 2010:1 formed based on information proxies and institutional investors' industry concentration. In panel A, we divide the sample into 25 portfolios based on geographical distance between institutional investors' home country and the US and based on the industry concentration of institutional investors' US holdings (from equation 5). Panel B repeats the analysis while using cultural distance as a proxy for information. In panel C we form 25 portfolios that are sorted based on industry concentration and based on US portfolio weight. The returns are computed on quarterly basis. First we compute each institutional investor's value-weighted performance of its US holdings from time t+1 to t+3 of those stocks that the institutional investor holds in time t (see equation 9). Each portfolio's performance is the equally weighted average of the institutional investors' excess returns that belong to that portfolio. The table also reports differences in the abnormal returns between the quintiles of foreign institutional investors closest and farthest from the US. Similarly, by quintile, the table reports abnormal return differentials between portfolios of institutional investors with the most diversified and most concentrated industry portfolios (* significant at 10%, ** significant at 5%, *** significant at 1% level).

Panel A: 25 Industry concentration/geographical distance portfolios

			Industry concentration					
			Low	2	3	4	High	small-big
	US		-0.0003	0.0006	0.0044 **	0.0109 ***	0.0173 ***	0.0176 ***
			-0.18	0.30	2.40	3.33	3.37	5.91
Quintile: Distance from the US	close	1	0.0063 *	0.0113 *	0.0165 **	0.0286	0.0323 ***	0.0260 ***
			1.68	1.89	2.32	1.64	2.79	3.96
		2	0.0002	0.0015	0.0020	0.0055	0.0005	0.0003
			0.10	0.42	0.50	1.44	0.06	0.08
		3	0.0000	0.0079	0.0030	0.0030	0.0168	0.0168 **
			0.00	0.85	0.84	0.45	0.86	2.62
		4	0.0001	0.0002	0.0030	0.0063	0.0135	0.0133
			0.05	0.08	0.84	1.58	1.60	0.02
	far	5	-0.0013	-0.0055	-0.0006	0.0108	0.0091	0.0104
			-0.61	-0.65	-0.27	1.07	0.39	1.47
		far-close	-0.0076 ***	-0.0168 **	-0.0171 ***	-0.0178	-0.0232	
			-2.67	-2.36	-4.24	-1.34	-1.41	

Panel B: 25 Industry concentration/cultural distance portfolios

			Industry concentration					
			Low	2	3	4	High	high-low
	US		-0.0003	0.0006	0.0044 **	0.0109 ***	0.0173 ***	0.0176 ***
			-0.18	0.30	2.40	3.33	3.37	5.91
Quintile: Cultural distance from the US	close	1	0.0002	0.0005	0.0008	0.0062	0.0006	0.0005
			0.08	0.15	0.19	1.62	0.07	0.11
		2	0.0064 *	0.0120 *	0.0161 **	0.0288 *	0.0275 **	0.0211 ***
			1.77	1.75	2.24	1.65	2.23	3.15
		3	0.0009	-0.0016	0.0030	0.0061	0.0226 *	0.0217 ***
			0.32	-0.52	0.87	1.29	1.72	3.49
		4	-0.0007	0.0085	0.0054 *	0.0047	0.0230	0.0237
			-0.38	1.22	1.84	0.63	1.09	0.03
	far	5	-0.0017	0.0003	0.0000	0.0052	0.0004	0.0021
			-0.79	0.06	0.00	1.12	0.03	0.40
		far-close	-0.0018	-0.0003	-0.0008	-0.0010	-0.0002	
			-0.87	-0.07	-0.23	-0.25	-0.02	

Panel C: 25 Industry concentration/US weight portfolios

			US weight					
			Low	2	3	4	High	high-low
Industry concentration	low	1	0.0012	0.0132	0.0015	0.0025	-0.0012	-0.0024
			0.50	0.88	0.32	0.77	-0.61	-1.10
		2	0.0124	0.0014	0.0057	0.0022	0.0003	-0.0121 *
			0.74	0.43	1.40	0.72	0.11	-1.68
		3	-0.0013	0.0063 *	0.0023	0.0056	0.0015	0.0028
			-0.33	1.70	0.77	1.50	0.42	0.75
		4	0.0180	0.0113 **	0.0157 *	0.0065 *	0.0021	-0.0159
			1.27	2.55	1.81	1.72	0.43	-0.04
	high	5	0.0087	0.0057	0.0063	0.0089	0.0111	0.0024
			0.62	0.56	0.82	1.34	1.11	0.20
		high-low	0.0075	-0.0076	0.0048	0.0064	0.0123 ***	
			1.28	-0.62	0.79	1.38	2.77	

Table VII. Determinants of institutional investors' abnormal returns

Table VII shows results from OLS regressions that test for determinants of institutional investors' abnormal performance in US securities from 1999:4 to 2010:1. Abnormal return is the Carhart's 4-factor regression alpha for each institutional investor. The institutional investors' US portfolio returns are computed on quarterly basis. We compute each institutional investor's value-weighted performance of its US holdings from time t+1 to t+3 of those stocks that the institutional investor holds in time t (see eq. 9). The independent variables include the industry concentration measure (from eq. 5), institutional investors' weight of the US securities as a share of their total portfolio value, institutional investors' total market value, and an indicator variable equal to one if the institutional investor is domiciled in the US and zero otherwise. In panels A and B we include only institutional investor level explanatory variables. Panel A and B repeat the same analysis for foreign institutional investors and US institutional investors respectively. In panel C, we include only the foreign institutional investorS. The explanatory variables include investors' home country controls as well as home country –US specific control variables. We also include interaction terms in some specifications. The regressions are run with either no fixed effects, or with country, investor type, or investor style fixed effects. All errors are robust, Specifications 1, 3, and 4 of each panels A and C are run with country clustered errors. (* significant at 10%, ** significant at 5%, *** significant at 1% level).

Panel A

	Foreign Institutional investors				
US %	-0.0001	-0.0001	-0.0001	-0.0001	0.0199
	2.39**	2.65**	2.67**	2.72**	2.14**
log, market value	0.0009	0.0003	0.0003	0.0003	0.0007
	2.25**	0.89	0.89	0.96	1.89*
Industry concentration	0.0212				0.0264
	4.29***				5.25***
ICI		0.0097			
		2.55**			
HHI			0.0094		
			2.49**		
Gini				0.0109	
				2.79***	
Industry concentration* US %					-0.0330
					2.15**
Constant	-0.0237	0.0005	0.0004	-0.0010	-0.0257
	2.09**	0.06	0.05	0.12	2.19**
Observations	1,243	1,243	1,243	1,243	1,243
Adjusted R^2	0.0354	0.0241	0.0232	0.0259	0.0414

Panel B

	US Institutional investors				
US %	-0.0001	-0.0001	-0.0001	-0.0001	0.0017
	0.80	0.69	0.69	0.70	1.82*
log, market value	0.0013	0.0009	0.0009	0.0009	0.0013
	6.03***	4.19***	4.19***	4.32***	6.04***
Industry concentration	0.0166				0.0149
	6.91***				5.71***
ICI		0.0051			
		1.53			
HHI			0.0047		
			1.42		
Gini				0.0061	
				1.99**	
Industry concentration* US %					0.0020
					1.76*
Constant	-0.0458	-0.0240	-0.0240	-0.0254	-0.0442
	8.78***	5.73***	5.67***	5.98***	8.30***
Observations	2,702	2,702	2,702	2,702	2,702
Adjusted R^2	0.0612	0.0458	0.0455	0.0470	0.0697

Panel C

US %	-0.0001	-0.0001	-0.0001	0.0208	0.0235
	1.61	1.58	1.97*	1.92*	2.01*
log, market value	0.0014	0.0014	0.0009	0.0012	0.0008
	3.99***	3.75***	2.81***	3.48***	2.22**
Industry concentration	0.0257	0.0259	0.0219	0.0922	0.0327
	5.16***	4.98***	5.28***	4.11***	3.61***
Cultural Distance	-0.0022		-0.0034		-0.0003
	2.92***		2.42**		0.14
Geog. Distance	-0.0071	-0.0076		-0.0026	
	13.84***	13.03***		1.52	
Industry concentration* US %				-0.0345	-0.0389
				1.93*	2.02*
Industry concentration* geo dist				-0.0070	
				2.58**	
Industry concentration* cult dist					-0.0043
					1.25
Market correlation	0.0123	0.0088	-0.0067	0.0077	-0.0078
	1.84*	1.13	0.40	0.93	0.46
Real X change Diff	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001
	3.78***	2.95***	0.98	2.29**	0.59
GDP growth	-0.0009	-0.0012	-0.0010	-0.0013	-0.0010
	1.08	1.18	0.66	1.11	0.69
log, GDP per capita	-0.0042	-0.0034	-0.0028	-0.0032	-0.0027
	1.43	1.15	0.79	1.08	0.74
log GDP	-0.0025	-0.0015	-0.0014	-0.0014	-0.0014
	2.82***	1.93*	0.97	1.71*	0.92
Constant	0.0757	0.0652	0.0255	0.0172	0.0174
	2.66**	2.15**	0.71	0.50	0.46
Observations	1,243	1,243	1,243	1,243	1,243
Adjusted R^2	0.0766	0.0730	0.0435	0.0802	0.0517